1995

METROPOL EĞİTİM KURUMLARI

YÖS

YABANCI ÖĞRENCİ SINAVLARI
FOREIGN STUDENT EXAMINATIONS

MATEMATİK 2
MATHEMATICS

SORU BANKASI
QUESTION BANK

1098 Alıştırma Sorusu
Exercise Questions

Test Sorusu 2382
Test Questions

256 YÖS Sorusu
YÖS Questions

Türkiye'de ve Dünyada!
In Turkey and Around the World!

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7. Baskı - 7th Edition

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ÖNSÖZ

Değerli öğrenciler,

Metropol Eğitim Kurumları, 1995'den bugüne üniversite giriş sınavlarına hazırlanan öğrencilere kurs, yayın ve rehberlik hizmetleri sunan, Türkiye'de ve Dünyanın farklı ülkelerinde şube ve temsilcilikleri bulunan uluslararası bir eğitim kurumları zinciridir.

Kurumlarımız, Türkiye üniversitelerinin gerçekleştirdikleri Yurtdışından Öğrenci Kabul Sınavları ya da bilinen adıyla Yabancı Uyruklu Öğrenci Sınavlarına (YÖS) hazırlanan ve bu üniversitelerde yüksek öğrenim görmeyi hedefleyen yabancı uyruklu ve T.C. vatandaşı öğrencilere kurs, yayın ve danışmalık hizmetleri vermektedirler.

Türkiye'nin önde gelen üniversitelerinin düzenledikleri bu sınavlarda (YÖS), Temel Öğrenme Becerileri Testi ve Türkçe Yeterlilik Testi olmak üzere iki ayrı test yer almaktadır. Sınavlardaki Türkçe testleri, sınava katılan öğrencilerin Türkçe dil yeterliliklerini ölçmek için uygulanmakta olup, yerleştirme puanlarını etkilememektedir. Temel Öğrenme Becerileri Testleri ise sınavların değerlendirmelerinde ve üniversitelere kabul aşamalarında dikkate alınmakta ve yerleştirmeler bu testlerin sonuçlarına göre yapılmaktadır.

Bu nedenle, sınavlarda başarılı olabilmek için öncelikle Temel Öğrenme Becerileri Testlerinde baraj olarak belirlenen puanları aşmanız ve hedeflediğiniz puanlara ulaşmanız gerekmektedir.

Sınavlardaki Temel Öğrenme Becerileri Testlerinde Genel Yetenek (IQ), Matematik ve Geometri soruları yer almakta olup; bu testlerin ortalama olarak % 40'ının Matematik sorularından oluştuğu dikkate alındığında, bu soruları doğru yanıtlamanız sınavların başarı sıralamalarında öne çıkmanızı sağlayacaktır.

Türkiye'nin seçkin üniversitelerinde öğrenim görebilme şansını yakalayabilmek için YÖS hazırlık kurslarımıza katılmanızı ve yayınlarımızı hazırlamış olan, alanında uzman ve deneyimli öğretmenlerimizden destek almanızı öneririz.

Tüm YÖS adaylarına başarılar dileriz!

PREFACE

Dear students,

Metropol Educational Institutions are a group of international educational institutions since 1995 which have been offering services such as training, publications and consultancy to students who are studying for the university entrance exam and which have branches and representations in Turkey and different countries in the world.

Our Institutions provide courses, publications and consultancy services to foreign and Turkish students who are preparing for the Foreign Students Acceptance Exams alias Foreign Students Exams (YÖS) which are held by the universities in Turkey.

In these exams (YÖS) held by the renowned universities in Turkey, there are two separate tests; Basic Learning Skills Test and Turkish Language Test. The Turkish Language Tests applied in the exams are intended to measure the Turkish language skills of the students who enter the exam and it does not effect on the placement score. The Basic Learning Skills Test is taken into consideration in the evaluation processes of the exams and in the acceptance processes by the universities; the placements are performed according to the results of these tests.

Therefore, in order to be successful in the exams, first of all you need to get higher scores than the base point determined for the Basic Learning Skills Test and reach the scores that you have targeted.

The Basic Learning Skills Tests include Intelligent Quotient (IQ), Mathematics and Geometry questions; considering that Mathematics comprises of the 40% of the questions averagely, giving the correct answers to these questions enables you to come to the forefront in the success ratings of these tests.

We suggest that you participate in YÖS preparation courses and obtain support from expert and experienced teachers who prepare the publications in order to have the chance to receive education in the respected universities of Turkey.

We wish luck to all YÖS candidates!

METROPOL EĞİTİM KURUMLARI
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BÖLÜM CHAPTER 1

TARİHSEL NOT / HISTORICAL NOTE

CAHİT ARF [1910 - 1997]

Türk matematikçi ve bilim insanı, TÜBİTAK Bilim Kolu eski başkanı. Cebir konusundaki çalışmalarıyla dünyaca ün kazanmıştır. Cisimlerin kuadratik formlarının sınıflandırılmasında ortaya çıkan değişmezlere ilişkin ARF değişmezi ve ARF halkaları gibi literatürde adıyla anılan çalışmaların yanı sıra "Hasse-ARF Teoremi" adı ile anılan teoremi matematik bilimine kazandırmıştır. Cahit ARF, matematiği bir meslek dalı olarak değil, bir yaşam tarzı olarak görmüştür. Öğrencilerine sürekli: "Matematiği ezberlemeyin, kendiniz yapın ve anlayın." demiştir.

Turkish mathematician and scientist. Former chairman of the TUBITAK Science Branch. His work on algebra has gained worldwide fame. In addition to the studies in the literature such as the Arf invariant and Arf rings related to the invariants that emerged in the classification of quadratic forms of the objects, he introduced the theorem called "Hasse-Arf Theorem" to mathematical science. Cahit Arf saw mathematics as a lifestyle rather than a profession. He constantly told his students: "Do not memorize the math, do it yourself and understand it."

POLİNOMLAR
POLYNOMIALS

Bu bölüm 64 alıştırma sorusu, 176 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 64 exercise questions, 176 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 1

POLİNOMLAR / POLYNOMIALS

1. P(x) bir polinomdur.

P(x) is a polynomial.

$P(x) = 4 \cdot x^{\frac{m+6}{m}} + 2x - 1$

$\Rightarrow \sum m = ?$

Yanıt / The Answer is 6

2. P(x) bir polinomdur.

P(x) is a polynomial.

$P(x) = x^{\frac{12}{m}} + x^{m-4} - 3x + 1$

$\Rightarrow \sum m = ?$

Yanıt / The Answer is 22

3. $der[P(x)] = 6$

$der[Q(x)] = 3$

$\Rightarrow der[Q(x) + P(x)] = ?$

Yanıt / The Answer is 6

4. $der[P(x)] = 5$

$der[Q(x)] = 3$

$\Rightarrow der[P(x) \cdot Q(x)] = ?$

Yanıt / The Answer is 8

5. $der[P(x+1)] = 8$

$der[2 \cdot Q^2(x)] = 4$

$\Rightarrow der\left[\frac{P(x)}{Q(x)}\right] = ?$

Yanıt / The Answer is 6

6. $der[P(x)] = 2$

$der[Q(x)] = 4$

$\Rightarrow der\left[\frac{Q^2(x)}{P(x)}\right] = ?$

Yanıt / The Answer is 6

7. $der[P(x)] = 3$

$der[Q(x)] = 4$

$\Rightarrow der[P^2(x) \cdot Q(x)] = ?$

Yanıt / The Answer is 10

8. $der[P(x) \cdot Q(x^2)] = 9$

$der\left[\frac{P(x)}{Q(x)}\right] = 3$

$\Rightarrow der(P(x) + Q(x)) = ?$

Yanıt / The Answer is 5

9. $P(x) = x^3 - x + 1$

$\Rightarrow$ **$P(2) = ?$**

Yanıt / The Answer is 7

10. $P(x+1) = x^2 - 4x + 1$

$\Rightarrow$ **$P(-1) = ?$**

Yanıt / The Answer is 13

11. $P(3x-1) = x^2 - x$

$\Rightarrow$ **$P(5) = ?$**

Yanıt / The Answer is 2

12. $P(5x-10) = 2x^3 + x - 1$

$\Rightarrow$ **$P(0) = ?$**

Yanıt / The Answer is 17

13. $P(x-2) = x^2 + 5x - 1$

$\Rightarrow$ **$P(2) - P(-2) = ?$**

Yanıt / The Answer is 36

14. $P(x+3) = x^2 - 2x + 4$

$\Rightarrow$ **$P(2) - P(-1) = ?$**

Yanıt / The Answer is −21

15. $P(x) = x^2 + 4x + 4$

$\Rightarrow$ **$P(\sqrt{2} - 2) = ?$**

Yanıt / The Answer is 2

16. $P(x-3) = x^2 - 4x + 3$

$\Rightarrow$ **$P(x) = ?$**

Yanıt / The Answer is $x^2 + 2x$

17. $P(2-x) = x^2 + 2x + 1$
$\Rightarrow$ **$P(x) = ?$**

Yanıt / The Answer is $(3-x)^2$

18. $P(2x-1) = x^2 - 3x + 1$
$\Rightarrow$ **$P(2x+3) = ?$**

Yanıt / The Answer is x^2+x-1

19. $P(x^2) = 4x^6 + 3x^4 - 2x^2 + 1$
$\Rightarrow$ **$P(x) = ?$**

Yanıt / The Answer is $4x^3+3x^2-2x+1$

20. $P(x^3-1) = 2(x^3-1)^2 - x^3 + 3$
$\Rightarrow$ **$P(x) = ?$**

Yanıt / The Answer is $2x^2 - x + 2$

21. $\dfrac{P(x-1)}{x+5} = 3 \cdot Q(x) - 11$
$P(4) = 10 \Rightarrow$ **$Q(5) = ?$**

Yanıt / The Answer is 4

22. $P(x+1) - Q(x-2) = x^2 - x - 4$
$P(-1) = 3 \Rightarrow$ **$Q(-4) = ?$**

Yanıt / The Answer is 1

23. $P(x) = (m-1)x^3 - 4x^2 - (2n+1)x + 5$
$Q(x) = kx^2 + 3x - r$
$P(x) = Q(x) \Rightarrow$ **$m + n + k + r = ?$**

Yanıt / The Answer is -10

24. $P(x) + P(x-1) = 4x - 6$
$\Rightarrow$ **$P(x) = ?$**

Yanıt / The Answer is $2x - 2$

25. $P(x) = x^3 - 3x^2 + 2x + 6$

$Q(x) = -x^3 + 3x - 1$

$\Rightarrow$ **$P(x) - Q(x) = ?$**

Yanıt / The Answer is $2x^3 - 3x^2 - x + 7$

26. $P(x+1) = x^2 + 2x + 1$

$Q(x-2) = x^2 - 4x + 4$

$\Rightarrow$ **$P(x) + Q(x) = ?$**

Yanıt / The Answer is $2x^2$

27. $P(x) = x^3 - 2$

$Q(x) = x + 2$

$\Rightarrow$ **$P(x) \cdot Q(x) = ?$**

Yanıt / The Answer is $x^4 + 2x^3 - 2x - 4$

28. $(x-2) \cdot (x^2 + mx - 2) = x^3 + nx^2 - 8x + 4$

$\Rightarrow$ **$m + n = ?$**

Yanıt / The Answer is 4

29. $\dfrac{2x-1}{x^2-3x-4} = \dfrac{A}{x-4} + \dfrac{B}{x+1}$

$\Rightarrow$ **$A + B = ?$**

Yanıt / The Answer is 2

30. $\dfrac{4x-2}{x^2-5x+6} = \dfrac{A}{x-3} + \dfrac{B}{x-2}$

$\Rightarrow$ **$A + B = ?$**

Yanıt / The Answer is 4

31. $\dfrac{5x-2}{x^2-4} = \dfrac{A}{x-2} + \dfrac{B}{x+2}$

$\Rightarrow$ **$A - 2B = ?$**

Yanıt / The Answer is -4

32. $x^3 - 2x^2 + x - 1 \;\big|\; x+1$

$\underline{-\qquad\qquad}\;\big|\; Q(x)$

-5

$\Rightarrow$ **$Q(x) = ?$**

Yanıt / The Answer is $x^2 - 3x + 4$

33. $x^6 + x^4 - 2x^2 + 2 \,\big|\, x^4 + 1$

$-$

$K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is $-3x^2+1$

34. $P(x) = x^4 - 3x - 2$

$P(x) \,\big|\, x+1$

$-$

$K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is 2

35. $P(x) = 4x^2 - 4x + 1$

$P(x-1) \,\big|\, x+1$

$-$

$K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is 25

36. $P(2x-3) = 4x^2 - 10x + 3$

$P(x-2) \,\big|\, x-3$

$-$

$K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is −1

37. $P(x-1) = x^3 - 2x^2 + 2$

$P(x+2) \,\big|\, x-1$

$-$

$K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is 34

38. $P(x+1) = x^3 - 5x^2 + kx - 1$

$P(x) \,\big|\, x-2$

$-$

0

$\Rightarrow$ **k = ?**

Yanıt / The Answer is 5

39. $P\left(\frac{x}{9}\right) = \frac{1}{3}x^2 + \frac{1}{27}x - \frac{1}{9}$

$P(x) \,\big|\, x - \frac{1}{3}$

$-$

$K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is 3

40. $x^4 + kx^3 - mx^2 + 5x + 3 \,\big|\, x^2 - 1$

$-$

0

$\Rightarrow$ **k + m = ?**

Yanıt / The Answer is −1

41. $P(x)\,\big|\,x-1$ $\quad$ $P(x)\,\big|\,x+3$ $\quad$ $P(x)\,\big|\,(x-1)\cdot(x+3)$ $\Rightarrow$ **K(x) = ?**

$\underline{\;\;}\,7$ $\quad$ $\underline{\;\;}\,-1$ $\quad$ $\underline{\;\;}\,K(x)$

Yanıt / The Answer is 2x+5

42. $P(3x) = (x^2+2x)\cdot Q(x-1) + x - 2$

$P(x)\,\big|\,x-6$ $\quad$ $Q(x)\,\big|\,x-1$ $\Rightarrow$ **K(x) = ?**

$\underline{\;\;}\,4$ $\quad$ $\underline{\;\;}\,K(x)$

Yanıt / The Answer is $\frac{1}{2}$

43. $(x-1)\cdot P(x+1) = x^3 - ax + 2$

$\Rightarrow$ **P(2) = ?**

Yanıt / The Answer is 0

44. $P(x)\,\big|\,Q(x)$ $\quad$ $Q(x)\,\big|\,x-1$ $\quad$ $P(x)\,\big|\,x-1$ $\Rightarrow$ **K(x)=?**

$\underline{\;\;}\,4x+2$ $\quad$ $\underline{\;\;}\,K(x)$

Yanıt / The Answer is 6

45. $P(x-2) = x^3 + 4x^2 - 5x + 2$

$P(x+1)\,\big|\,x-1$ $\Rightarrow$ **K(x)=?**

$\underline{\;\;}\,K(x)$

Yanıt / The Answer is 110

46. $\dfrac{P(x-2)}{Q(x+2)} = 4x - 8$

$Q(x)\,\big|\,x-5$ $\quad$ $P(x)\,\big|\,x-1$ $\Rightarrow$ **K(x) = ?**

$\underline{\;\;}\,3$ $\quad$ $\underline{\;\;}\,K(x)$

Yanıt / The Answer is 12

47. $P(x)\,\big|\,x^2-5x+6$ $\quad$ $P(x)\,\big|\,x-3$ $\Rightarrow$ **K(x) = ?**

$\underline{\;\;}\,2x-1$ $\quad$ $\underline{\;\;}\,K(x)$

Yanıt / The Answer is 5

48. $P(x)\,\big|\,x^2-1$ $\quad$ $P(x)\,\big|\,x-1$ $\Rightarrow$ **K(x) = ?**

$\underline{\;\;}\,2x-1$ $\quad$ $\underline{\;\;}\,K(x)$

Yanıt / The Answer is 1

49. $P(x) \,|\, x+2$; -3 ; $Q(x)$ $\qquad$ $Q(x) \,|\, x-1$; -5 ; $P(x)$ $\qquad$ $P(x) \,|\, x^2+x-2$; $-K(x)$ $\Rightarrow$ **K(x)=?**

Yanıt / The Answer is 5x+7

50. $P(x) \,|\, x-1$; -1 ; $Q(x)$ $\qquad$ $Q(x) \,|\, x+1$; -4 ; $P(x)$ $\qquad$ $P(x) \,|\, x^2-1$; $-K(x)$ $\Rightarrow$ **K(x)=?**

Yanıt / The Answer is 4x−5

51. $P(x) = -x^4 + ax^2 + bx - 4$

$P(x) \,|\, x^2-3$; $-3x+11$ $\Rightarrow$ **a+b=?**

Yanıt / The Answer is 11

52. $2x^4 + 3x^2 + ax + b \,|\, x^2 - x - 5$; $-20x+80$ $\Rightarrow$ **a + b = ?**

Yanıt / The Answer is 0

53. $P(x) + P(x+1) = 4x^2 - 6x + 5$

$\Rightarrow$ **P(x) = ?**

Yanıt / The Answer is $2x^2 - 5x + 4$

54. $P(x-2) = x^3 - 4x^2 + 3x + a$

$P(x+1) = \ldots\ldots + 7x^0$

$\Rightarrow$ **a = ?**

Yanıt / The Answer is 7

55. $\dfrac{P(x-1)}{Q(x+1)} = 3x - 5,$

$Q(x) = \ldots\ldots + 3x^0$

$P(x) \,|\, x+2$; $-K(x)$ $\Rightarrow$ **K(x)=?**

Yanıt / The Answer is −24

56. $P(x) \,|\, x+1$; -8 ; $Q(x)$ $\qquad$ $Q(x) \,|\, x+1$; -12 ; $P(x)$ $\qquad$ $P(x) - Q(x) \,|\, x+1$; $-K(x)$ $\Rightarrow$ **K(x)=?**

Yanıt / The Answer is −4

57. $x^3-2x^2+ax+b \;\big|\; x^2+1$

$\underline{-\quad\quad\quad}\; Q(x)$

0

$\Rightarrow$ **a + b = ?**

Yanıt / The Answer is –1

58. $P(x) \;\big|\; x^2+x-2$ $\quad$ $P(x) \;\big|\; x-1$ $\quad$ $P(x) \;\big|\; x+2$

$\underline{-\quad}$ $3x-2$ $\quad$ $\underline{-\quad}$ b $\quad$ $\underline{-\quad}$ a

$\Rightarrow$ **a + b = ?**

Yanıt / The Answer is –7

59. $P(x)=x\cdot(x-1)\cdot(x-2)\cdot Q(x)+x^2-2x+13,$

$P(x) \;\big|\; x^2-3x+2$

$\underline{-\quad}$ $K(x)$

$\Rightarrow$ **K(x)=?**

Yanıt / The Answer is x+11

60. $P(x-2)+P(x+2)=4x+2,$

$P(x) \;\big|\; x+3$

$\underline{-\quad}$ $K(x)$

$\Rightarrow$ **K(x)=?**

Yanıt / The Answer is –5

61. $P(x-3) \;\big|\; x-1$ $\quad$ $P(x-3) \;\big|\; x-9$ $\quad$ $P(x) \;\big|\; x^2-4x-12$

$\underline{-\quad}$ 27 $\quad$ $\underline{-\quad}$ 3 $\quad$ $\underline{-\quad}$ $K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is –3x + 21

62. $P(x) \;\big|\; x-3$ $\quad$ $P(x) \;\big|\; x-2$ $\quad$ $P(x) \;\big|\; (x-3)\cdot(x-2)$

$\underline{-\quad}$ $2m$ $\quad$ $\underline{-\quad}$ m $\quad$ $\underline{-\quad}$ $K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is mx – m

63. $P(x)=ax^6+2bx^4+3x-5$

$P(x) \;\big|\; x-1$ $\quad$ $P(x) \;\big|\; x+1$

$\underline{-\quad}$ 0 $\quad$ $\underline{-\quad}$ $K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is –6

64. $P(x,y)=(x+y-1)^3-3x-3y,$

$P(x,y) \;\big|\; x+y-1$

$\underline{-\quad}$ $K(x)$

$\Rightarrow$ **K(x) = ?**

Yanıt / The Answer is –3

1. P(x) bir polinomdur.
P(x) is a polynomial.
$P(x) = x^{n-2} + x^{4-n} - 2$
$\Rightarrow$ **n = ?**
A) {2} B) {2,3} C) {2,3,4} D) {2,4} E) {5}

2. $P(x) = x^{n-7} + 2 \cdot x^{8-n} \Rightarrow \sum n = ?$
A) 20 B) 22 C) 23 D) 24 E) 25

3. P(x) bir polinomdur.
P(x) is a polynomial.
$P(x) = x^{\frac{36}{n}} + x^{\frac{n}{4}} + 1 \Rightarrow \sum n = ?$
A) 40 B) 48 C) 52 D) 60 E) 70

4. der [P (x)] = 4,
der [Q (x)] = 3
$\Rightarrow$ **der $[P^2(x) \cdot Q(x^2)]$ = ?**
A) 12 B) 13 C) 14 D) 10 E) 8

5. $P(x) = (x^4 + x^2)^4$
$Q(x) = 3x^3 - 1 \Rightarrow \text{der}\left[\frac{P(x)}{Q(x)}\right] = ?$
A) 13 B) 14 C) 15 D) 16 E) 17

6. $\text{der}[P^2(x) \cdot Q(x)] = 8$
$\text{der}\left[\frac{P(x)}{Q(x)}\right] = 1$
$\Rightarrow \text{der}[P(x) + Q(x)] = ?$
A) 5 B) 4 C) 3 D) 2 E) 1

7. P(x) bir polinomdur.
P(x) is a polynomial.
$P(x) = x^{m-4} + x^{7-m} + 3$
$\Rightarrow \max(\text{der}[P(x)]) = ?$
A) 1 B) 2 C) 3 D) 7 E) 11

8. $\text{der}[P(x) \cdot Q^2(x)] = 6$,
$\text{der}[P^2(x) \cdot Q(x)] = 12$
$\Rightarrow \text{der}[Q(x)] = ?$
A) 1 B) 6 C) 3 D) 0 E) 5

9. $P(x) = (3a-1)x^4 + (b-2)x^3 + 5x^2 - 3$

$der[P(x)] = 2 \Rightarrow \mathbf{a+b=?}$

A) $\frac{4}{3}$ B) $\frac{5}{3}$ C) 2 D) $\frac{7}{3}$ E) 3

10. $P(x) = 3x^5 - 4x^2 + 2$,

$der[P(x)\cdot Q(x)] = 15 \Rightarrow \mathbf{der[x^3\cdot Q(x)] = ?}$

A) 6 B) 8 C) 10 D) 12 E) 13

11. $P(x) = x^5 - 3x^2 - 1$,

$Q(x) = 2x^4 + 5x^3 + 4 \Rightarrow \mathbf{der\left[P^2(x)\cdot Q(x)\right] + der\left[\frac{P(x^3)}{x^2\cdot Q(x)}\right] = ?}$

A) 14 B) 16 C) 20 D) 23 E) 24

12. $n \subset N$,

$der[P(x)] = 7n+3$

$der[Q(x)] = 3n+4$

$der[P(x)\cdot Q(x)] = 27$

$\Rightarrow \mathbf{der[P(x)] = ?}$

A) 9 B) 13 C) 15 D) 17 E) 19

13. $n \subset N$,

$P(x) = x^{\frac{24}{n-2}} + x^{n+3}$

$\Rightarrow \mathbf{max(der[P(x)]) = ?}$

A) 29 B) 27 C) 25 D) 17 E) 11

14. $P(x) = (x^2-x)^m\,(2x^4-1)^2\,(4x^3)$,

$der[P(x)] = 25 \Rightarrow \mathbf{m = ?}$

A) 6 B) 7 C) 8 D) 9 E) 10

15. $der[P^2(x)\cdot Q(x^3)] = 12$,

$der\left[\frac{P(x^3)}{Q^2(x)}\right] = 5 \Rightarrow \mathbf{der[5\cdot P(x) + 2\cdot Q(x)] = ?}$

A) 3 B) 9 C) 10 D) 12 E) 16

16. $der[P(x)] = 4$, $der[Q(x)] = 3$

$\Rightarrow \mathbf{der\left[\frac{P^2(x^3)}{Q(x^2)}\right] = ?}$

A) 18 B) 16 C) 12 D) 9 E) 6

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1	2	3	4	5	6	7	8
C	D	C	C	A	C	C	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	E	D	D	A	B	A	A

1. P(x) bir polinomdur.
P(x) is a polynomial.
$x^4 \cdot P(x) = ax^6 + bx^5 + (a-2)x^3 + (b-a-1)x^2$
$\Rightarrow$ **P(−2) = ?**

A) −2 B) −1 C) 0 D) 1 E) 2

2. $P(x) = 64x^2 - 8x + 21 \Rightarrow$ **P(0) = ?**

A) 21 B) 45 C) 54 D) 64 E) 77

3. $P(3x-6) = x^3 + 4x^2 - 9x - 2$
$\Rightarrow$ **P(0) = ?**

A) −2 B) −1 C) 0 D) 2 E) 4

4. $P(2x+3) = x^2 + 6x + b$,
$P(1) = 10 \Rightarrow$ **b = ?**

A) 5 B) 9 C) 12 D) 15 E) 18

5. $P(x) = (a-3)x^2 - 3ax - 7$,
$P(1) = -4 \Rightarrow$ **P(−2) = ?**

A) −49 B) −36 C) −24 D) −9 E) −1

6. $P\left(\frac{2-3x}{4}\right) = -2x^3 + 2x^2 + ax$,
$P(-1) = 2 \Rightarrow$ **a = ?**

A) 2 B) 3 C) 4 D) 5 E) 6

7. $P(x) = -3x^3 + ax^2 - x + 1$,
$4 \cdot P(1) + P(2) = -5 \Rightarrow$ **a = ?**

A) −4 B) −2 C) 0 D) 2 E) 4

8. $P(x) = (x^3 - 4x + 1)^3 \cdot (x^2 - x + 2)^2$,
$P(1) = A$, $P(0) = B$
$\Rightarrow \frac{A}{B^2} = ?$

A) −4 B) −2 C) 2 D) 4 E) 6

9. $P(x^3) = ax^9 + (a-3)x^8 + (b-2)x^7 + bx^3$,

$9 \cdot P(-1) = -18 \Rightarrow \mathbf{b = ?}$

A) $-\frac{1}{2}$ B) $-\frac{1}{4}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

10. $P(x) = x^3 + 3x^2 + 3x + 1$

$\Rightarrow \mathbf{P(\sqrt[3]{10} - 1) = ?}$

A) 1 B) 5 C) 10 D) 15 E) 20

11. $P(x) = x^3 - 6x^2 + 12x - 8$

$\Rightarrow \mathbf{P(2 + \sqrt[3]{3}) = ?}$

A) −3 B) −1 C) 0 D) 3 E) 9

12. $(x-1) \cdot P(x) = x^4 - ax^2 + 2x + 7$

$\Rightarrow \mathbf{a = ?}$

A) 7 B) 8 C) 10 D) 12 E) 14

13. $(x-3) \cdot P(x) = x^3 - ax^2 - 9$

$\Rightarrow \mathbf{P(3) = ?}$

A) 9 B) 12 C) 15 D) 18 E) 21

14. $(x+1) \cdot P(x+3) = x^3 + ax^2 + bx + 2$

$\Rightarrow \mathbf{P(3) = ?}$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $der[P(x) \cdot Q(x)] = 18$,

$der\left[\frac{P(x^2)}{Q(x)}\right] = 6$

$\Rightarrow \mathbf{der[P(x^2) \cdot Q(2x)] = ?}$

A) 20 B) 24 C) 26 D) 28 E) 30

16. $der[P(x)] = a$,

$der[Q(x)] = b$,

$der[P(x^2) \cdot Q(x^3)] = 17$ ve / and $der\left[\frac{P(x^2)}{Q(x)}\right] = 5$

$\Rightarrow \mathbf{a = ?}$

A) 2 B) 3 C) 4 D) 5 E) 6

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1	2	3	4	5	6	7	8
E	A	E	D	A	D	E	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	C	D	C	C	B	C	C

1. $P(x) = x^2 - 2x^3 + 3x - 3 \Rightarrow \mathbf{P(1) + P(-1) = ?}$

A) -4 B) -3 C) -2 D) -1 E) 0

2. $P(x) = 5x^4 - 2x^3 + x^2 - 8$

$\Rightarrow \mathbf{P(0) = ?}$

A) 8 B) 4 C) 0 D) -4 E) -8

3. $P(x) = x^2 + mx - 3,\ P(-1) = 4 \Rightarrow \mathbf{P(-2) = ?}$

A) 6 B) 8 C) 9 D) 12 E) 13

4. $P(x+3) = x^4 - 2x^2 + 4x + 1 \Rightarrow \mathbf{P(4) = ?}$

A) 4 B) 5 C) 6 D) 7 E) 8

5. $P(x) = (m-2)x^3 + 2x^2 + nx - 5$

$Q(x) = 5x^2 - nx^2 - ax - 5$

$P(x) = Q(x) \Rightarrow \mathbf{m + n + 2a = ?}$

A) -3 B) -1 C) 0 D) 2 E) 6

6. $m, n \in \mathbb{R}$,

$P(x) = x^2 - 2x + 4$,

$Q(x) = (x+1)\cdot(x-m) + n$,

$P(x) = Q(x) \Rightarrow \mathbf{n = ?}$

A) 3 B) 4 C) 5 D) 6 E) 7

7. $P(x^2) = 2x^4 - 3x^2 + 4 \Rightarrow \mathbf{P(2) = ?}$

A) 3 B) 5 C) 8 D) 6 E) 12

8. $P(x) = 3x^{11} - 4x^7 + kx$,

$P(1) = 0 \Rightarrow \mathbf{k = ?}$

A) -11 B) 7 C) 3 D) 1 E) -5

9. $Q(x) = 2x^2 - 5a + 2$,
$Q(2) = 0 \Rightarrow$ **a = ?**

A) 2 B) −3 C) 4 D) 5 E) −6

10. $P(x-3) = (x^2+x-2) \cdot Q(x+1)$,
$P(1) = 9 \Rightarrow$ **Q(5) = ?**

A) −2 B) −1 C) $\frac{1}{2}$ D) 1 E) $\frac{2}{3}$

11. $\frac{2x+2}{x^2-2x-8} = \frac{A}{x-4} + \frac{B}{x+2} \Rightarrow$ **A + B = ?**

A) 2 B) 3 C) 4 D) 5 E) 6

12. $\frac{x+3}{(x+2)^2} = \frac{A}{x+2} + \frac{B}{(x+2)^2} \Rightarrow$ **A + B = ?**

A) −1 B) −2 C) 0 D) 1 E) 2

13. $P(x) + (x+1) \cdot Q(x-2) = x^2 - 4x - 8$,
$P(2) = 6 \Rightarrow$ **Q(0) = ?**

A) −5 B) −6 C) −7 D) −8 E) −9

14. $P(x+3) = (2x^2-3) \cdot Q(x+2) + x + 2$,
$Q(0) = 11 \Rightarrow$ **P(1) = ?**

A) 11 B) 22 C) 40 D) 55 E) 66

15. $P(2x-3) = 2x^3 - 3 \cdot Q(x-2) + 1$,
$P(1) = -4 \Rightarrow$ **Q(0) = ?**

A) 7 B) 9 C) 11 D) 13 E) 15

16. $P(2x+a) \cdot Q(x-1) = x^3 - 5x^2 + 18$ ve / and $P(a) = 6$
$\Rightarrow$ **Q(−1) = ?**

A) 3 B) 4 C) 5 D) 6 E) 8

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1	2	3	4	5	6	7	8
A	E	E	A	B	E	D	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	C	A	E	B	D	A	A

1. $(x-2)\cdot P(x) = x^2 - 3x - a$

$\Rightarrow$ **$P(2) = ?$**

A) 1 B) −1 C) 2 D) −2 E) 0

2. $x^2 - 2x + a = (x+1)\cdot P(x)$

$\Rightarrow$ **$P(2) = ?$**

A) −2 B) −1 C) 0 D) 4 E) 5

3. $P(x) = x^3 + 2x^2 - 2ax - 1$

$P(1) = 0 \Rightarrow$ **$a = ?$**

A) 1 B) 3 C) 5 D) 7 E) 9

4. $(x-1)\cdot P(x) = ax^2 + 2x - b,$

$P(0) = 1$

$\Rightarrow$ **$a + b = ?$**

A) 4 B) 3 C) 2 D) 1 E) 0

5. $(x-3)\cdot P(x+1) = Q(x+2) + x^2 - x + m$

$P(0) = -2,\ Q(1) = 6 \Rightarrow$ **$m = ?$**

A) 3 B) 0 C) −1 D) −2 E) −4

6. $P(x) = (x^2+1)\cdot(5x-2)\cdot(ax+b),$

$P(0) = 4,\ P(1) = 6 \Rightarrow$ **$a - b = ?$**

A) 3 B) 4 C) 5 D) 6 E) 9

7. $P(x) = x^3 - ax + 3,$

$Q(x) = x^2 - 4x + a,$

$P(2) = Q(2) \Rightarrow$ **$a = ?$**

A) 3 B) 4 C) 5 D) 6 E) 9

8. $P(x) = 3x^4 - 5x^2 + (a-3)x - b + 4$

$Q(x) = (c-1)x^4 + (2d+1)x^2 + 3$

$P(x) = Q(x) \Rightarrow$ **$a + b - c + d = ?$**

A) −3 B) −2 C) 0 D) 2 E) 3

9. $P(x) = x^5 + ax^4 - 2x^3 + bx^2 + 7x - 2$,

$Q(x) = (cx^3 - x + 2) \cdot (x^2 + 3x - 1)$,

$P(x) = Q(x) \Rightarrow \mathbf{a + b + c = ?}$

A) -2 B) -1 C) 1 D) 3 E) 5

10. $P(x-3) = x^2 - 6x + 10$

$\Rightarrow \mathbf{P(x) = ?}$

A) $x^2 - 3$ B) $x^2 - 2$ C) $x^2 - 1$ D) $x^2 + 1$ E) $x^2 + 16$

11. $P(3x-2) = 6x - 5 \Rightarrow \mathbf{P(x+1) = ?}$

A) $2x - 2$ B) $2x - 1$ C) $2x$ D) $2x+1$ E) $2x+2$

12. $P(1-x) = x^2 + x - 2 \Rightarrow \mathbf{P(x+1) = ?}$

A) $x^2 - x + 1$ B) $x^2 + x + 1$ C) $x^2 - x - 2$ D) $x^2 - 2x - 3$ E) $x^2 + x + 3$

13. $P(x+2) = (x^2 - x) \cdot Q(x)$,

$Q(-1) = 2 \Rightarrow \mathbf{P(1) = ?}$

A) 4 B) 6 C) 8 D) 10 E) 12

14. $P(x-2) + P(x+2) = 8x + 6$

$\Rightarrow \mathbf{P(x) = ?}$

A) $4x$ B) $6x$ C) 3 D) $4x + 3$ E) $6x + 3$

15. $a \cdot P(2x-1) = \dfrac{P(x+2)}{Q(x-1)}$,

$P(4) = 5 \cdot P(3)$,

$Q(1) = \dfrac{3}{4} \Rightarrow \mathbf{a = ?}$

A) $\dfrac{4}{5}$ B) $\dfrac{20}{3}$ C) 7 D) $\dfrac{25}{3}$ E) $\dfrac{20}{7}$

16. $P(x) = x^3 + 3x^2 + 3x + 2$

$\Rightarrow \mathbf{P(\sqrt[3]{2} - 1) = ?}$

A) 0 B) 2 C) 3 D) 7 E) -9

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1	2	3	4	5	6	7	8
A	B	A	E	B	C	C	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	D	D	C	A	D	B	C

1. $P(x) = (x^2+1)\cdot Q(x) + 4,$

$P(1) = 10,\ Q(0) = 5$

$\Rightarrow$ **$P(0) + Q(1) = ?$**

A) 3 B) 6 C) 9 D) 12 E) 15

2. $Q(x+1) = (2x^2+3)\cdot P(x+2) - 1$

$Q(0) = -16$

$\Rightarrow$ **$P(1) = ?$**

A) -5 B) -3 C) -1 D) 3 E) 5

3. $P(x) = x\cdot Q(x) + 2x - 1$

$\Rightarrow \dfrac{P(3)-5}{Q(3)} = ?$

A) 3 B) 5 C) 6 D) 9 E) 10

4. $\dfrac{P(x+3)+x^2}{x-2} = (x^3-1)\cdot Q(x) + 4$

$P(2) = 5 \Rightarrow$ **$Q(-1) = ?$**

A) 1 B) 2 C) 3 D) 4 E) 5

5. $P(x) = ax^2 + bx + c$

$Q(x) = (x-2)\cdot(x-3)$

$P(x) = Q(x) \Rightarrow$ **$a + b + c = ?$**

A) 2 B) 3 C) 4 D) 5 E) 6

6. $P(x) = (a-3)x^2 + (b-2)x^3 + (c^2-4)x^5$

$Q(x) = (d-1)x + (2a-6)x^2 + 2x^3 + (c-2)x^4$

$P(x) = Q(x) \Rightarrow$ **$a + b + c + d = ?$**

A) 8 B) 10 C) 12 D) 14 E) 16

7. $\dfrac{5-2x}{x^2-5x+6} = \dfrac{A}{x-3} + \dfrac{B}{x-2} \Rightarrow$ **$2A + B = ?$**

A) -3 B) -1 C) 0 D) 1 E) 3

8. $\dfrac{2x+3}{2x^2-x-1} = \dfrac{A}{x-1} + \dfrac{B}{2x+1} \Rightarrow$ **$A + B = ?$**

A) $-\dfrac{2}{3}$ B) $-\dfrac{1}{3}$ C) $\dfrac{1}{3}$ D) $\dfrac{2}{3}$ E) $\dfrac{5}{3}$

9. $P(x^3-1) = Q(x^3+1)\cdot(x^6+12)$,
$Q(4) = 3 \Rightarrow \mathbf{P(2) = ?}$

A) 9 B) 21 C) 36 D) 54 E) 63

10. $(3x-2)\cdot P(x-2) - x\cdot P(x-3) = x^2+6x$
$P(0) = 5 \Rightarrow \mathbf{P(-1) = ?}$

A) 0 B) 1 C) 2 D) 3 E) 4

11. $(x^2-4)\cdot P(x) = x^3-2x^2+ax+b$
$\Rightarrow \mathbf{b = ?}$

A) 2 B) 4 C) 6 D) 8 E) 10

12. $(x^3+6)\cdot P(x)+6x = ax^3+2ax+b+3$
$\Rightarrow \mathbf{b = ?}$

A) 3 B) 5 C) 8 D) 10 E) 15

13. $P(x) + P(x+1) = 8x - 16$
$\Rightarrow \mathbf{P(9) = ?}$

A) 21 B) 23 C) 26 D) 29 E) 33

14. $P(x)+2\cdot P(-x) = -4x+6 \Rightarrow \mathbf{P(2) = ?}$

A) -30 B) -10 C) 0 D) 10 E) 30

15. $a > 0$, $P(x) = ax + b$
$P(x)\cdot P(x+1) = x^2+3x+2$
$\Rightarrow \mathbf{P(4) = ?}$

A) 3 B) 4 C) 5 D) 6 E) 7

16. $P(x)+P(x+2) = 2x^2+4x+2$
$\Rightarrow \mathbf{P(x) = ?}$

A) x^2-1 B) x^2-2 C) x^2-4 D) x^2-x-1 E) x^2-2x-1

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1	2	3	4	5	6	7	8
D	B	A	C	A	B	A	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	C	D	E	C	D	C	A

1. $P(x) = x^2 + x + 3,$

$Q(x) = x - 1$

$\Rightarrow$ **$P(x) \cdot Q(x) = ?$**

A) $x^3 - x^2 + 2x - 3$
B) $x^3 - x + 3$
C) $x^3 + 2x - 3$
D) $x^3 - 3$
E) $x^3 + 4x - 3$

2. $(x^2 - x + 2) \cdot (x^2 - 2x + 1) = x^4 + Ax^3 + Bx^2 + Cx + D$

$\Rightarrow$ **$A = ?$**

A) -1 B) -2 C) -3 D) -4 E) -7

3. $x^3 + ax^2 + bx + c = (x+1) \cdot (x-2) \cdot (x+3)$

$\Rightarrow$ **$a + b + c = ?$**

A) -9 B) -13 C) -3 D) -1 E) 13

4. $P(x) = x^3 + 2,$

$Q(x) = x^4 - x - 1,$

$P(x) \cdot Q(x) = a_7x^7 + a_6x^6 + a_5x^5 + \ldots + a_1x + a_0$

$\Rightarrow$ **$a_1 = ?$**

A) -2 B) -1 C) 0 D) 1 E) 2

5. $ax^3 + bx^2 + cx + d = (4x-2) \cdot (x-2)^2$

$\Rightarrow$ **$a + b + c + d = ?$**

A) -6 B) -4 C) 2 D) 4 E) 6

6. $P(x) = x^2 - x + 3,$

$$\begin{array}{r|l} P(x) & x-1 \\ \hline - & K(x) \end{array} \Rightarrow \textbf{K(x)=?}$$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $P(x) = x^3 - 2x^2 + 3x + a - 4$

$$\begin{array}{r|l} P(x) & x-2 \\ \hline - & 0 \end{array} \Rightarrow \textbf{P(1) = ?}$$

A) -2 B) -3 C) -4 D) -5 E) -6

8. $P(2x-1) = x^3 - 3x^2 + x + m,$

$$\begin{array}{r|l} P(x) & x+3 \\ \hline - & 2 \end{array} \Rightarrow \textbf{m = ?}$$

A) 7 B) 6 C) 2 D) 0 E) -2

9. $P(x) = 3x^3 + 6x^2 + x + 4$

$P(2x-1) \,\big|\, 2x+1$ → **K(x) = ?**

$K(x)$

A) −4 B) −2 C) 0 D) 2 E) 4

10. $P(x+2) = x^2 - 3x + 5$

$Q(x) = (x+1)\cdot P(x+3) + 3\cdot P(2x+1)$

$Q(x) \,\big|\, x-1$ → **K(x) = ?**

$K(x)$

A) 11 B) 12 C) 13 D) 14 E) 15

11. $P(x) = x^6 + 3ax^4 - b$

$P(x) \,\big|\, x^3-2$ ⇒ **a − b = ?**

$12x+5$

A) 1 B) 2 C) 3 D) 4 E) 5

12. $P(x) = 3x^5 - 2x^4 + ax^3 + bx^2 - 1$

$P(x) \,\big|\, x^2-1$ → **a·b = ?**

0

A) −9 B) −6 C) −3 D) 3 E) 9

13. $P(x) = x^{15} - x^{10} + x^5 - 2$

$P(x) \,\big|\, x^5+1$ ⇒ **t = ?**

t

A) −6 B) −5 C) −4 D) −3 E) −2

14. $P(x) = 2x^4 - 3x^3 + (a-b)x + 3a + b,$

$P(x) \,\big|\, x^2+1$ ⇒ **a = ?**

$5x+6$

A) 6 B) 4 C) $\frac{3}{2}$ D) $\frac{2}{3}$ E) $\frac{1}{2}$

15. $P(x) = x^3 + 3x^2 + 3x + m$

$P(x) \,\big|\, x-\sqrt[3]{5}+1$ ⇒ **m=?**

0

A) −6 B) −5 C) −4 D) −3 E) −2

16. $P(x) \,\big|\, x+3$

5

$(x+1)\cdot P(x) = x^3 - ax^2 + b$ ⇒ **a + b = ?**

A) −5 B) −3 C) −2 D) 1 E) 0

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1	2	3	4	5	6	7	8
C	C	A	A	C	C	C	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	E	C	A	B	C	C	B

1. $P(x) + P(2x) = 12x + 6 \Rightarrow \mathbf{P(3) = ?}$

A) 10 B) 15 C) 20 D) 36 E) 42

2. $x \cdot P(x) - P(x) = 2x^2 + 2x - 4$

$\Rightarrow \mathbf{P(x - 1) = ?}$

A) $2x - 2$ B) $-2x + 2$ C) $x - 4$ D) $2x + 2$ E) $2x + 4$

3. $P(3x) + 4 \cdot P(-3x) = 25x$

$\Rightarrow \mathbf{P(1) + P(-1) = ?}$

A) -1 B) $-\frac{1}{3}$ C) 0 D) $\frac{1}{3}$ E) 1

4. $P(3x - 4) = x^4 + 2x^2 - 1$

$$\begin{array}{r|l} P(x+2) & x+3 \\ \hline - & \\ \hline k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) -4 B) -2 C) 1 D) 2 E) 4

5. $P(5x+1) = 3x^2 - 7x + 10$

$$\begin{array}{r|l} P(2x-3) & x-2 \\ \hline - & \\ \hline k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) 8 B) 10 C) 12 D) 14 E) 16

6. $P(3x + 1) = x^3 - 5x^2 + 4x + 6$

$$\begin{array}{r|l} P(x+1) & x+3 \\ \hline - & \\ \hline k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) -6 B) -4 C) -2 D) 4 E) 6

7. $P(x) = x^6 - 2x^4 + 3x^2 - 1$

$$\begin{array}{r|l} P(x) & x-\sqrt{3} \\ \hline - & \\ \hline k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) 15 B) 17 C) 24 D) 27 E) 39

8. $Q(x) = x^4 + 2x^2 - 15$

$$\begin{array}{r|l} Q(x) & x+\sqrt{5} \\ \hline - & \\ \hline k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) 5 B) 10 C) 15 D) 20 E) 25

9. $P(4x+1) + P(3x) + 6 = 0$

$$\begin{array}{r|l} P(x) & x+3 \\ \hline = k & \end{array} \Rightarrow k = ?$$

A) −3 B) −2 C) −1 D) 2 E) 3

10. $P(x^4+1) = x^8 - 3x^4 + 5$

$$\begin{array}{r|l} P(x) & x-2 \\ \hline = k & \end{array} \Rightarrow k = ?$$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $Q(x^5-2) = x^{15} - 3x^{10} - x^5 + 2$

$$\begin{array}{r|l} Q(x-1) & x-2 \\ \hline = k & \end{array} \Rightarrow k = ?$$

A) −4 B) −3 C) −2 D) −1 E) 0

12. $P(x) = x^9 + 2x^8 + x^6 + n$

$$\begin{array}{r|l} P(x) & x^3+2 \\ \hline = nx^2+m & \end{array} \Rightarrow m = ?$$

A) −8 B) −4 C) 0 D) 4 E) 8

13. $$\begin{array}{r|l} P(x) & x^2-2x \\ \hline = 3x-1 & \end{array} \qquad \begin{array}{r|l} P(x) & x-2 \\ \hline = k & \end{array} \Rightarrow k = ?$$

A) 1 B) 3 C) 5 D) 7 E) 9

14. $P(x) = 3x^3 + ax + b$

$$\begin{array}{r|l} P(x) & x^2-x-1 \\ \hline = 0 & \end{array} \Rightarrow a \cdot b = ?$$

A) 3 B) 6 C) 9 D) 12 E) 18

15. $$\left.\begin{array}{l} P(0)=5 \\ P(1)=9 \end{array}\right\} \Rightarrow \begin{array}{r|l} P(x) & x^2-x \\ \hline = k = ? & \end{array}$$

A) 4x B) 4x + 1 C) −4x − 1 D) 4x + 3 E) 4x + 5

16. $$\begin{array}{r|l} P(x) & x-a \\ \hline = 1 & \end{array} \qquad \begin{array}{r|l} P(x) & (x-1)\cdot(x-a) \\ \hline = -2x+5 & \end{array} \Rightarrow a = ?$$

A) 8 B) 6 C) 4 D) 2 E) 0

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	D	C	D	B	B	B	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	C	D	D	C	E	E	D

1. $\begin{array}{l|l} P(x) & x-2 \\ \hline & Q(x) \\ \hline 4 & \end{array}$ $\Rightarrow$ **P(1) + Q(1) = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

2. $P(x) = 2x^3 + 3x^2 + 4x + 5,$

$\begin{array}{l|l} P(x) & x+1 \\ \hline & Q(x) \\ \hline m & \end{array}$ $\Rightarrow$ **m = ?**

A) 4 B) 3 C) 2 D) 1 E) 0

3. $P(x) = 4x^3 + 5x^2 + 3mx - 3,$

$\begin{array}{l|l} P(x) & x-1 \\ \hline & Q(x) \\ \hline 0 & \end{array}$ $\Rightarrow$ **m = ?**

A) −5 B) −4 C) −3 D) −2 E) −1

4. $\dfrac{3x + P(x-6)}{Q(x+1)} = x - 5 \Rightarrow \begin{array}{l|l} P(x) & x+1 \\ \hline & \\ \hline ? & \end{array}$

A) −15 B) −10 C) −5 D) 10 E) 5

5. $P(x-1) = -x^3 + 2x^2 + ax - 3,$

$2 \cdot P(x) + 5 = Q(x),$

$\begin{array}{l|l} Q(x) & x+2 \\ \hline & \\ \hline -1 & \end{array}$ $\Rightarrow$ **a = ?**

A) 1 B) 5 C) 6 D) 3 E) 8

6. $P(x) = x^8 - 4x^6 - 3x^5 - 2x^3 + 10$

$\Rightarrow \begin{array}{l|l} P(x) & x^2 \\ \hline & \\ \hline ? & \end{array}$

A) 6 B) 4 C) 2 D) 10 E) −2

7. $\begin{array}{l|l} P(x) & x^2 - 2x \\ \hline & \\ \hline 3x-2 & \end{array}$ $\Rightarrow$ **P(0) = ?**

A) −2 B) −1 C) 0 D) 1 E) 2

8. $P(x) = x^3 + ax^2 + bx + 1,$

$\begin{array}{l|l} P(x) & x^2 - x + 1 \\ \hline & \\ \hline 0 & \end{array}$ $\Rightarrow$ **a + b = ?**

A) $-\frac{5}{2}$ B) −2 C) 0 D) $\frac{1}{3}$ E) −1

9. $P(x) = ax^4 + bx^2 + 1,$

$P(x) \,\big|\, (x-1)^2 = 0 \Rightarrow \mathbf{b = ?}$

A) −2 B) −1 C) 1 D) 3 E) 4

10. $P(x) = 2x^3 - ax + b,$

$P(x) \,\big|\, (x-1)^2 = 0 \Rightarrow \mathbf{a \cdot b = ?}$

A) 10 B) 14 C) 20 D) 24 E) 30

11. $P(x) \,\big|\, x+1 = 1$ $\quad P(x) \,\big|\, x-1 = 5$

$\Rightarrow \mathbf{P(x) \,\big|\, x^2 - 1 = ?}$

A) 2x − 3 B) 2x + 3 C) 3 − 2x D) x + 3 E) 2x + 2

12. $P(x) \,\big|\, x+4 = -19$ $\quad P(x) \,\big|\, x-5 = -1$

$\Rightarrow \mathbf{P(x) \,\big|\, x^2 - x - 20 = ?}$

A) −2x − 11 B) −2x + 11 C) 2x − 11 D) 2x + 11 E) −x − 11

13. $P(2x-6) = (x^2 - 4x - 5) \cdot T(x-2) + x^2 + 2x + 6,$

$T(1) = 4 \Rightarrow \mathbf{P(0) = ?}$

A) −15 B) −13 C) −12 D) −11 E) −10

14. $P(x-2) \,\big|\, x-1 = 2$ $\quad P(x-2) \,\big|\, x+1 = 4$

$\Rightarrow \mathbf{P(x) \,\big|\, x^2 + 4x + 3 = ?}$

A) 8 B) −x + 1 C) −x − 1 D) x + 4 E) x + 5

15. $P(x+2) = (3x^2 + ax) \cdot Q(x-1) + 5,$

$Q(1) = 4,$

$P(x) \,\big|\, x-4 = 5 \Rightarrow \mathbf{a = ?}$

A) −7 B) −5 C) −6 D) −8 E) −10

16. $\dfrac{P(x-7)}{Q(x+1)} = x^2 - x + 3,$

$Q(x) \,\big|\, x-1 = 3$ $\quad P(x) \,\big|\, x+7 = k$ $\Rightarrow \mathbf{k = ?}$

A) 9 B) −9 C) 6 D) −6 E) 3

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	C	D	A	D	D	A	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	D	B	C	D	B	C	A

1. $P(x+2) = x^2 - 3x + 5$

$P(x-1) \,\big|\, x-4$, remainder m $\Rightarrow$ **m = ?**

A) 2 B) 3 C) 5 D) 6 E) 9

2. $Q(x) = x^3 - x^2 + 3x + n$,

$Q(x+1) \,\big|\, x-2$, remainder 0 $\Rightarrow$ **n = ?**

A) −27 B) −15 C) −10 D) 10 E) 27

3. $P(x) \,\big|\, x-1$, remainder -2; $P(x) \,\big|\, x+1$, remainder 4 $\Rightarrow$ $P(x) \,\big|\, x^2-1$, remainder **?**

A) −2 B) 1 C) −3 D) −3x + 1 E) 3x + 1

4. $P(x) \,\big|\, x-1$, remainder 0; $P(x) \,\big|\, x+1$, remainder 0; $P(x) \,\big|\, x+2$, remainder 0

$P(3) = 40 \Rightarrow$ **P(0) = ?**

A) −5 B) −4 C) −3 D) −2 E) −1

5. $P(x) \,\big|\, x^3-1$, remainder x^2+3x-1 $\Rightarrow$ $P(x) \,\big|\, x-1$, remainder **?**

A) 1 B) 2 C) 3 D) 4 E) 5

6. $P(x) \,\big|\, x-2$, remainder 6; $P(x) \,\big|\, (x-2)\cdot(x-1)$, remainder $2x+a$

$\Rightarrow$ $P(x) \,\big|\, x-1$, remainder **?**

A) −4 B) −1 C) 1 D) 2 E) 4

7. $P(x) \,\big|\, x^2-5x+4$, remainder $2x+3$; $P(x) \,\big|\, x-4$, remainder $K(x)$ $\Rightarrow$ **K(x) = ?**

A) 5 B) 7 C) 8 D) 10 E) 11

8. $P(2) = 5$, $Q(1) = 3$,

$P(x+4)\cdot Q(x+3) \,\big|\, x+2$, remainder $K(x)$ $\Rightarrow$ **K(x)=?**

A) 3 B) 5 C) 8 D) 12 E) 15

9. $\dfrac{P(x-1)}{Q(x-4)} = -x^3+3x^2+5x+3$

$P(x) \,|\, x-3$, -7 $\qquad$ $Q(x) \,|\, x$, $K(x)$ $\rightarrow$ **K (x) = ?**

A) −3 B) −1 C) 0 D) 1 E) 3

10. $P(x+2) = (x^2-3x+5)\cdot Q(x+2)+x+4$

$Q(x) \,|\, x$, 3 $\qquad$ $P(x) \,|\, x$, $K(x)$ $\Rightarrow$ **K (x) = ?**

A) 43 B) 45 C) 47 D) 49 E) 51

11. $P(x) \,|\, x-1$, $Q(x)$, 2 $\qquad$ $Q(x) \,|\, x+2$, 3

$\Rightarrow$ $P(x) \,|\, x^2+x-2$, $?$

A) 1 − 3x B) 3 − x C) 3x − 1 D) 3x + 1 E) x − 3

12. $P(x) = x^5$,

$P(x) \,|\, x^2+x+1$, $K(x)$ $\Rightarrow$ **K (x) = ?**

A) x B) −x + 1 C) x − 1 D) x + 1 E) −x − 1

13. $8x^4+6x^3-5x^2-6x+m \,|\, x^2-1$, $B(x)$, 0

$\Rightarrow$ **m=?**

A) −2 B) −3 C) −4 D) −5 E) −6

14. $\dfrac{P(3x-3)}{Q(3x-4)} = 3x^2-4x-5$

$Q(x) \,|\, x-2$, 7 $\qquad$ $P(x) \,|\, x-3$, $K(x)$ $\Rightarrow$ **K (x) = ?**

A) −9 B) −7 C) −5 D) −3 E) −1

15. $P(x) \,|\, (x+2)^2$, $2x+1$ $\Rightarrow$ $P^2(x) \,|\, (x+2)^2$, $?$

A) −12x + 17 B) 12x + 15 C) −12x − 15 D) −12x + 15 E) 4x + 15

16. $(x-2)\cdot P(x) = x^4-2x^3+ax+6$,

$P(x) \,|\, x+2$, k $\Rightarrow$ **k = ?**

A) −9 B) 10 C) −11 D) 12 E) −13

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	A	D	D	C	E	E	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	C	C	E	B	B	C	C

1. $P(x) = x^3 + 2x^2 - 3x + 4,$

$$\rightarrow \begin{array}{r|l} P(x) & x+2 \\ \hline = & \\ ? & \end{array}$$

A) 10 B) −6 C) 0 D) 6 E) −10

2. $P(x) = x^{10} - mx^5 + n - 1,$

$$\begin{array}{r|l} P(x) & x^5+1 \\ \hline = & \\ 0 & \end{array} \rightarrow \mathbf{m+n=?}$$

A) 5 B) −5 C) 0 D) −10 E) 10

3. $P(x) = x^3 + ax^2 - 5x + 6,$

$$\begin{array}{r|l} P(x) & x^2+x \\ \hline = & \\ 5x+6 & \end{array} \rightarrow \mathbf{a=?}$$

A) −10 B) −9 C) −8 D) −7 E) −6

4. $P(x) = x^3 + nx^2 + mx - 2,$

$$\begin{array}{r|l} P(x) & x^2-x-2 \\ \hline = & \\ 0 & \end{array} \rightarrow \mathbf{m+n=?}$$

A) −5 B) −3 C) −2 D) 1 E) 5

5. $P(x) = x^5 + ax - b,$

$$\begin{array}{r|l} P(x) & x^2-1 \\ \hline = & \\ 5x-3 & \end{array} \rightarrow \mathbf{a \cdot b = ?}$$

A) 6 B) 12 C) 18 D) 24 E) 36

6. $P(x) = ax^2 + bx + c,$

$P(-1) = P(2) = 6,$

$$\begin{array}{r|l} P(x) & x-3 \\ \hline = & \\ 22 & \end{array} \rightarrow \mathbf{P(1) = ?}$$

A) −6 B) 6 C) −3 D) 3 E) −2

7. $P(x) = ax^2 + bx + c,$

$P(5) = P(-2) = 18,$

$P(1) = -6,$

$$\begin{array}{r|l} P(x) & x+3 \\ \hline = & \\ k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) 30 B) 34 C) 38 D) 42 E) 46

8. $(x-1) \cdot P(x-1) = 4x^3 + ax^2 + 3x - 1,$

$$\begin{array}{r|l} P(x) & x-2 \\ \hline = & \\ k & \end{array} \rightarrow \mathbf{k = ?}$$

A) 11 B) 21 C) 31 D) 41 E) 51

9. $x \cdot P(2x+1) + (x^2-4) \cdot Q(x) = x^2 - 3x + 4$

$P(x) \,|\, x-5$, remainder k $\Rightarrow$ **k = ?**

A) 1 B) 3 C) 5 D) 7 E) 9

10. $P(x) \,|\, x^2+3x-10$, remainder $7x+3$; $P(x) \,|\, x-2$, remainder k $\Rightarrow$ **k = ?**

A) 13 B) 15 C) 17 D) 19 E) 23

11. $P(x) \,|\, x^2+1$, remainder $x+2$; $Q(x) \,|\, x-1$, remainder 4

$\Rightarrow$ **P (1) = ?**

A) 10 B) 11 C) 12 D) 13 E) 14

12. $P(x+3) = 7 \cdot Q(x+1) + 2x + 3$

$P(x) \,|\, x-2$, remainder 8 ; $Q(x) \,|\, x$, remainder k $\Rightarrow$ **k = ?**

A) 12 B) 7 C) 3 D) 2 E) 1

13. $P(x-4) = 3 \cdot Q(x) + 7x + 4$

$P(x) \,|\, x-2$, remainder 4 ; $Q(x) \,|\, x-6$, remainder k $\Rightarrow$ **k = ?**

A) 14 B) 7 C) 0 D) −7 E) −14

14. $(x-2) \cdot P(x) = x^4 - 6x^3 + 14x^2 + (3a-2)x + 16$

$P(x) \,|\, x+2$, remainder k $\Rightarrow$ **k = ?**

A) −11 B) −22 C) −44 D) −66 E) −88

15. $P(x) \,|\, (x-3)^2 \cdot (x+3)$, remainder x^2-2x-6

$P(x) \,|\, x^2-9$, remainder $mx+n$ $\Rightarrow$ **m·n=?**

A) −9 B) 9 C) −6 D) 6 E) −3

16. $P(x) = (x+1) \cdot Q(x) + 3$,

$Q(x) = (x-1) \cdot T(x) - 2$,

$P(x) \,|\, x^2-1$, remainder $mx+n$ $\Rightarrow$ **m − n = ?**

A) −5 B) −4 C) −3 D) −2 E) −1

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	C	B	B	B	E	B	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	C	B	E	E	C	C	C

1. $P\left(\frac{5}{x}\right)+2\cdot P\left(\frac{x}{5}\right)=2x-1 \Rightarrow \mathbf{P(2)=?}$

A) 7 B) $\frac{28}{3}$ C) $\frac{32}{3}$ D) $\frac{34}{3}$ E) −8

2. $P(x+1)+P(x-1)=2x^2-8x+18$

$\Rightarrow \mathbf{P(1)=?}$

A) 4 B) 5 C) 6 D) 7 E) 8

3. $P(2x)+P(4x)+P(16x)+P(8x)=60x+20$

$\Rightarrow \mathbf{P(1)=?}$

A) 10 B) 8 C) 7 D) 5 E) 2

4. $a, b \in Z^+$,

$P(x)=(x-2)^{2a+3}+25\cdot(x+8)^b$,

$P(-3)=0 \Rightarrow \mathbf{b=?}$

A) 2a B) 2a + 1 C) 2a − 1 D) $\frac{a}{2}$ E) $\frac{a+1}{2}$

5. $P(x)=x^3+bx^2+cx+d$,

$P(-1)=P(1)=P(2)=4$,

$P(x) \,\big|\, x+2$, $= k(x)$ $\Rightarrow \mathbf{k(x)=?}$

A) −12 B) 10 C) −8 D) −4 E) 0

6. $i^2=-1$, $P(x)=x^4+bx^3+cx^2+d$

$P(1)=P(-1)=P(i)=P(-i)=0$

$\Rightarrow \mathbf{P(2)=?}$

A) 7 B) 9 C) 12 D) 15 E) 17

7. $k, m \in \mathbb{R}$

$x^4-2x^3+x-2 \,\big|\, (x-k)\cdot(x-m)$, $= 0$ $\Rightarrow \mathbf{k+m=?}$

A) 0 B) 1 C) 2 D) 3 E) 4

8. P(x) polinomunun (x − 3) ile bölümünden kalan 3 ve (x − 4) ile bölümünden kalan 5 olduğuna göre **P(x) polinomunun $x^2-7x+12$ ile bölümünden kalan kaçtır?**

If the remainder of the polynomial p(x) dividing by (x − 3) is 3 and dividing by (x − 4) is 5, then what is the remainder of the polynomial P(x) dividing by $x^2-7x+12$?

A) x − 3 B) 2x + 3 C) 2x − 3 D) 2x + 5 E) 2x − 5

9. **P(x) polinomunun $(x^2 - 4x - 21)$ ile bölümünden kalan $(5x + 1)$ ise $(x - 7)$ ile bölümünden kalan nedir?**

If the remainder of the polynomial P(x) when divided by $(x^2 - 4x - 21)$ is $(5x + 1)$, what is its remainder when divided by $(x - 7)$?

A) 25 B) 27 C) 29 D) 32 E) 36

10. **$P(x - 7) = x^8 + 2x^7 + 3x^4 + 9$ ise P(x) polinomunun $(x + 7)$ ile bölümünden kalan kaçtır?**

If $P(x - 7) = x^8 + 2x^7 + 3x^4 + 9$, what is the remainder of the polynomial P(x) when divided by $(x + 7)$?

A) 8 B) 9 C) 10 D) 11 E) 12

11. $n \in Z^+$,

$P(x) = x^{3n} - 3x^{2n} + 3x^n + 10$,

$$\begin{array}{r|l} P(x) & x^n - \sqrt[3]{6} - 1 \\ \hline - & \\ k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) −5 B) −4 C) −3 D) −2 E) 0

12. $P(x) = x^3 + 6x^2 - x - 6$,

$P(x) = 0,\ x \in Z \Rightarrow \sum \mathbf{x = ?}$

A) −8 B) −7 C) −6 D) −5 E) −4

13. $P(x) = x^5 - 2x^4 - 2x^3 + 2x^2 + x$,

$P(x) = 0,\ x \in Z \Rightarrow \prod \mathbf{x = ?}$

A) 0 B) −1 C) −2 D) 2 E) 3

14. $P(x) = x^4 - 9x^2 - x + 3$,

$P(x) = 0,\ x \in Z \Rightarrow \sum \mathbf{x = ?}$

A) 6 B) 5 C) 4 D) 3 E) 2

15. $k \in Z$,

$P(x^5 + k) = x^{10} + 6x^5 + 4$,

$$\begin{array}{r|l} P(x+k) & x - k \\ \hline - & \\ -5 & \end{array} \Rightarrow \mathbf{k = ?}$$

A) −3 B) −2 C) −1 D) 2 E) 3

16. $x^2 + 6 \cdot P(x) + 5x + a = x \cdot P(x)$,

$$\begin{array}{r|l} P(x+1) & x - 2 \\ \hline - & \\ k(x) & \end{array} \Rightarrow \mathbf{k(x) = ?}$$

A) 9 B) 11 C) 14 D) 15 E) 16

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	B	C	B	C	D	B	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	B	C	C	A	D	A	C

1. P(x) polinomunun $(x-2)$ ile bölümünden kalan 1 ve $(x-3)$ ile bölümünden kalan 4 olduğuna göre **P(x) polinomunun x^2-5x+6 ile bölümünden kalan kaçtır?**

If the remainder of the polynomial P(x) dividing by $(x-2)$ is 1 and dividing by $(x-3)$ is 4, then what is the remainder of the polynomial P(x) dividing by x^2-5x+6?

A) $3x-5$ B) $2x+2$ C) $4x-2$ D) $7x-2$ E) $3x+1$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2.

$$\begin{array}{r|l} x^3-6x^2+x-6 & x-a \\ \hline -\quad\quad\quad\quad 0 & \end{array} \Rightarrow \mathbf{a=?}$$

A) 2 B) 3 C) 4 D) 6 E) 8

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

3. $P(x)=ax^3+bx^2+cx+d,$
$P(2)=P(3)=P(4)=0,$
$P(5)=12$
$\Rightarrow \mathbf{P(1)=?}$

A) 4 B) −10 C) −4 D) −12 E) 12

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2019]

4. $P(x)=x^3-2x^2+3x-2$
$P(x)=(x-2)\cdot Q(x)+B(x)$
$\Rightarrow \mathbf{B(x)=?}$

A) 4 B) 6 C) 8 D) 10 E) 12

[YÜZÜNCÜ YIL ÜNİVERSİTESİ – YÖS 2019]

5. $(x-2)\cdot P(x)=x^3+ax^2+x-2$
$\Rightarrow \mathbf{P(2)=?}$

A) 0 B) 2 C) 3 D) 4 E) 5

[GAZİANTEP ÜNİVERSİTESİ – YÖS 2019]

6. $P(x-1)+P(x)=6x-5$
$\Rightarrow \mathbf{P(1)=?}$

A) 2 B) 3 C) 4 D) 5 E) 6

[GAZİANTEP ÜNİVERSİTESİ – YÖS 2019]

7. P(x) polinomunun x^2-2x-8'ye bölümünden kalan $8x-5$ ise **$x-4$'e bölümünden kalan nedir?**

If the remainder of the polynomial P(x) when divided by x^2-2x-8 is $8x-5$, what is its remainder when divided by $x-4$?

A) 39 B) 34 C) 28 D) 25 E) 27

[ULUDAĞ ÜNİVERSİTESİ – YÖS 2018]

8. $P(x+2)=2x^3+4x^2-3x+11$ ise **P(x) polinomunun $x-2$ ile bölümünden kalan kaçtır?**

If $P(x+2)=2x^3+4x^2-3x+11$, what is the remainder of the polynomial P(x) when divided by $x-2$?

A) 11 B) 12 C) 13 D) 14 E) 15

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

9. P(x) ve Q(x) polinomlarının x ile bölümlerinden kalan sırasıyla −2 ve 3'tür. **Buna göre aşağıdakilerden hangisi x'e tam bölünür?**
The remainders of the polynomials P(x) and Q(x) when divided by x are −2 and 3, respectively. Accordingly, which of the following is divisible by x=?

A) P(x) + Q(x) + 1 B) P(x) + Q(x) − 5
C) P(x) − Q(x) + 5 D) P(x) − Q(x) + 3
E) P(x) + Q(x) + 5

[ULUDAĞ ÜNİVERSİTESİ – YÖS 2018]

10. $P(x) = ax^2 + bx + c$
$P(2) = 0$
$P(3) = 0$
$\Rightarrow \frac{b}{a} = ?$

A) −6 B) −5 C) −2 D) −3 E) 6

[ERCİYES ÜNİVERSİTESİ – YÖS 2017]

11. $P(x) = (x-1)\cdot(x-2)\cdot(x-4)$

$$\begin{array}{r|l} P(x+1) & x+2 \\ \hline - & B(x) \\ \hline k & \end{array} \quad \Rightarrow k = ?$$

A) 5 B) 13 C) −11 D) −18 E) −30

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

12. $P\left(\frac{3x+7}{5}\right) = x^3 - 4x + 2ax - 5$
$P(2) = 0 \Rightarrow a = ?$

A) −3 B) −2 C) 1 D) 2 E) 4

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2015]

13. $x^3 + 3x^2 + 6x + 3 = (x^2 + x + 1)\cdot(x + a) + bx + c$
$\Rightarrow c = ?$

A) −2 B) 0 C) 1 D) 3 E) 5

[İSTANBUL ÜNİVERSİTESİ – YÖS 2015]

14. $P(x) = 2x^3 + 7x^2 + mx - 10$ polinomu $Q(x) = 2x + 5$ polinomuna tam bölünebiliyorsa **m nedir?**
If $P(x) = 2x^3 + 7x^2 + mx - 10$ is divisible by $Q(x) = 2x + 5$, what the value of **m**?

A) −1 B) 0 C) 1 D) 2 E) 3

[SÜLEYMAN DEMİREL ÜNİVERSİTESİ – YÖS 2014]

15. $A = 3x^3 + 2x^2 + ax - 1$
$B = 2x^3 - (2a+1)x^2 + 4x + 1$
$A \cdot B = \ldots + 2x^4 + \ldots$
$\Rightarrow a = ?$

A) −2 B) −1 C) 2 D) 4 E) 5

[İSTANBUL ÜNİVERSİTESİ – YÖS 2014]

16. $P(x) = (x^2 - 1)\cdot Q(x) + 4x + 5$,
$P(x) = (x-1)\cdot K(x) + R$
$\Rightarrow R = ?$

A) 7 B) 8 C) 9 D) 10 E) 11

[ANKARA ÜNİVERSİTESİ – YÖS 2013]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	D	D	A	E	A	E	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	B	E	E	C	C	D	C

BÖLÜM CHAPTER 2

TARİHSEL NOT / HISTORICAL NOTE

MERYEM MİRZAKHANİ [1977 - 2017]

2008'den bu yana Stanford Üniversitesi'nde Matematik profesörü olarak çalışan MİRZAKHANİ, 2014 yılında "Matematiğin Nobeli" sayılan Fields madalyasını alarak bu ödülü kazanan ilk kadın olmuştur. Çalışmalarında özellikle hiperbolik geometri, ergodik teori, simplektik geometri ve Teichmüller teorisine odaklanmaktadır.

MIRZAKHANI, who had been working as a professor of mathematics at Stanford University since 2008, has awarded the Fields Medal as the Nobel Prize in Mathematics in 2014 and became the first woman to win this award. She focused on hyperbolic geometry, ergodic theory, symplectic geometry and Teichmüller theory in her works.

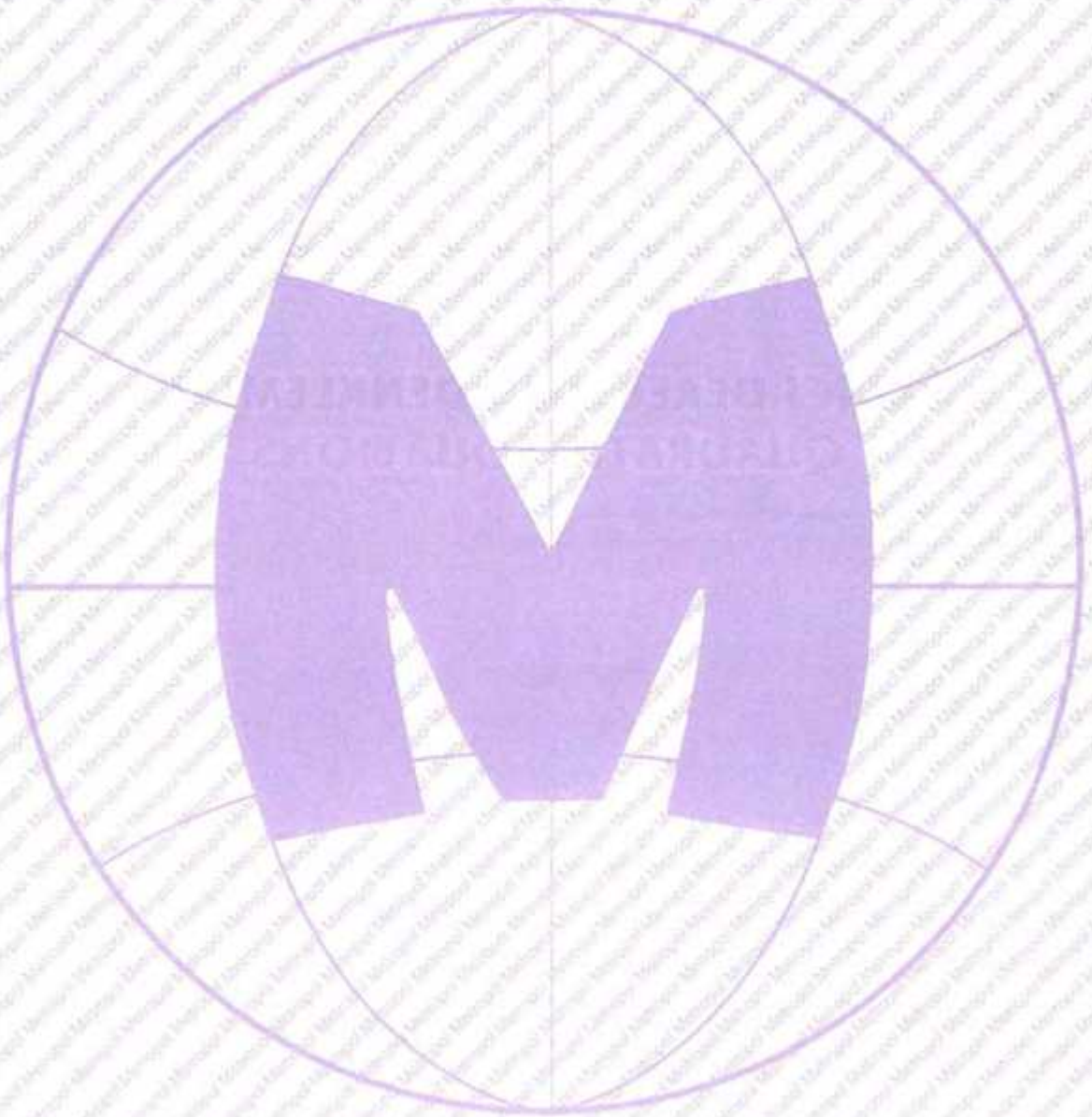
İKİNCİ DERECEDEN DENKLEMLER
QUADRATIC EQUATIONS

Bu bölüm 80 alıştırma sorusu, 160 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 80 exercise questions, 160 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 2

İKİNCİ DERECEDEN DENKLEMLER / QUADRATIC EQUATIONS



1. $x^2 = 4 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-2, 2\}$

2. $3x^2 - 9 = 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-\sqrt{3}, \sqrt{3}\}$

3. $10 - x^2 = 0 \Rightarrow$ ÇK(SS = ?)

Yanıt / The Answer is $\{-\sqrt{10}, \sqrt{10}\}$

4. $2x^2 + 10x = 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-5, 0\}$

5. $3x^2 + 1 = 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\varnothing$

6. $x^2 + x - 6 = 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-3, 2\}$

7. $x^2 + 6x + 9 = 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-3\}$

8. $x^2 + x - 1 = 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left\{\frac{-1-\sqrt{5}}{2}, \frac{-1+\sqrt{5}}{2}\right\}$

9. $x^2-2x-1=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{1-\sqrt{2}, 1+\sqrt{2}\}$

10. $x^2+2x-35=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-7, 5\}$

11. $2x^2+x-1=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left\{-1, \frac{1}{2}\right\}$

12. $3x^2+8x-3=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left\{-3, \frac{1}{3}\right\}$

13. $x^2+4x-1=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-2-\sqrt{5}, -2+\sqrt{5}\}$

14. $\frac{x^2-6x-16}{x^2-3x-10}=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{8\}$

15. $\frac{x^2-4}{x^2-3x+2}=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-2\}$

16. $1-\frac{3}{x}-\frac{10}{x^2}=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-2, 5\}$

17. $\frac{6}{x^2}-\frac{5}{x}+1=0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is {2, 3}

18. $\frac{1}{x-1}-\frac{1}{x}=\frac{1}{2} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is {−1,2}

19. $(x+4)\cdot(x+2)\cdot(1-x)=0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is {−4,−2,1}

20. $f(x)=x^2-px+12$,
$f(x_1)=f(x_2)=0$, $x_1=4$
$\Rightarrow$ **p = ?**

Yanıt / The Answer is 7

21. $f(x)=ax^2+bx-6$,
$f(x_1)=f(x_2)=0$, $x_1=-2 \Rightarrow$ **2a − b = ?**

Yanıt / The Answer is 3

22. $f(x)=x^2-(k+1)\cdot x+2=0$
$f(x_1)=f(x_2)=0$, $x_1=1$
$\Rightarrow$ **x_2 = ?**

Yanıt / The Answer is 2

23. $x^2-(m+3)x+1=0$,
$f(x_1)=f(x_2)=0$, $x_1=2-\sqrt{3}$
$\Rightarrow$ **m = ?**

Yanıt / The Answer is 1

24. $f(x)=ax^2+bx+c$, $f(x_1)=f(x_2)=0$,
$x_1=1-\sqrt{2} \Rightarrow$ **x_2 = ?**

Yanıt / The Answer is $1+\sqrt{2}$

25. $x^4-13x^2+36=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{\pm 2, \pm 3\}$

26. $(3x-1)^2-4\cdot(3x-1)+4=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{1\}$

27. $(x^2+1)^2-6(x^2+1)+5=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{0, \mp 2\}$

28. $\left(x+\frac{1}{x}\right)^2-2\left(x+\frac{1}{x}\right)+1=0 \Rightarrow x^2-x=$?

Yanıt / The Answer is -1

29. $9^x-2\cdot 3^{x+1}-27=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{2\}$

30. $x+\sqrt{x}-6=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{4\}$

31. $x^{-2}-4x^{-1}+4=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left\{\frac{1}{2}\right\}$

32. $x^{\frac{4}{3}}-3\cdot x^{\frac{2}{3}}+2=0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{\pm 2\sqrt{2}, \pm 1\}$

33. $x - 2\sqrt{x} + 1 = 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is {1}

34. $\sqrt{x+2} = x + 2 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is {−2,−1}

35. $\sqrt{x+3} + 2 = 1 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is ∅

36. $x^2 - 5x + 6 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow x_1 + x_2 = ?$

Yanıt / The Answer is 5

37. $x^2 - 11x + 12 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow x_1 + x_2 = ?$

Yanıt / The Answer is 11

38. $-x^2 - 5x + 10 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow x_1 \cdot x_2 = ?$

Yanıt / The Answer is −10

39. $2x^2 - 7x + 3 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow x_1 \cdot x_2 = ?$

Yanıt / The Answer is $\frac{3}{2}$

40. $3x^2 - x - 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow \frac{1}{x_1} + \frac{1}{x_2} = ?$

Yanıt / The Answer is −1

41. $x^2-7x+6=0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $x_1 \cdot x_2 + x_1 + x_2 = ?$

Yanıt / The Answer is 13

42. $x^2+ax+6=0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 + x_2 = 6 \Rightarrow a = ?$

Yanıt / The Answer is −6

43. $2x^2-3x+m=0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 \cdot x_2 = -8 \Rightarrow m = ?$

Yanıt / The Answer is −16

44. $2x^2+ax-1=0$, ÇK(SS) = $\{x_1, x_2\}$

$x_1 + x_2 + x_1 \cdot x_2 = 5 \Rightarrow a = ?$

Yanıt / The Answer is −11

45. $x^2-7x+12=0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $x_1^2 \cdot x_2 + x_1 \cdot x_2^2 = ?$

Yanıt / The Answer is 84

46. $x^2-5x-4=0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $x_1^2 + x_2^2 = ?$

Yanıt / The Answer is 33

47. $2x^2-4x+1=0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $x_1^3 + x_2^3 = ?$

Yanıt / The Answer is 5

48. $3x^2+2x-1=0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $|x_1 - x_2| = ?$

Yanıt / The Answer is $\frac{4}{3}$

49. $x^2-3x-2=0$, ÇK(SS) $=\{x_1,x_2\}$

$\Rightarrow x_1^2\cdot x_2+x_1\cdot x_2^2=?$

Yanıt / The Answer is -6

50. $x^2+6x+2m=0$, ÇK(SS) $=\{x_1,x_2\}$

$(x_1-2)\cdot(x_2-2)=12 \Rightarrow m=?$

Yanıt / The Answer is -2

51. $2x^2+kx-5=0$, ÇK(SS) $=\{x_1,x_2\}$

$(2x_1+1)\cdot(2x_2+1)=-20 \Rightarrow k=?$

Yanıt / The Answer is 11

52. $x^2-(a+1)x+a=0$, $x_1=-x_2$

$\Rightarrow x_1\cdot x_2=?$

Yanıt / The Answer is -1

53. $x^2-2x+p=0$, ÇK(SS) $=\{x_1,x_2\}$

$\frac{1}{x_1}+\frac{1}{x_2}=2 \Rightarrow p=?$

Yanıt / The Answer is 1

54. $x^2-6x+4=0$, ÇK(SS) $=\{x_1,x_2\}$

$\Rightarrow \frac{1}{x_1+1}+\frac{1}{x_2+1}=?$

Yanıt / The Answer is $\frac{8}{11}$

55. $x^2-3x-1=0$, ÇK(SS) $=\{x_1,x_2\}$;

$f(x)=x^2+bx+c$, ÇK(SS) $=\{x_1-2,x_2-2\}$

$\Rightarrow f(x)=?$

Yanıt / The Answer is x^2+x-3

56. $x^2-2x-4=0$, ÇK(SS) $=\{x_1,x_2\}$;

$f(x)=x^2+bx+c$, ÇK(SS) $=\{x_1-1,x_2-1\}$

$\Rightarrow f(x)=?$

Yanıt / The Answer is x^2-5

57. $x^2+2x+p-3=0$, ÇK(SS) $=\{x_1,x_2\}$,

$4x_1-x_2=7 \Rightarrow$ **$x_1 \cdot x_2$ = ?**

Yanıt / The Answer is –3

58. $x^2+(3x_2-5)x+2x_1=0$, ÇK(SS) $=\{x_1,x_2\}$,

$x_1,x_2 \neq 0 \Rightarrow$ **$x_1^2+x_2^2$ = ?**

Yanıt / The Answer is 13

59. $9x^2-8x+1=0$, ÇK(SS) $=\{x_1,x_2\}$

$\Rightarrow$ **$\sqrt{x_1}+\sqrt{x_2}$ = ?**

Yanıt / The Answer is $\frac{\sqrt{14}}{3}$

60. $3x^2+4x+3a-4=0$, ÇK(SS) $=\{x_1,x_2\}$;

$3x^2-3x-3a+3=0$, ÇK(SS) $=\{x_1,x_3\}$

$\Rightarrow$ **a = ?**

Yanıt / The Answer is – 1

61. $x^2-(a-1)x-8=0$, ÇK(SS) $=\{x_1,x_2\}$,

$x_1=x_2^2 \Rightarrow$ **a = ?**

Yanıt / The Answer is 3

62. $x^2-3mx+6n=0$, ÇK(SS) $=\{m,n\}$

$\Rightarrow$ **m + n = ?**

Yanıt / The Answer is 18

63. $x^2-4x+2k-1=0$, ÇK(SS) $=\{x_1,x_2\}$,

$x_1=3\cdot x_2 \Rightarrow$ **k = ?**

Yanıt / The Answer is 2

64. $2x^2-kx+4=0$, ÇK(SS) $=\{x_1,x_2\}$,

$x_1^2=4\cdot x_2 \Rightarrow$ **k = ?**

Yanıt / The Answer is 6

65. $x^2-4x+1=0$, ÇK(SS) $=\{x_1,x_2\}$

$\Rightarrow \dfrac{1}{\sqrt{x_1}}+\dfrac{1}{\sqrt{x_2}}=?$

Yanıt / The Answer is $\sqrt{6}$

66. $x^2-6x+c=0$, ÇK(SS) $=\{x_1,x_2\}$;

$x^2+ax-b+1=0$, ÇK(SS) $=\{x_1+2,x_2+2\}$

$\Rightarrow a=?$

Yanıt / The Answer is -10

67. $x^2-5x+1=0$, ÇK(SS) $=\{x_1,x_2\}$

$\Rightarrow \dfrac{1}{4-x_1}+\dfrac{1}{4-x_2}=?$

Yanıt / The Answer is -1

68. $x^2-5x+6=0$, ÇK(SS) $=\{x_1,x_2\}$

$\Rightarrow \left(\dfrac{1}{x_1}+x_2\right)\left(\dfrac{1}{x_2}+x_1\right)=?$

Yanıt / The Answer is $\dfrac{49}{6}$

69. $x^2+(m+5)x+m+1=0$, $x_1=-x_2$

$\Rightarrow m=?$

Yanıt / The Answer is -5

70. $(a-3)x^2-2ax+a+12=0$, ÇK(SS) $=\{x_1,x_2\}$;

$x_1=x_2 \Rightarrow a=?$

Yanıt / The Answer is 4

71. $2x^2-x+a+1=0$, ÇK(SS) $=\{x_1,x_2\}$;

$x_1-x_2=0 \Rightarrow a=?$

Yanıt / The Answer is $-\dfrac{7}{8}$

72. $(x-2)(x^2-3x+2)=0$

$\Rightarrow$ ÇK(SS) $=?$

Yanıt / The Answer is $\{1,2\}$

73. $\dfrac{x^2-3x+2}{(x-2)^2}=0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{1\}$

74. $\dfrac{x^2-3x-4}{x^2+1}=0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{-1,4\}$

75. $x^3-7x^2-8x=0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{-1,0,8\}$

76. $x^3+3x^2-4x-12=0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{-3,-2,2\}$

77. $x^3-7x^2+14x-8$, ÇK(SS) $=\{4,x_2,x_3\}$

$\Rightarrow$ $\mathbf{x_2+x_3=?}$

Yanıt / The Answer is 3

78. $x^3-6x^2+11x-6=0$, ÇK(SS) $=\{3,x_2,x_3\}$

$\Rightarrow$ $\mathbf{x_2 \cdot x_3=?}$

Yanıt / The Answer is 2

79. $x^3+mx^2+3x+5=0$,

ÇK(SS) $=\{x_1,x_2,x_3\}$,

$x_1+x_2+x_3=2 \Rightarrow$ **m = ?**

Yanıt / The Answer is −2

80. $x^3-3x^2-2x+6=0$, ÇK(SS) $=\{x_1,x_2,x_3\}$

$\Rightarrow$ $\mathbf{x_1+x_2+x_3=?}$

Yanıt / The Answer is 3

1. $x^2 + 7x + 12 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-4\}$ B) $\{-3\}$ C) $\{-4, -3\}$ D) $\{3, 4\}$ E) $\{4\}$

2. $f(x) = 2\,(x+2)\,(x+3)$,

$f(x_1) = f(x_2) = 0 \Rightarrow \dfrac{x_1 + x_2}{x_1 \cdot x_2} = ?$

A) $\frac{1}{6}$ B) $-\frac{1}{6}$ C) $\frac{5}{6}$ D) $-\frac{5}{6}$ E) 2

3. $x^2 - 6x + 13 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{4, 9\}$ B) $\{-10, -3\}$ C) $\{2, 5\}$ D) $\{-1, 6\}$ E) $\varnothing$

4. $\dfrac{5}{x-1} + \dfrac{x}{x+1} = \dfrac{10}{x^2-1} \Rightarrow x = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

5. $x^2 - 4x + 1 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{2 - \sqrt{3}, 2 + \sqrt{3}\}$ B) $\{2 - \sqrt{2}, 2 + \sqrt{2}\}$ C) $\{3 - \sqrt{2}, 3 + \sqrt{2}\}$ D) $\{2 - 2\sqrt{2}, 2 + 2\sqrt{2}\}$ E) $\{3 - 2\sqrt{2}, 3 + 2\sqrt{2}\}$

6. $\dfrac{x}{x+2} + \dfrac{x}{x+3} = 1 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-\sqrt{3}, \sqrt{3}\}$ B) $\{-\sqrt{6}, \sqrt{6}\}$ C) $\{-1, 1\}$ D) $\{-3, 3\}$ E) $\{-6, 6\}$

7. $\dfrac{1}{3x^2} + \dfrac{3}{4x} - \dfrac{15}{6} = 0 \Rightarrow \sum x = ?$

A) $\frac{5}{8}$ B) $\frac{3}{10}$ C) $-\frac{3}{10}$ D) $-\frac{5}{8}$ E) $-\frac{1}{2}$

8. $x^2 - 2x - 4 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-\sqrt{5}, \sqrt{5}\}$ B) $\{2 - \sqrt{5}, 2 + \sqrt{5}\}$ C) $\{-2\sqrt{5}, 2\sqrt{5}\}$ D) $\{1 - \sqrt{5}, 1 + \sqrt{5}\}$ E) $\{-2, 2\}$

9. $m \in Z^+$, ÇK(SS) = ∅,
$x^2 - 5mx + 25 = 0 \Rightarrow \sum \mathbf{m} = ?$
A) 1 B) 2 C) 3 D) 4 E) 5

10. $x^2 - mx - x + m = 0$,
$f(x_1) = f(x_2) = 0$, $x_1 = x_2 \Rightarrow \mathbf{m = ?}$
A) −2 B) −1 C) 0 D) 1 E) 2

11. $a \neq 1$, $ax^2 - (a+1)x + a = 0$,
ÇK(SS) = $\{x_1, x_2\}$, $x_1 = x_2 \Rightarrow \mathbf{a = ?}$
A) 2 B) $\frac{2}{3}$ C) $\frac{1}{3}$ D) $-\frac{1}{3}$ E) −1

12. $x^2 - 2x + m + 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 \neq x_2 \Rightarrow \mathbf{? < m < ?}$
A) $m > 0$ B) $m < 0$ C) $m < -1$
D) $m > -1$ E) $m > 1$

13. $x^4 - 13x^2 + 36 = 0 \Rightarrow$ **ÇK(SS) = ?**
A) {−2, 2} B) {−3, 3} C) {−3, −2}
D) {−3, −2, 2, 3} E) {2, 3}

14. $x^4 - 26x^2 + 25 = 0 \Rightarrow$ **ÇK(SS) = ?**
A) {−1, 11} B) {−5, 5} C) {−5, −1}
D) {−5, −1, 1, 5} E) {1, 5}

15. $3x^2 - (2k-1)x - 5k + 1 = 0$,
ÇK(SS) = $\{x_1, x_2\}$, $x_1 = -2$
$\Rightarrow \mathbf{x_2 = ?}$
A) 9 B) 8 C) 7 D) 6 E) 5

16. $x^2 - (2m-4)x - 15 = 0$,
ÇK(SS) = $\{x_1, x_2\}$, $x_1 = -3$
$\Rightarrow \mathbf{m - x_2 = ?}$
A) −2 B) 0 C) 3 D) 6 E) 8

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1	2	3	4	5	6	7	8
C	D	E	A	A	B	B	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	D	D	B	D	D	A	A

1. $2x^2 - ax + 2x + 1 = 0$,
$x = a \Rightarrow \mathbf{a = ?}$
A) -3 B) -2 C) -1 D) 1 E) 2

2. $mx^2 + 3mx - 2x + 6 = 0$,
ÇK(SS) = $\{x_1, x_2\}$, $x_1 = -1 \Rightarrow \mathbf{x_2 = ?}$
A) $-\frac{5}{2}$ B) $-\frac{3}{2}$ C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) $\frac{3}{2}$

3. $x^2 + mx + nx + n = 0$,
ÇK(SS) = $\{-1, 1\} \Rightarrow \mathbf{n = ?}$
A) -2 B) -1 C) 0 D) 1 E) 2

4. $x^2 + (a-2)x - a^2 + 2a - 3 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 = 2 \Rightarrow \mathbf{\sum a = ?}$
A) 1 B) 2 C) 3 D) 4 E) 5

5. $mx^3 + (m-3)x^2 - mx + 2 = 0$,
ÇK(SS) = $\{x_1, x_2, x_3\}$,
$x_1 = -1 \Rightarrow \mathbf{m = ?}$
A) 0 B) 1 C) 2 D) -3 E) 4

6. $18 \cdot 2^x + 5 \cdot 2^{x-1} - 164 = 0$
$\Rightarrow \mathbf{x = ?}$
A) 1 B) 2 C) 3 D) 4 E) 5

7. $3 \cdot 9^x - 8 \cdot 3^x - 3 = 0 \Rightarrow \mathbf{x = ?}$
A) $\frac{1}{3}$ B) 0 C) 1 D) $\frac{2}{3}$ E) 5

8. $4^x - 9 \cdot 2^x + 8 = 0 \Rightarrow$ **ÇK(SS) = ?**
A) $\{0, 3\}$ B) $\{-3, 0\}$ C) $\{-3\}$ D) $\{0\}$ E) $\{3\}$

9. $x - 7\sqrt{x} + 10 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{4\}$ B) $\{25\}$ C) $\{4, 25\}$ D) $\{2\}$ E) $\{2, 5\}$

10. $(x-2)^2 + 2(x-2)(x+3) + (x+3)^2 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-3\}$ B) $\left\{-\frac{3}{2}\right\}$ C) $\left\{-\frac{3}{2}, -\frac{1}{2}\right\}$ D) $\left\{-\frac{1}{2}\right\}$ E) $\left\{-\frac{1}{2}, 3\right\}$

11. $(x^2-1)^2 + 2(x^2-1) - 3 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-1, 1\}$ B) $\{-\sqrt{2}, \sqrt{2}\}$ C) $\{-\sqrt{3}, \sqrt{3}\}$ D) $\{-2, 2\}$ E) $\{-\sqrt{5}, \sqrt{5}\}$

12. $(2x+3)^2 - 9(x-1)^2 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{0\}$ B) $\{0, 3\}$ C) $\{3, 6\}$ D) $\{3, 9\}$ E) $\{0, 6\}$

13. $x \in \mathbb{R}$,

$(x^2-x)^2 - 2(x^2-x) - 8 = 0 \Rightarrow \sum x = ?$

A) -1 B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) 1

14. $x \in \mathbb{R}$,

$3^x - 10\sqrt{3^x} + 9 = 0 \Rightarrow \sum x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $\left(\frac{2x+1}{x}\right)^2 + 2\left(\frac{2x+1}{x}\right) - 3 = 0$

$\Rightarrow$ **ÇK(SS) = ?**

A) $\mathbb{R}$ B) $\left\{-\frac{1}{5}\right\}$ C) $\{-1\}$ D) $\left\{-1, -\frac{1}{5}\right\}$ E) $\{0\}$

16. $(x+3)^4 + 2(x+3)^2 - 3 = 0$

$\Rightarrow$ **ÇK(SS) = ?**

A) $\{-4\}$ B) $\{-2\}$ C) $\varnothing$ D) $\{-3\}$ E) $\{-4, -2\}$

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1	2	3	4	5	6	7	8
C	B	B	D	B	C	C	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	D	B	E	E	D	D	E

1. $4x^2 + 3x + m = 0$

$\Delta = 25 \Rightarrow$ **m = ?**

A) -7 B) -5 C) -3 D) -1 E) 0

2. $x^2 - nx + 18m^2 = 0$,

$\Delta = 32$,

$n = 8(m + 1) \Rightarrow$ **8m + n = ?**

A) 2 B) 4 C) 6 D) 8 E) 16

3. $\dfrac{x^2 + 4x - 5}{x^2 + 2x - 3} = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-10\}$ B) $\{-5\}$ C) $\{0\}$ D) $\{-3\}$ E) $\{-5, 1\}$

4. $(x - 1)^2 - 3x + 5 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{0, 1\}$ B) $\{1\}$ C) $\{2\}$ D) $\{2, 3\}$ E) $\{1, 2, 3\}$

5. $x^2 - 1 = 4(x + 1) \Rightarrow$ **ÇK(SS) = ?**

A) $\{-1\}$ B) $\{5\}$ C) $\{-1, 5\}$ D) $\mathbb{R}$ E) $\varnothing$

6. $2^{x^2 - 7x + 6} = 1$

$\Rightarrow$ **ÇK(SS) = ?**

A) $\{0, 1\}$ B) $\{-1, 0, 1\}$ C) $\{1, 6\}$ D) $\{6\}$ E) $\{-1, 1, 6\}$

7. $x^2 + 6x + 3 - a = 0$, ÇK(SS) $= \{x_1, x_2\}$,

$x_1 = x_2 \Rightarrow$ **a = ?**

A) -18 B) -12 C) -6 D) 0 E) 6

8. $x^2 + mx + n = 0$, ÇK(SS) $= \{x_1, x_2\}$,

$x_1 = -3$, $x_2 = 5$,

$(2x + 1)^2 + m(2x + 1) + n = 0$

$\Rightarrow$ **ÇK(SS) = ?**

A) $\{-2\}$ B) $\{2\}$ C) $\varnothing$ D) $\{-2, 2\}$ E) $\{0, 2\}$

9. $(x+3)^2 = 8x + a$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 = x_2 \Rightarrow$ **a = ?**

A) 13 B) 11 C) 9 D) 8 E) 7

10. $mx^2 - (2m-1)x + m + 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 = x_2 \rightarrow$ **m = ?**

A) $\frac{1}{4}$ B) $\frac{1}{8}$ C) $\frac{1}{3}$ D) $\frac{1}{9}$ E) $\frac{1}{24}$

11. $x^2 + (a-b)x + b - a = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 = x_2$, $a + b = 12$, $a \neq b \Rightarrow$ **b = ?**

A) 2^5 B) 2^4 C) 2^3 D) 2^2 E) -2^2

12. $ax^2 - 12x + a = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1, x_2 \in \mathbb{R}$, $x_1 \neq x_2$

$\rightarrow a \in \mathbb{Z}$, $\sum a$ **= ?**

A) -12 B) 0 C) 12 D) 24 E) 48

13. $x^2 - (2n-3m)x - 4m = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 = n$, $x_2 = m \Rightarrow \Delta$ **= ?**

A) 121 B) 100 C) 81 D) 16 E) 9

14. $x^2 - mx + n = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 = x_2 = 4 \Rightarrow \frac{n}{m}$ **= ?**

A) 2 B) 3 C) 4 D) 5 E) 6

15. $x^2 + (n-2m)x + 6n = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 = m$, $x_2 = n \Rightarrow$ **n-m = ?**

A) 90 B) 72 C) 54 D) 36 E) 18

16. $x^2 + (4-a)x + a - b + 6 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 = a$, $x_2 = b \Rightarrow$ **a + b = ?**

A) -6 B) -4 C) -2 D) 0 E) 2

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1	2	3	4	5	6	7	8
D	B	B	D	C	C	C	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	B	C	B	E	A	E	A

1. $x \in \mathbb{R}$,
$x^2 - 4x + 8 = 0 \Rightarrow$ **ÇK(SS) = ?**
A) $\mathbb{R}$ B) $\varnothing$ C) $\{0\}$ D) $\{0,1\}$ E) $\{-1\}$

2. $x^2 + bx + 4 = 0$, ÇK(SS) = $\varnothing$,
$b \in \mathbb{Z} \Rightarrow$ **min(b) = ?**
A) -3 B) -4 C) -5 D) -6 E) -7

3. $x^3 - 3x^2 + 2x = 0 \Rightarrow$ **ÇK(SS) = ?**
A) $\{0\}$ B) $\{1\}$ C) $\{0,2\}$ D) $\{1,2\}$ E) $\{0,1,2\}$

4. $(x+2)^2 + 3(x+2) + 2 = 0$
$\Rightarrow$ **ÇK(SS) = ?**
A) $\{-3\}$ B) $\{-4\}$ C) $\{-4,-3\}$ D) $\{3\}$ E) $\{-4,-3,3\}$

5. $x \in \mathbb{R}$, $\sqrt{x+2} - x = 5 \Rightarrow$ **ÇK(SS) = ?**
A) $\mathbb{R}$ B) -2 C) -5 D) -7 E) $\varnothing$

6. $\sqrt{2x-1} = x - 2 \Rightarrow$ **ÇK(SS) = ?**
A) $\{1,5\}$ B) $\{-1,1\}$ C) $\{1\}$ D) $\{5\}$ E) $\{3,5\}$

7. $x^3 - \frac{2}{x-5} = 64 + \frac{2}{5-x} \Rightarrow$ **x = ?**
A) 5 B) 4 C) 3 D) 2 E) 1

8. $9^x - 28 \cdot 3^x + 27 = 0$
$\Rightarrow$ **ÇK(SS) = ?**
A) $\{0\}$ B) $\{1\}$ C) $\{2\}$ D) $\{0,3\}$ E) $\{0,1,2,3\}$

9. $2x^2 - 8x + 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $x_1 + x_2 = ?$

A) -1 B) $\frac{5}{2}$ C) 3 D) $\frac{3}{2}$ E) 4

10. $x^2 + 4x + 2 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow \frac{x_1 + x_2}{x_1 \cdot x_2} = ?$

A) 2 B) -2 C) 1 D) -1 E) -4

11. $x^2 + 6x - 4 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $x_1^2 \cdot x_2 + x_2^2 \cdot x_1 = ?$

A) 2 B) -2 C) -10 D) -24 E) 24

12. $x^2 - 8x + 3b - 6 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$\frac{x_1}{5} = \frac{x_2}{3} \Rightarrow b = ?$

A) 7 B) 5 C) 9 D) 3 E) 13

13. $x^2 + (m - 3)x - 6 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_2 \cdot (1 - x_1) = 4 \Rightarrow m = ?$

A) 2 B) 6 C) 10 D) 14 E) 16

14. $x^2 - 5x + m = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_2 = x_1 + 1 \Rightarrow m = ?$

A) -5 B) -6 C) 6 D) 5 E) 11

15. $x^2 + 4x + 2a - 8 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 - x_2 = 8 \Rightarrow a = ?$

A) -8 B) -6 C) -4 D) -2 E) 0

16. $x^2 - 10x + 4 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow \sqrt{x_1} - \sqrt{x_2} \in R^+ = ?$

A) $\sqrt{3}$ B) 2 C) $\sqrt{5}$ D) $\sqrt{7}$ E) $\sqrt{6}$

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1	2	3	4	5	6	7	8
B	A	E	C	E	D	B	D
9	10	11	12	13	14	15	16
E	B	E	A	A	C	D	E

1. $x^2 - 3x - 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$ $\Rightarrow$ $\mathbf{x_1 + x_2 = ?}$

A) -3 B) $-\frac{3}{2}$ C) $\frac{3}{2}$ D) 3 E) -5

2. $x^2 - 6x + m = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 \cdot x_2 + x_1 + x_2 = 13 \Rightarrow$ $\mathbf{m = ?}$

A) 4 B) 5 C) 6 D) 7 E) 8

3. $3x^2 - (m-2)x + 2 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 + x_2 = -2 \Rightarrow$ $\mathbf{m = ?}$

A) -8 B) -6 C) -4 D) -2 E) -1

4. $x^2 + 12x - 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$ $\Rightarrow$ $\mathbf{x_1 \cdot x_2 = ?}$

A) -5 B) -2 C) 5 D) 6 E) 12

5. $x^2 - (a-2)x + 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 + \frac{1}{x_2} = 6 \Rightarrow$ $\mathbf{a = ?}$

A) 5 B) 6 C) 7 D) 8 E) 9

6. $2x^2 + 5x - 7 = 0$,

$f(x_1) = f(x_2) = 0 \Rightarrow \frac{1}{x_1} + \frac{1}{x_2} = ?$

A) $\frac{5}{2}$ B) $\frac{7}{2}$ C) $\frac{7}{5}$ D) $\frac{5}{7}$ E) $\frac{2}{7}$

7. $2x^2 - 4x - 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow \frac{1}{x_1} + \frac{1}{x_2} = ?$

A) -2 B) $-\frac{4}{5}$ C) $\frac{4}{5}$ D) 2 E) 4

8. $mx^2 + (1-m)x + 3 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 + x_2 = 17 \Rightarrow$ $\mathbf{x_1 \cdot x_2 = ?}$

A) 48 B) 1 C) 17 D) -17 E) -48

9. $mx^2 - 5x - 3m + 2 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 \cdot x_2 = -\frac{1}{3} \Rightarrow$ **m = ?**

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{4}$ D) $\frac{4}{5}$ E) $\frac{5}{6}$

10. $x^2 - 2x - 3 = 0$, $f(x_1) = f(x_2) = 0$

$\Rightarrow \left(x_1 + \frac{1}{x_2}\right) \cdot \left(x_2 + \frac{1}{x_1}\right) = ?$

A) $-\frac{15}{4}$ B) $-\frac{16}{3}$ C) $\frac{3}{2}$ D) $-\frac{4}{3}$ E) $\frac{1}{2}$

11. $x^2 - 2x - 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow \left(x_1 + \frac{1}{x_2}\right) \cdot \left(x_2 - \frac{1}{x_1}\right) = ?$

A) $-\frac{24}{5}$ B) $-\frac{16}{5}$ C) $-\frac{12}{5}$ D) $-\frac{8}{5}$ E) $-\frac{4}{5}$

12. $f(x) = x^2 - (m+4)x + 5m - 2$, $f(x_1) = f(x_2) = 0$,

$\frac{6x_1}{x_2} = x_1 - 6 \Rightarrow$ **m = ?**

A) −28 B) −26 C) −24 D) −22 E) −20

13. $2x^2 - 4x + n = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$3x_1 + x_2 = 8 \Rightarrow$ **n = ?**

A) −6 B) −3 C) 1 D) 3 E) 6

14. $m \neq 0$,

$mx^2 - (m-1)x + 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 + x_2 = 5 \cdot x_1 \cdot x_2 \Rightarrow$ **m = ?**

A) 8 B) 6 C) 4 D) 2 E) 1

15. $f(x) = x^2 + x + m$

$f(x_1) = f(x_2) = 0$, $x_1 = 2 \cdot x_2 \Rightarrow$ **m = ?**

A) $\frac{2}{3}$ B) $\frac{7}{5}$ C) $\frac{7}{11}$ D) $\frac{3}{4}$ E) $\frac{2}{9}$

16. $x^2 - 4x + 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow x_1^3 + x_2^3 = ?$

A) 52 B) 42 C) 32 D) 22 E) 12

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1	2	3	4	5	6	7	8
D	D	C	A	D	D	B	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	D	A	B	A	B	E	A

1. $x^2-4x+2=0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $\mathbf{x_1^2 \cdot x_2 + x_1 \cdot x_2^2 = ?}$

A) 2 B) 3 C) 4 D) 6 E) 8

2. $3x^2-(2m-3)x-12=0$, $f(x_1)=f(x_2)=0$,

$x_1+\frac{1}{x_2}=\frac{3}{4}$ $\Rightarrow$ **m = ?**

A) −4 B) −3 C) 8 D) 10 E) 12

3. $(m-1)x^2+2x+m+3=0$, $f(x_1)=f(x_2)=0$,

$x_1 \cdot x_2=\frac{2}{m-1}$ $\Rightarrow$ **m = ?**

A) −3 B) −1 C) 1 D) 3 E) 5

4. $m \in \mathbb{Z}^+$,

$x^2-8x+m^2-1=0$, ÇK(SS) = $\{x_1 x_2\}$,

$x_2=x_1+2$ $\Rightarrow$ **m = ?**

A) 2 B) 3 C) 4 D) 5 E) 6

5. $x^2-5x+m=0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1=4 \cdot x_2$ $\Rightarrow$ **m = ?**

A) −4 B) −1 C) 0 D) 1 E) 4

6. $x^2+mx-27=0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1=x_2^2$ $\Rightarrow$ **m = ?**

A) 6 B) 3 C) 2 D) −2 E) −6

7. $x^2-5x-4k-6=0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1-3 \cdot x_2=13$ $\Rightarrow$ **k = ?**

A) −2 B) −1 C) 0 D) 1 E) 2

8. $x^2-13x+3m+12=0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_2=2 \cdot x_1+1$ $\Rightarrow$ **m = ?**

A) 5 B) 6 C) 8 D) 9 E) 10

9. $m \in Z^+$, $x^2-(m-1)x+2=0$,
ÇK(SS) = $\{x_1, x_2\}$, $x_1^2+x_2^2=5 \Rightarrow$ **m = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

10. $x^2+(2m-1)x+m-3=0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1^2+x_2^2=7 \Rightarrow \sum$ **m = ?**

A) 0 B) $\frac{1}{2}$ C) 1 D) $\frac{3}{2}$ E) 2

11. $x^2-4x+1=0$, ÇK(SS) = $\{x_1, x_2\} \Rightarrow \sqrt{x_1}+\sqrt{x_2}=$ **?**

A) $\sqrt{2}$ B) 2 C) $\sqrt{6}$ D) $2\sqrt{2}$ E) $2\sqrt{3}$

12. $x^2-8x+4=0$,
ÇK(SS) = $\{x_1, x_2\} \Rightarrow \frac{1}{\sqrt{x_1}}+\frac{1}{\sqrt{x_2}}=$ **?**

A) $\sqrt{2}$ B) $\sqrt{3}$ C) 2 D) $\sqrt{5}$ E) 3

13. $x^2-8x-2=0$, ÇK(SS) = $\{x_1, x_2\}$
$\Rightarrow |x_1-x_2|=$ **?**

A) $3\sqrt{2}$ B) $4\sqrt{2}$ C) $5\sqrt{2}$ D) $6\sqrt{2}$ E) $8\sqrt{2}$

14. $x^2-3x+m=0$, ÇK(SS) = $\{x_1, x_2\}$,
$|x_1^2-x_2^2|=6 \Rightarrow$ **m = ?**

A) $\frac{1}{4}$ B) $\frac{3}{4}$ C) 1 D) $\frac{5}{4}$ E) $\frac{7}{4}$

15. $x^2+kx-2=0$, ÇK(SS) = $\{x_1, x_2\}$,
$\frac{2}{3x_2}+\frac{2}{3x_1}=5 \Rightarrow$ **k = ?**

A) 15 B) 12 C) 10 D) 9 E) 8

16. $x^2-mx-m+2=0$, ÇK(SS) = $\{x_1, x_2\}$,
$\frac{1}{x_1+1}+\frac{1}{x_2+1}=\frac{1}{4} \Rightarrow$ **m = ?**

A) -3 B) $-\frac{5}{4}$ C) 2 D) $\frac{5}{2}$ E) 3

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1	2	3	4	5	6	7	8
E	B	B	C	E	E	E	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	D	C	B	D	D	A	B

1. $2x^2 + mx - 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 + x_2 = m + 6 \Rightarrow \mathbf{m = ?}$

A) -3 B) -4 C) 3 D) 4 E) 5

2. $x^2 + 4x + m + 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 \cdot x_2 = m^2 + 2m - 5 \Rightarrow \sum \mathbf{m = ?}$

A) 5 B) 4 C) 3 D) -1 E) 0

3. $x^2 - (m - 3n + 20)x + m + n = 0$
$f(m) = f(n) = 0 \Rightarrow \mathbf{m - n = ?}$

A) $-\frac{15}{4}$ B) $-\frac{15}{2}$ C) -25 D) $\frac{15}{2}$ E) $\frac{15}{4}$

4. $x^2 - 8x + m - 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 - x_2 = 4 \Rightarrow \mathbf{m = ?}$

A) 12 B) 13 C) 15 D) 16 E) 17

5. $mx^2 - 6mx + 2m + 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 = 2 \Rightarrow \mathbf{x_1^2 + x_2^2 = ?}$

A) 24 B) 20 C) 18 D) 12 E) 10

6. $x^2 + mx - 3 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1^3 + x_2^3 = 0 \Rightarrow \mathbf{m = ?}$

A) 0 B) -3 C) 1 D) -2 E) 3

7. $x^2 - 2x - 2\sqrt{3} = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$\Rightarrow \mathbf{x_1^3 \cdot x_2^2 + x_1^2 \cdot x_2^3 = ?}$

A) 12 B) 24 C) 16 D) 18 E) 20

8. $x^2 - (m - 2)x + 2 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1^3 \cdot x_2 + x_1 \cdot x_2^3 = 10 \Rightarrow \sum \mathbf{m = ?}$

A) 13 B) 10 C) 7 D) 6 E) 4

9. $x^2 + bx + c = 0$,
ÇK(SS) = $\{\sqrt{2} - \sqrt{3},\ \sqrt{2} + \sqrt{3}\}$
$\Rightarrow$ **b = ?**

A) $-2\sqrt{2}$ B) $2\sqrt{5} - 1$ C) 2
D) 1 E) 0

10. $x^2 - mx + 3 = 0$, ÇK(SS) = $\{1, x_1\}$;
$x^2 - (m + 1)x + k = 0$, ÇK(SS) = $\{2, x_2\}$
$\Rightarrow$ **k = ?**

A) 3 B) 4 C) 5 D) 6 E) 8

11. $x^2 - 2x + a = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 = x_2 + 4 \Rightarrow$ **a = ?**

A) −5 B) −3 C) 0 D) 2 E) 5

12. $mx^2 - 2(m - 1)x - 2 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 = -x_2 \Rightarrow$ **m = ?**

A) $m < 0$ B) $m > 0$ C) $m = 1$
D) $m > 1$ E) $m < 1$

13. $-x^2 + (m - 2)x - 8 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1^2 = x_2 \Rightarrow$ **m = ?**

A) 2 B) 4 C) 6 D) 8 E) 10

14. $x^2 + (m - 3)x + 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 < 0,\ x_2 < 0$
$\Rightarrow$ **? < m < ?**

A) $2 < m < 5$ B) $m > 5$ C) $m > 3$
D) $m < 1$ E) $1 < m < 5$

15. $x^2 - |x| - 12 = 0 \Rightarrow \prod x = ?$

A) −9 B) −12 C) −16 D) −20 E) −24

16. $f(x) = x^2 - |2x - 4| - 7 = 0$
$f(x_1) = f(x_2) = 0 \Rightarrow$ **$x_1 + x_2$ = ?**

A) $2 - 2\sqrt{3}$ B) $2 + \sqrt{3}$ C) $1 - \sqrt{3}$
D) $1 + \sqrt{3}$ E) 2

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1	2	3	4	5	6	7	8
B	D	A	E	B	A	B	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	D	B	C	D	C	C	A

1. $\frac{x^2-2x-3}{x^2-x-6}=0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-3\}$ B) $\{-1\}$ C) $\{1\}$ D) $\{3\}$ E) $\{-1, 3\}$

2. $(2x-1)\cdot(x+1)+(2x-1)\cdot(x-3)=0 \Rightarrow \sum \mathbf{x} = ?$

A) $\frac{3}{2}$ B) 2 C) $\frac{5}{2}$ D) 3 E) $\frac{7}{2}$

3. $(3x-2)^2-5(3x-2)-6=0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ $\mathbf{x_1+x_2=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $x^2+mx+1=0$, ÇK(SS) = $\{x_1, x_2\}$;

$x^2+x+m=0$, ÇK(SS) = $\{x_1, x_3\} \Rightarrow$ **m = ?**

A) −2 B) −1 C) 0 D) 1 E) 2

5. $x^2-bx+c=0$, ÇK(SS) = $\{4, x_1\}$;

$x^2-mx+n=0$, ÇK(SS) = $\{5, -x_1\} \Rightarrow$ **b + m = ?**

A) 2 B) 3 C) 5 D) 6 E) 9

6. $x^2-mx-2x-m=0$, ÇK(SS) = $\{x_1, x_2\}$,

$\frac{1}{x_1}+\frac{1}{x_2}=m+2 \Rightarrow \sum \mathbf{m} = ?$

A) −1 B) −2 C) −3 D) −4 E) −5

7. $3x^2-(2m-1)x+5m-3=0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1=x_2 \Rightarrow \sum \mathbf{m} = ?$

A) 15 B) 16 C) 18 D) 20 E) 22

8. $m \neq 0$ ve/and $n \neq 0$,

$x^2-(3m-2n)x+m=0$, ÇK(SS) = $\{m, n\}$

$\Rightarrow$ **m + n = ?**

A) 3 B) $\frac{5}{2}$ C) 2 D) $\frac{3}{2}$ E) 1

9. $x \in \mathbb{R}$,
$x^2 - \sqrt{x^2 - 4x + 4} = -2 \Rightarrow$ **ÇK(SS) = ?**
A) $\{-2\}$ B) $\{-2, 0\}$ C) $\{-1, 0\}$ D) $\{-2, -1\}$ E) $\{-1\}$

10. $m \in \mathbb{R}^+$, $x^2 - (m-4)x + 25 = 0$
ÇK(SS) = $\{x_1, x_2\}$, $x_1 = x_2 \Rightarrow$ **m = ?**
A) 10 B) 12 C) 14 D) 16 E) 18

11. $x^2 - (m-4)x + 16 = 0$,
ÇK(SS) = $\{x_1, x_2\}$, $\sqrt{x_1} + \sqrt{x_2} = 3 \Rightarrow$ **m = ?**
A) 1 B) 2 C) 3 D) 4 E) 5

12. $2x^2 - 3x + m + 1 = 0$, $f(x_1) = f(x_2) = 0$,
$x_1 + x_2 + x_1 \cdot x_2 = -8 \Rightarrow$ **m = ?**
A) −20 B) −16 C) −14 D) −12 E) −10

13. $x^2 + (2-m) \cdot x + 3n = 0$,
ÇK(SS) = $\{m, n\} \Rightarrow$ **m − n = ?**
A) 6 B) 5 C) 4 D) 3 E) 2

14. $(m+1)x^2 - 2mx + m - 2 = 0$,
ÇK(SS) = $\{x_1, x_2\}$, $x_1 - x_2 = 2 \Rightarrow \sum$ **m = ?**
A) $-\frac{1}{4}$ B) $-\frac{1}{3}$ C) −1 D) $\frac{1}{2}$ E) $\frac{1}{4}$

15. $\left(x + \frac{1}{x}\right)^2 - 6x - \frac{6}{x} + 9 = 0$
ÇK(SS) = $\{x_1, x_2\} \Rightarrow$ **$x_1 + x_2$ = ?**
A) −3 B) −2 C) 2 D) 3 E) 6

16. $4^x - 10 \cdot 2^x + 16 = 0 \Rightarrow$ **ÇK(SS) = ?**
A) $\{1\}$ B) $\{2\}$ C) $\{3\}$ D) $\{1, 3\}$ E) $\{2, 3\}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	A	C	A	E	C	B	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	C	E	A	B	C	D	D

1. $x^2 - 3x + m - 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 \cdot x_2 = -2m + 5 \rightarrow$ **m = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

2. $2x^2 - x + p^2 + 3p = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 \cdot x_2 = 5$, $p \in \mathbb{R}^+ \rightarrow$ **p = ?**

A) 1 B) 2 C) 5 D) 6 E) 10

3. $x^2 - (m-2)x - 5 = 0$,
$f(x_1) = f(x_2) = 0$, $x_1 + \frac{1}{x_2} = 2 \rightarrow$ **m = ?**

A) $\frac{1}{2}$ B) $\frac{5}{2}$ C) $\frac{9}{2}$ D) $\frac{13}{2}$ E) $\frac{17}{2}$

4. $x^2 - 8x + c + 6 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1^2 - x_2^2 = 16 \Rightarrow$ **c = ?**

A) 9 B) 16 C) 25 D) 36 E) 49

5. $x^2 - 10x + m^2 + 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$x_1 - x_2 = 4$, $m > 0 \rightarrow$ **m = ?**

A) 16 B) 12 C) 8 D) 4 E) 2

6. $(m-1)x^2 - (2m+1)x + m - 16 = 0$,
$f(x_1) = f(x_2) = 0$, $x_1 + x_2 = 3 \rightarrow$ **$x_1 \cdot x_2$ = ?**

A) −4 B) −5 C) −11 D) −17 E) −20

7. $m \in \mathbb{R}^+$,
$(m-4)x^2 + 4x + m + 7 = 0$,
$f(x_1) = f(x_2) = 0$, $x_1 \cdot x_2 = 2m + 2 \Rightarrow$ **m = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

8. $x^2 - 3x + 2m = 0$
ÇK(SS) = $\{x_1, x_2\}$,
$x_1^3 + x_2^3 = 9 \Rightarrow$ **m = ?**

A) 81 B) 27 C) 18 D) 9 E) 1

9. $x^2 - mx + 9 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$\sqrt{x_1} + \sqrt{x_2} = 4 \Rightarrow$ **m = ?**

A) −10 B) 10 C) 0 D) 9 E) −9

10. $3x^2 + 4x - 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow \sqrt{x_1^2 + x_2^2 - x_1 \cdot x_2} = ?$

A) $\frac{3}{5}$ B) $\frac{4}{3}$ C) $\frac{5}{3}$ D) $\frac{3}{4}$ E) $\frac{1}{4}$

11. $x^2 + 6x - 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$;

$ax^2 + bx + c = 0$, ÇK(SS) = $\left\{\frac{1}{x_1}, \frac{1}{x_2}\right\}$

$\Rightarrow$ **a + b + c = ?**

A) −14 B) 14 C) 0 D) 6 E) −6

12. $x^2 - 7x + 12 = 0$, ÇK(SS) = $\{x_1, x_2\}$;

$ax^2 + bx + c = 0$, ÇK(SS) = $\left\{\frac{1}{x_1}, \frac{1}{x_2}\right\}$

$\Rightarrow$ **a + b + c = ?**

A) 6 B) 3 C) 0 D) −3 E) −18

13. $2x^2 - 3x + 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$;

$ax^2 + bx + c = 0$, ÇK(SS) = $\{x_1 - 3, x_2 - 3\}$

$\Rightarrow$ **a + b − c = ?**

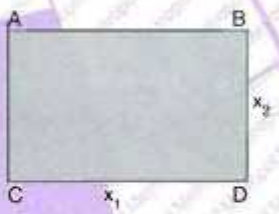
A) −3 B) −2 C) −1 D) 0 E) 3

14. $x \in \mathbb{R}$,

$x^2 - |3x - 4| = 0 \Rightarrow \sum x = ?$

A) −8 B) −5 C) −3 D) 5 E) 8

15.



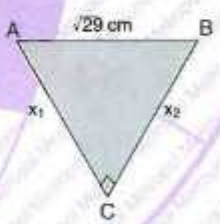
ABCD bir dikdörtgendir. ABCD is a rectangle.

Çevre / The perimeter (ABCD) = 20 cm, A(ABCD) = 21 cm²,

$3x^2 + tx + (2p - 1) = 0$, ÇK(SS) = $\{x_1, x_2\} \Rightarrow$ **t + p = ?**

A) −7 B) −5 C) −3 D) 2 E) 4

16.



$|BC| = x_2$, $|AC| = x_1$, $[AC] \perp [BC]$,

$p < 0$, $x^2 + (3p + 1)x + 4k = 0$,

ÇK(SS) = $\{x_1, x_2\}$, $A(\widehat{ABC}) = 5\,cm^2 \Rightarrow$ **2k − 3p = ?**

A) 19 B) 17 C) 13 D) 11 E) 8

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	B	B	A	D	A	E	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	C	E	A	A	C	D	C

1. $\frac{3}{x}+\frac{x}{x-1}+\frac{x-2}{x}=2 \Rightarrow x=?$

A) $\frac{1}{4}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$ D) $\frac{3}{4}$ E) $\frac{5}{6}$

2. $\frac{x^2-7x+12}{x^2-4x} : \frac{x^2-9}{3x+9}=?$

A) 3 B) 3x C) x D) $\frac{3}{x}$ E) $\frac{1}{x}$

3. $\frac{2x^2+3xy-5y^2}{\left(\frac{2x}{5}+y\right)\cdot\left(\frac{y-x}{2xy}\right)}=?$

A) 2xy B) −10xy C) 10xy D) 6xy E) xy

4. $\left.\begin{array}{l}2x^2-xy-3y^2=42\\ x+y=6\end{array}\right\} \Rightarrow y=?$

A) 0 B) 1 C) 2 D) 3 E) 4

5. $(x^2+x)^2-8x^2-8x+12=0$

$\Rightarrow \prod x=?$

A) −12 B) −6 C) 6 D) 12 E) 18

6. $x^2-4x+2m-1=0$, ÇK(SS) $=\{x_1,x_2\}$,

$x_1^2-x_2^2=24 \Rightarrow m=?$

A) −5 B) −4 C) −3 D) −2 E) −1

7. $f(x)=x^2-x\ |x-4|-48$,

$f(x_1)=f(x_2)=0 \Rightarrow x_1+x_2=?$

A) 8 B) 10 C) 12 D) 14 E) 16

8. $2x+y=6$,

$(3x-y)^2-2\ (3x-y)-8=0$

$\Rightarrow \sum y=?$

A) 6 B) $\frac{31}{5}$ C) $\frac{32}{5}$ D) $\frac{34}{5}$ E) 7

9. $f(x) = x^2 - 4x + m - 3$,
$f(x_1) = f(x_2) = 0$, $x_1 = 3 \cdot x_2$
$\Rightarrow$ **m = ?**

A) 5 B) 6 C) 7 D) 8 E) 9

10. $k \in R^+$,
$3x^2 + kx - 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$,
$|x_1 - x_2| = 3 \Rightarrow$ **k = ?**

A) $\sqrt{22}$ B) $2\sqrt{5}$ C) $\sqrt{19}$ D) $3\sqrt{2}$ E) $\sqrt{21}$

11. $\sqrt[3]{x^2} - 6 \cdot \sqrt[3]{x} + 8 = 0 \Rightarrow \sum x = ?$

A) 6 B) 8 C) 24 D) 64 E) 72

12. $a \in R$,
$a^2 + 3a + \sqrt{a^2 + 3a + 5} = 7$
$\Rightarrow a^2 + 3a + 8 = ?$

A) 4 B) 8 C) 9 D) 10 E) 12

13. $(a^2 + 2a)^2 - 18 \cdot (a^2 + 2a) + 45 = 0$
$\Rightarrow$ **max(a) + min(a) = ?**

A) −2 B) −1 C) 0 D) 1 E) 2

14. $f(x) = x^2 - 4x - 3$,
$f(x_1) = f(x_2) = 0 \Rightarrow |x_1^2 - x_2^2| = ?$

A) $4\sqrt{5}$ B) $8\sqrt{5}$ C) $4\sqrt{7}$ D) $8\sqrt{7}$ E) $12\sqrt{7}$

15. $x^2 + mx - 2x = 16$, ÇK(SS) = $\{x_1, x_2\}$,
$x_2 = 2 \cdot x_1^2 \Rightarrow$ **m = ?**

A) −4 B) −3 C) −2 D) 2 E) 3

16. $\sqrt{x + 34} - x = 4 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-9\}$ B) $\{2\}$ C) $\{-9, 2\}$ D) $\{2, 9\}$ E) $\{9\}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	D	B	B	D	D	A	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	E	E	E	A	D	A	B

1. $\frac{x}{x-2} - \frac{1}{x+1} + 2 = \frac{x}{x+1}$

$\Rightarrow$ **x = ?**

A) −2 B) −1 C) 0 D) 1 E) 2

[GAZİANTEP ÜNİVERSİTESİ – YÖS 2019]

2. $P(x) = 3x^2 + kx + 1$

$P(x_1) = P(x_2) = 0$

$x_1 \neq x_2,\ x_1 + x_2 = 2x_1 \cdot x_2$

$\Rightarrow$ **k = ?**

A) −3 B) −2 C) −1 D) 1 E) 2

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

3. $\left.\begin{array}{l} 2x^2 + 9xy - 5y^2 = 40 \\ x + 5y = 4 \end{array}\right\} \Rightarrow$ **y = ?**

A) 1 B) $\frac{1}{3}$ C) $-\frac{2}{11}$ D) $\frac{3}{13}$ E) $-\frac{5}{17}$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

4. $x^2 - 2x - 1 = 0$

$\Rightarrow \frac{x^2 - x - 1}{4x} = ?$

A) $\frac{5}{4}$ B) $\frac{1}{4}$ C) $-\frac{1}{4}$ D) $\frac{1}{2}$ E) 3

[ULUDAĞ ÜNİVERSİTESİ – YÖS 2018]

5. $\frac{x^2 - 5x + 6}{x^2 - 3x} : \frac{x^2 - 4}{2x + 4} = ?$

A) 1 B) 2x C) x D) $\frac{2}{x}$ E) $\frac{1}{x}$

[ULUDAĞ ÜNİVERSİTESİ – YÖS 2018]

6. $\frac{2}{x} + \frac{x}{x+1} + \frac{x-2}{x} = \frac{5}{4}$

$\Rightarrow$ **x = ?**

A) $\frac{1}{4}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$ D) $\frac{3}{4}$ E) $\frac{4}{5}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2018]

7. $\frac{x^2 - 3x - 10}{\left(\frac{2}{x} + 1\right)\left(\frac{5}{x} - 1\right)} = ?$

A) −3x B) −x + 2 C) $-x^2$ D) x + 1 E) x − 5

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

8. $2a - \frac{1}{a} = 8 \Rightarrow a^2 + \frac{1}{4a^2} = ?$

A) 68 B) 60 C) 17 D) 15 E) 14

[KARABÜK ÜNİVERSİTESİ – YÖS 2018]

9. $x \in Z^+$,

$\frac{1}{x} - \frac{1}{x+2} = \frac{2}{15} \Rightarrow x = ?$

A) $\frac{1}{5}$ B) $\frac{1}{3}$ C) 3 D) 5 E) $\frac{1}{7}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2017]

10. **$y = 2x^2 + 4x - m + 3$ fonksiyonu x eksenini kesmediğine göre, m sayısının alabileceği en büyük tam sayı değeri kaçtır?**

If the function $y = 2x^2 + 4x - m + 3$ doesn't intersect the x – axis what is the biggest integer value of m?

A) −4 B) −3 C) 2 D) 4 E) 0

[ANADOLU ÜNİVERSİTESİ – YÖS 2017]

11. $f(x) = x^2 + x + m$

$f(x_1) = f(x_2) = 0$

$x_1 = 2 \cdot x_2 \Rightarrow m = ?$

A) $\frac{2}{3}$ B) $\frac{7}{5}$ C) $\frac{7}{11}$ D) $\frac{3}{4}$ E) $\frac{2}{9}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

12. $f(x) = mx^2 + 6x - n$

$f(x_1) = f(x_2) = 0$

$x_1 = x_2 \Rightarrow m \cdot n = ?$

A) −11 B) −10 C) −9 D) −8 E) −7

[İSTANBUL ÜNİVERSİTESİ – YÖS 2014]

13. $f(x) = 2x^2 - 5x + k$

$f(x_1) = f(x_2) = 0$

$x_1 = \frac{7}{x_2} \Rightarrow \frac{1}{x_1} + \frac{1}{x_2} = ?$

A) $\frac{5}{7}$ B) $\frac{7}{5}$ C) $\frac{14}{5}$ D) $\frac{5}{14}$ E) $\frac{5}{2}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

14. $\left(\frac{a^2-1}{a^2}\right)\left(\frac{a}{\frac{1}{a}-1}\right) = ?$

A) a + 1 B) −a + 1 C) a − 1 D) −a − 1 E) $\frac{a+1}{a}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

15. $\frac{(k-3)^2 + (k-1) - (3k-7)}{k(k-5)} = ?$

A) k + 3 B) $\frac{k-3}{k-5}$ C) $\frac{k+5}{k}$ D) $\frac{k-3}{k}$ E) $\frac{k-5}{k-3}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

16. $x^2 + (m^2 - 16)x - 2 + m = 0$

$x_1 + x_2 = 0 \Rightarrow m = ?$

A) −4 B) −2 C) 0 D) 2 E) 4

[AKDENİZ ÜNİVERSİTESİ – YÖS 2013]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	B	C	B	D	B	C	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	E	E	C	D	D	D	A

BÖLÜM CHAPTER 3

TARİHSEL NOT / HISTORICAL NOTE

GABRIEL CRAMER [1704 - 1752]

İsviçreli matematikçi. 18 yaşında doktorasını aldı ve 20 yaşında Cenevre Üniversitesi'nde Matematik başkanlığı yaptı. 1750'de, Cramer'in kuralını yayınladı ve sistem tarafından ima edilen belirleyiciler açısından, benzersiz bir çözüme sahip doğrusal denklem sisteminde herhangi bir bilinmeyenin çözümü için genel bir formül verdi. Bu kural hala standarttır.

Swiss mathematician. He received his doctorate's degree at the age of 18, and at the age of 20, he became the head of mathematics at the University of Geneva. In 1750, he published Cramer's rule and gave a general formula for the solution of any unknown in the system of linear equations with a unique solution, for the determinants implied by the system. This rule is still standard.

İKİNCİ DERECEDEN EŞİTSİZLİKLER
QUADRATIC INEQUALITIES

Bu bölüm 48 alıştırma sorusu, 88 test sorusu, 8 YÖS sorusu içermektedir.

This chapter includes 48 exercise questions, 88 test questions, and 8 YÖS questions.

BÖLÜM / CHAPTER 3

İKİNCİ DERECEDEN EŞİTSİZLİKLER / QUADRATIC INEQUALITIES

İKİNCİ DERECEDEN EŞİTSİZLİKLER
QUADRATIC INEQUALITIES

1. $(x-2)^2 \geq 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is R

2. $(x+3)^2 > 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $R-\{-3\}$

3. $(x+2)^2 < 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\emptyset$

4. $(x+5)^2 \leq 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-5\}$

5. $x \in Z$,
$(x+3)\cdot(x-1) < 0 \Rightarrow \sum x = ?$

Yanıt / The Answer is -3

6. $x \in Z^-$,
$(x+5)\cdot(x-2)\cdot(1-x) < 0 \Rightarrow \sum x = ?$

Yanıt / The Answer is -10

7. $-x^2 \geq 9x \Rightarrow ? < x < ?$

Yanıt / The Answer is $-9 \leq x \leq 0$

8. $-x^2+4x < 4 \Rightarrow ? < x < ?$

Yanıt / The Answer is $R-\{2\}$

9. $-x^2 \cdot (x^2-5x+6) > 0 \Rightarrow ? < x < ?$

Yanıt / The Answer is $2 < x < 3$

10. $x^2 \cdot (x^2-3x-10) < 0 \Rightarrow ? < x < ?$

Yanıt / The Answer is $(-2,5)-\{0\}$

11. $x^2-x+1 > 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\mathbb{R}$

12. $x^2-x+6 < 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\emptyset$

13. $(x^2+3x-10)^2 \cdot (x-2)^3 < 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(-\infty,2)-\{-5\}$

14. $\frac{x-1}{x+3} < 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(-3,1)$

15. $\frac{x+1}{x-1} < -3 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left(\frac{1}{2},1\right)$

16. $x \le \frac{1}{x} \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(-\infty,-1] \cup (0,1]$

17. $x < \frac{4}{x} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(-\infty,-2)\cup(0,2)$

18. $(x+1)\cdot(x^2-1) > 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(1,\infty)$

19. $\frac{(x-2)\cdot(x+1)}{x-4} < 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(-\infty,-1)\cup(2,4)$

20. $\frac{(3-x)^{15}\cdot(x-1)^5}{(x+2)^4} \geq 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $[1,3]$

21. $\frac{(1-x^2)\cdot(x^2+2x-3)}{x^2+1} \geq 0,$
$x \in \mathbb{Z} \Rightarrow \sum x = ?$

Yanıt / The Answer is -5

22. $\frac{(x-1)\cdot(x^2-2x-3)}{-x+1} \geq 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $[-1,3]-\{1\}$

23. $\frac{5^x\cdot(x-2)}{3-x} \leq 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(-\infty,2]\cup(3,\infty)$

24. $\left(\frac{3}{7}\right)^{x^2+3} > \left(\frac{7}{3}\right)^{-4x} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(1,3)$

25. $x \in \mathbb{Z}$,
$\sqrt{x+3} \cdot (3x-6) < 0 \Rightarrow \sum x = ?$

Yanıt / The Answer is -2

26. $x^2+1 < x+3 < x^2-3 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\emptyset$

27. $\left.\begin{array}{l} x \cdot (x-3) < 0 \\ x-1 > 0 \end{array}\right\} \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(1,3)$

28. $x \in \mathbb{Z}^+$, $-2 \le x^2-2x-5 \le 10$
$\Rightarrow \min(x) = ?$

Yanıt / The Answer is 3

29. $\dfrac{|x-5| \cdot (x^3-9x)}{(x^2+x+5) \cdot (x-2)} < 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $[-3,0] \cup (2,3] \cup \{5\}$

30. $x < 7\sqrt{x-12} \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(9,16)$

31. $\left.\begin{array}{l} 4x-x^2 \ge 0 \\ \dfrac{x-2}{x+1} \le 0 \end{array}\right\} \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $[0,2]$

32. $x < \dfrac{16}{x} < 4 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(-\infty,-4)$

33. $x \in Z,\ \dfrac{(x^2-x-12)\cdot(x^2+5x+8)}{x^2+4x+4} \geq 0$

$\Rightarrow \sum x = ?$

Yanıt / The Answer is -3

34. $\dfrac{(1-x^2)\cdot(x^2-4)}{(x-1)^2} > 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(-2,-1)\cup(1,2)$

35. $\dfrac{x}{x-1} \geq \dfrac{1}{x-1} - 2x + 3 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(1,\infty)$

36. $\left.\begin{array}{l} \dfrac{-2}{-x^2+7x-10} < 0 \\ (4-x)\cdot(x+1) \geq 0 \end{array}\right\} \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(2,4]$

37. $\dfrac{x^2\cdot(4-x)^7}{x^2-x-2} \geq 0 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(-\infty,-1)\cup(2,4]\cup\{0\}$

38. $\dfrac{2^{-x+1}\cdot(x-6)}{|x-3|\cdot\sqrt{x-2}} \leq 0,$

$x \in Z \Rightarrow \sum x = ?$

Yanıt / The Answer is 15

39. $\left.\begin{array}{l} x^2-3x-4 < 0 \\ -x^2+4x+12 \geq 0 \end{array}\right\} \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $(-1,4)$

40. $(m-2)x^2-2x+m+3=0$, ÇK(SS) $=\{x_1,x_2\}$,

$x_1 < 0 < x_2 \Rightarrow ? < m < ?$

Yanıt / The Answer is $-3 < m < 2$

41. $m \in Z^+$, $mx^2+3x-4+m=0$,
ÇK(SS) $=\{x_1, x_2\}$, $x_1 < x_2 < 0$
$\Rightarrow$ **min(m) = ?**

Yanıt / The Answer is 5

42. $\frac{x}{x+2} \le \frac{1}{x} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(-2,-1] \cup (0,2]$

43. $\left.\begin{array}{l} x\cdot(3-x)>0 \\ (2x+1)\cdot(x-2)<0 \end{array}\right\} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(0,2)$

44. $\frac{3x+1}{(x+1)^2} > 1 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(0,1)$

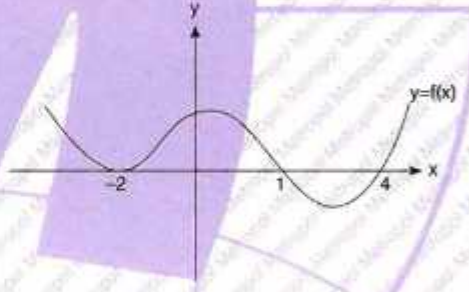
45. $\frac{(x^6-1)\cdot(x^4+1)}{x^2\cdot(x^2-4)} < 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(-2,-1) \cup (1,2)$

46. $\left.\begin{array}{l} x^2+2x+1>0 \\ x^2-2x-3<0 \end{array}\right\} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(-1,3)$

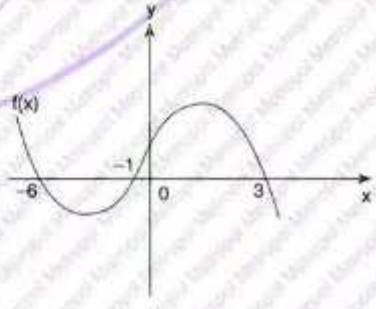
47.



$x \in Z$ ve/and $f(x) \le 0 \Rightarrow \sum x = ?$

Yanıt / The Answer is 8

48.



$(x-1)\cdot f(x) > 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $[-6,-1] \cup [1,3]$

1. $x^2 < 2x + 3 \Rightarrow$ **ÇK(SS) = ?**

A) $3 < x < 4$ B) $-1 < x < 3$
C) $-3 < x < -2$ D) $-2 < x < -1$
E) $4 < x < 5$

2. $x \in \mathbb{Z}$,
$2x - 3 \le x + 2 < 3x - 1 \Rightarrow \sum \mathbf{x} = ?$

A) 9 B) 10 C) 12 D) 14 E) 16

3. $x \in \mathbb{Z}$,
$3x + 2 \le x + 17 \le 4x - 1$
$\Rightarrow \sum \mathbf{x} = ?$

A) 10 B) 13 C) 16 D) 19 E) 22

4. $x \in \mathbb{Z}$,
$\frac{x}{6} > \frac{4}{x} \Rightarrow \min(\mathbf{x}) = ?$

A) -5 B) -4 C) 3 D) 4 E) 5

5. $x \in \mathbb{R}^+$,
$\frac{3}{x} > \frac{x}{3} \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, 0)$ B) $(-3, 3)$ C) $(-3, 0)$
D) $(3, \infty)$ E) $(0, 3)$

6. $x \in \mathbb{Z}$,
$(x + 2)(3 - x) > 0 \Rightarrow \sum \mathbf{x} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $x \in \mathbb{Z}$,
$\frac{2x - 9}{x + 4} \le 0 \Rightarrow \sum \mathbf{x} = ?$

A) 8 B) 7 C) 6 D) 4 E) 3

8. $\frac{x}{x - 2} < \frac{1}{x + 2} \Rightarrow$ **ÇK(SS) = ?**

A) $(-2, 2)$ B) $(-1, 2)$ C) $(-2, 3)$
D) $(1, 2)$ E) $(2, 3)$

9. $x\cdot(x^2-3x-4)\geq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty,-1)\cup[0,\infty)$
B) $(-1,4]$
C) $[-1,0]\cup[4,\infty)$
D) $(-\infty,-1]\cup[0,4]$
E) $(-\infty,-1)\cup[4,\infty)$

10. $\dfrac{3x}{x^2-1}\leq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty,-1)\cup[0,1)$
B) $(-\infty,-1]\cup[0,1)$
C) $(-\infty,-1)\cup[0,1]$
D) $(-\infty,-1]\cup(0,1)$
E) $(-\infty,-1)$

11. $x\in\mathbb{R}^+$,
$\dfrac{x^2-4x}{(1+x)\cdot(4-x^2)}\geq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $[0,1]$ B) $[1,2]$ C) $[1,4]$ D) $[2,4]$ E) $(2,4]$

12. $12\geq x^2+x \Rightarrow$ **ÇK(SS) = ?**

A) $[-4,3]$ B) $(0,6)$ C) $(-\infty,3)$ D) $(-4,\infty)$ E) $(-4,0)$

13. $\left(\frac{1}{2}\right)^{x^2}\geq(0,5)^{2x}$,
$x\in Z \Rightarrow \prod x = ?$

A) 3 B) 2 C) 0 D) −2 E) −3

14. $x\in\mathbb{Z}$,
$\dfrac{(x-3)\cdot(x-1)^8}{x-3}>0 \Rightarrow \sum x = ?$

A) −4 B) 0 C) 1 D) 2 E) 3

15. $\dfrac{2}{x+1}-\dfrac{1}{1-x}>1 \Rightarrow$ **ÇK(SS) = ?**

A) $(1,\infty)$ B) $(1,2)$ C) $(-1,1)$ D) $(0,3)$ E) $(-1,0)\cup(1,3)$

16. $\dfrac{2x^2}{x^2+x+1}<2 \Rightarrow$ **ÇK(SS) = ?**

A) $(-1,\infty)$ B) $(-\infty,-1)$ C) $(1,\infty)$ D) $(-1,0)$ E) $(-1,1)$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	D	B	B	E	B	D	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	E	A	C	A	E	A

1. $x \in Z$,

$(x-3)^2 \cdot (x+3)\cdot(5-x) > 0 \Rightarrow \sum x = ?$

A) 7 B) 6 C) 5 D) 4 E) 3

2. $x \in Z^+$,

$(x^4+7)\cdot(3x-11) < 0 \Rightarrow \sum x = ?$

A) 3 B) 4 C) 5 D) 6 E) 8

3. $(x-4)\cdot(x+1)\cdot(x-1)^2 < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty,1)\cup(1,4)$ B) $(1,\infty)$ C) $(-1,4)$ D) $(0,4)$ E) $(-1,1)\cup(1,4)$

4. $\dfrac{x^2\cdot(1-x)}{x^3-1} > 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, 0)$ B) $(-\infty, 1)$ C) $(0, \infty)$ D) R E) $\varnothing$

5. $\dfrac{8-x^3}{x^3+8} > 0 \Rightarrow$ **ÇK(SS) = ?**

A) $-2 < x < 2$ B) $-1 < x < 3$ C) $2 > x$ D) $x \geq 3$ E) $R - [-2, 2]$

6. $x \in Z^+$,

$\dfrac{x^2+4x}{x+4} \leq 8 \Rightarrow \sum x = ?$

A) 4 B) 8 C) 10 D) 13 E) 36

7. $x \in Z$,

$\dfrac{(x+3)\cdot(2-x)^3}{(x-1)^2} \geq 0 \Rightarrow \sum x = ?$

A) -4 B) -3 C) -2 D) 0 E) 2

8. $\dfrac{x^2-8x+16}{x+2} \leq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-2, 4)$ B) $[4, \infty)$ C) $(-\infty, 4]$ D) $(2, 4]$ E) $(-\infty, -2)\cup\{4\}$

9. $\dfrac{(2-x)^2-(x-2)}{x+1} \le 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, -1) \cup [2, 3]$
B) $(-\infty, -1] \cup (2, 3)$
C) $(-\infty, -1) \cup (2, 3)$
D) $(-\infty, -1] \cup [2, 3)$
E) $(-\infty, -1] \cup (2, 3]$

10. $\dfrac{x\cdot(x^2-x+3)}{-x^2+2x-4} < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(0, \infty)$ B) $(0, 1)$ C) $(1, 2)$ D) $(0, 2)$ E) $(2, \infty)$

11. $\dfrac{(x+2)\cdot(x^2-2x+1)}{(3-x)} > 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-2, 1)$ B) $(-2, 3)$ C) $(-2, 1) \cup \{3\}$ D) $(-2, 3) - \{1\}$ E) $(1, 3) - \{2\}$

12. $x \in Z$,
$\dfrac{(3x-12)\cdot(-x^2-4)}{(x+2)^3} \ge 0 \Rightarrow \sum x = ?$

A) 7 B) 9 C) 10 D) 12 E) 14

13. $\dfrac{x^2-4x+4}{x^2-2x-15} < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-3, 2)$ B) $(2, 5)$
C) $(-3, 5) - \{2\}$ D) $(-\infty, -3) \cup (2, 5)$
E) $(-2, 1) \cup (3, \infty)$

14. $x \in Z^-$,
$\dfrac{-(x+3)\cdot(x+6)^2}{x} > 0 \Rightarrow$ **min(x) = ?**

A) -6 B) -4 C) -3 D) -2 E) -1

15. $x \in Z$,
$\dfrac{(3-x)\cdot(x-8)}{x^2-8x+16} \ge 0 \Rightarrow \sum x = ?$

A) 33 B) 32 C) 30 D) 29 E) 28

16. $x \in Z$,
$\dfrac{-(x+2)^2\cdot(x+4)}{(x-4)} > 0 \Rightarrow$ **max(x) = ?**

A) -1 B) 0 C) 1 D) 2 E) 3

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	D	E	E	A	E	A	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	A	D	B	C	D	D	E

1. $x \in Z^+$,

$x - \frac{4}{x+1} < 2 \Rightarrow \sum x = ?$

A) 3 B) 2 C) 1 D) 0 E) 10

2. $x \in Z$,

$7^x \cdot (5x - x^2) \le 0 \Rightarrow \sum x = ?$

A) −12 B) −11 C) −10 D) −8 E) −5

3. $\left.\begin{array}{l} \frac{x-3}{4-x^2} > 0 \\ (x+2)\cdot(x-4) < 0 \end{array}\right\} \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, -2)$ B) $(-2, 2)$ C) $(2, 3)$ D) $(2, 4)$ E) $(3, 4)$

4. $x \in Z$,

$\frac{(x-2)\cdot(9-x^2)}{x^5} \ge 0 \Rightarrow$ **max(x) = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

5. $\frac{(2-x)^3}{(x-1)^4} < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, 1)$ B) $(1, 2)$ C) $(2, \infty)$ D) $(-2, 1)$ E) $(0, 2)$

6. $x \in Z$,

$\left.\begin{array}{l} x^2 - x - 6 < 0 \\ x^2 + 4x + 3 > 0 \end{array}\right\} \Rightarrow \sum x = ?$

A) −1 B) 1 C) 2 D) 3 E) 4

7. $4^x - 5\cdot 2^x + 4 < 0$

$\Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, -2)$ B) $(0, 2)$ C) $(-2, 0)$ D) $(4, \infty)$ E) $(2, 4)$

8. $A \in R$, $x \in Z^+$,

$A = \sqrt{\frac{-3}{x^2\,(x-7)}} \Rightarrow \sum x = ?$

A) 21 B) 23 C) 25 D) 28 E) 30

9. $\sqrt{x-1} > 3-x \rightarrow$ **? < x < ?**

A) $x > 5$ B) $x < -5$ C) $1 \le x < 2$ D) $2 < x < 5$ E) $x > 0$

10. $x \in Z$,

$\sqrt{x^2+3x-4} < 6 \Rightarrow \sum x = ?$

A) -12 B) -16 C) -21 D) -25 E) -27

11. $\sqrt{x^2-2x+1} \le 6 \Rightarrow \sum x = ?$

A) 6 B) 13 C) 18 D) 26 E) 28

12. $x \in Z$,

$\sqrt{x+2}\cdot(3x-15) \le 0 \Rightarrow \sum x = ?$

A) 6 B) 8 C) 9 D) 10 E) 12

13. $\forall x \in R$,

$x^2+x+m > x+1 \Rightarrow$ **? < m < ?**

A) $m < 0$ B) $m < 1$ C) $1 < m$ D) $0 < m$ E) $0 < m < 1$

14. $x \in Z$,

$\dfrac{|x-3|\cdot(x^2-4x-5)}{x^2-x+2} \le 0 \Rightarrow \sum x = ?$

A) 11 B) 13 C) 14 D) 15 E) 16

15. $x \in Z$,

$\dfrac{(2-x)^{1881}\cdot(x-1)^{1938}}{(x+1)^{55}\cdot(x^2-9)} \ge 0 \Rightarrow \sum x = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

16. $\dfrac{(x-1)^{2013}\cdot(x-x^2)^{1938}}{(x^2-4x+3)^{1995}} > 0 \rightarrow$ **ÇK(SS) = ?**

A) $(0, \infty)$ B) $(-\infty, 3)$ C) $(3, \infty)$ D) $(1, 3)$ E) $(0, 3)$

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1	2	3	4	5	6	7	8
A	C	C	C	C	D	B	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	A	B	E	C	C	D	C

1. $x^2 - 2x - 3 < 0 \Rightarrow ? < x < ?$

A) $2 < x$ B) $-2 < x < 3$ C) $x < 3$
D) $-1 < x$ E) $-1 < x < 3$

2. $(x^2 - 3x)\cdot(-x^2 + x) > 0 \Rightarrow ? < x < ?$

A) $-1 < x < 0$ B) $0 < x$ C) $x < 2$
D) $x < 3$ E) $1 < x < 3$

3. $x > 0,\ \frac{x^2 - x}{2 - x} > 0 \Rightarrow ? < x < ?$

A) $1 < x < 2$ B) $x > 2$ C) $x > 1$
D) $x < 3$ E) $0 < x < 2$

4. $\frac{(2-x)\cdot(x^2+4x-5)}{x+5} \geq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $R - [1,2]$ B) $R - (1,2)$ C) $[-5,2]$
D) $(-5,2]$ E) $[1,2]$

5. $\frac{(x-2)\cdot(x^2+5x+4)}{x^2+1} < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, -1)$ B) $(-\infty, -4)$ C) $(-\infty, 2) - \{0\}$
D) $(-\infty, -4) \cup (-1,2)$ E) $(-1,2) - \{1\}$

6. $\frac{x\cdot(2-x)^2}{x+1} \leq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-1, 0]$ B) $(-1, 0] \cup \{2\}$ C) $\{2\}$
D) $\varnothing$ E) $\{0\}$

7. $x \in Z,$
$\frac{(1-x)^2\cdot(x-3)}{5-x} \geq 0 \Rightarrow \sum x = ?$

A) 3 B) 5 C) 8 D) 11 E) 18

8. $\frac{(4-x^2)\cdot(x-3)}{x^2+4x+4} > 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, 2)$ B) $(-\infty, 3)$ C) $(2, \infty)$
D) $(-\infty, -2) \cup \{2\}$ E) $(-\infty, -2) \cup (2,3)$

9. $\dfrac{x^2-4x+4}{x^2+6x+9} \geq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\varnothing$ B) R C) $R-\{-3\}$ D) $R-\{2\}$ E) $\{-3, 2\}$

10. $x \in Z$,

$\dfrac{4x^2-5x+1}{x^2-x-2} \leq 0 \Rightarrow \sum x = ?$

A) $\frac{1}{2}$ B) $\frac{3}{2}$ C) 1 D) 4 E) 7

11. $\dfrac{(x-1)^{2019}\cdot(x-x^2)^{2018}}{(x^2-4x+3)^{1995}} > 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(1,\infty)$ B) $(0,\infty)$ C) $(1,3)$ D) $(3,\infty)$ E) $R-(1,3)$

12. $\dfrac{(x+1)^{1919}\cdot(x-1)^{1923}}{(x^2-1)^{1881}\cdot(x+3)^{1938}} < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\varnothing$ B) $R-\{1\}$ C) $R-\{-3,1\}$ D) $\{-1\}$ E) R

13. $x \in Z$,

$\dfrac{(x^2-2x+1)\cdot(x^2-5x+6)}{x^2-16} < 0 \Rightarrow \sum x = ?$

A) −4 B) −6 C) −16 D) −24 E) −44

14. $x \in Z$,

$\dfrac{(-x^2-4)\cdot(x^2+3x+2)}{x^2+x-20} \geq 0 \Rightarrow \sum x = ?$

A) −4 B) −5 C) −11 D) 0 E) 4

15. $x \in Z$,

$\dfrac{|x-3|\cdot(2-x)}{x^4\cdot(x^3-8)} \leq 0 \Rightarrow \sum x = ?$

A) −8 B) −2 C) 2 D) 8 E) 12

16. $x \in N$,

$\dfrac{x^2+x-30}{|x-5|+1} \leq 0 \Rightarrow \sum x = ?$

A) 35 B) 15 C) 13 D) 9 E) 5

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1	2	3	4	5	6	7	8
E	E	A	E	D	B	C	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	C	D	A	B	A	B	B

1. $x \in Z$,

$$\left.\begin{array}{l} x^2 - 2x - 8 \le 0 \\ -x^2 + 9 > 0 \end{array}\right\} \Rightarrow \sum x = ?$$

A) -2 B) -1 C) 0 D) 1 E) 2

2. $x^2 - x - 20 < 0$,

$x^2 + 6x + 5 < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-5, -4)$ B) $(-4, -1)$ C) $(-1, 5)$ D) $(-5, -1)$ E) $(-4, 5)$

3. $x \cdot (3 - x) > 0$, $(2x + 1) \cdot (x - 2) < 0$,

ÇK(SS) = $(a, b) \Rightarrow a - b = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

4. $x \in Z^+$,

$x^3 - 3x^2 - x + 3 \le 0 \Rightarrow \sum x = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

5. $2 < x^2 + x < 6 \Rightarrow x = ?$

A) $-2 < x < 2$

B) $2 < x$

C) $-1 < x < 2$

D) $-3 < x < -2 \cup 1 < x < 2$

E) $x < -3$

6. $x \in Z$,

$|x^2 + 2x + 1| < 4 \Rightarrow \sum x = ?$

A) -2 B) -3 C) -4 D) -5 E) -7

7. $x \in Z$,

$6x - \frac{5}{2} \ge \frac{13}{2} + 3x \Rightarrow \min(x) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $f(x) = \sqrt{1 - \frac{2x - 8}{x - 2}} \Rightarrow$ **ÇK(SS) = ?**

A) $(2,4)$ B) $(3,4]$ C) $(2,6)$ D) $(2,6]$ E) $(2,8)$

9. $x \in Z$,

$\frac{|x-2|}{x^2-9} < 0 \Rightarrow \sum x = ?$

A) −3 B) −2 C) 0 D) 2 E) 3

10. $x \in Z$,

$\frac{|x+2|\cdot(4-x)}{x-2} \geq 0 \Rightarrow \sum x = ?$

A) 4 B) 5 C) 7 D) 12 E) 14

11. $x \in R^+$,

$\frac{|-x+3|\cdot(x^5-1)}{x^2-9} \leq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, -3)$ B) $(-\infty, 1]$ C) $(-3, 1]$ D) $[1, 3)$ E) $(3, \infty)$

12. $x \in Z$,

$\frac{|x-3|\cdot(x^2-5x-6)}{(x-2)^2} < 0 \Rightarrow \sum x = ?$

A) 10 B) 11 C) 13 D) 14 E) 15

13. $m \in Z$, $x_1 \neq x_2$,

ÇK(SS) = $\{x_1, x_2\}$, $(m+1)\cdot x^2 + 2(m+1)\cdot x + 3m - 2 = 0$

$\Rightarrow \sum m = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $(m^2-1)x^2 + (m+2)x + m^2 + 2m - 3 = 0$,

ÇK(SS) = $\{x_1, x_2\}$, $x_1 < 0 < x_2 \Rightarrow ? < m < ?$

A) (−5, −3) B) (−5, −1) C) (−5, 1) D) (−3, 1) E) (−3, −1)

15. $m \in Z$, $|x_1| < x_2$, $x_1 < 0 < x_2$,

$(m+4)x^2 - 3(m-2)x - m + 5 = 0$,

ÇK(SS) = $\{x_1, x_2\} \Rightarrow \sum m = ?$

A) −5 B) −4 C) 4 D) 5 E) 7

16. $\forall x \in R$,

$(m-1)x^2 - 2x + 5 > 4 \Rightarrow ? > m > ?$

A) $1 < m < 2$ B) $m > 2$ C) $m < 1$ D) $m > 1$ E) $m < 2$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	B	A	E	D	B	C	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	B	D	A	A	E	A	B

1. $x \in Z$,

$$\frac{(x+2)^2 \cdot (x+4)^4 \cdot 3^x}{x^2+x+2} \le 0 \Rightarrow \sum x = ?$$

A) −16 B) −12 C) −10 D) −6 E) −4

2. $x \in R$,

$$\frac{(x^2+1)\cdot(x-1)^{2019}}{(x+1)^{2020}\cdot|x|} \ge 0$$

$\Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, 0) - \{-1\}$
B) $(-1, 0)$
C) $(-1, 1) - \{0\}$
D) $(0, 1]$
E) $[1, \infty)$

3. $x \in Z$,

$$\frac{(x^2-4)\cdot|x-1|}{(x+1)^{2018}\cdot(x^2-x-2)} \le 0 \Rightarrow \sum x = ?$$

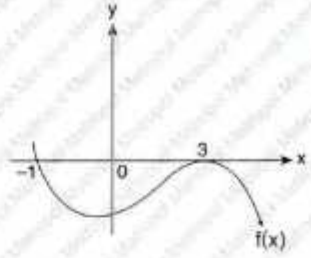
A) −3 B) −2 C) −1 D) 1 E) 2

4. $y = f(x) = \sqrt{\frac{4}{x-1} - \frac{6}{x+2}}$, $x \in Z^+$

$\Rightarrow \sum x = ?$

A) 33 B) 30 C) 27 D) 24 E) 21

5.



$(x+1)\cdot f(x) \le 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\varnothing$ B) R C) $\{-1\}$
D) $[-1, 3]$ E) $[3, \infty) \cup \{-1\}$

6. $m \in Z$,

$\forall x \in R$ için / for $x^2 - (m+2)x + 7 > 0$

$\Rightarrow$ **max(m) = ?**

A) 7 B) 1 C) 5 D) 2 E) 3

7. $k \in Z$,

$\forall x \in R$ için / for $-x^2 + kx - 5 < 0$

$\rightarrow$ **max(k) = ?**

A) 1 B) 4 C) 6 D) 7 E) 8

8. $x^2 + (m-3)x + m^2 - 9 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 < 0 < x_2$, $|x_1| < x_2 \Rightarrow$ **m = ?**

A) $(-\infty, 3)$ B) $(3, \infty)$ C) $(-3, 3)$
D) $(-3, -1)$ E) $(1, 3)$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	E	C	C	B	E	B	C

1. $\dfrac{(x+2)\cdot(1-x)}{-x^2+2x+8} \le 0$

olduğuna göre **denklemin çözüm kümesi nedir?**

Therefore, what is the solution set of the equation?

A) $1 \le x < 4$
B) $x \le 1$
C) $1 \le x$
D) $x < 4$
E) $-2 \le x < 1$

[ÇUKUROVA ÜNİVERSİTESİ – YÖS 2018]

2. $\dfrac{(x^2+x+4)\cdot(x-1)}{x^2-4} < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, -2) \cup (2, \infty)$
B) $(2, \infty)$
C) $(-2, 2)$
D) $(-\infty, -2) \cup (1, 2)$
E) $(-2, 1) \cup (2, \infty)$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2018]

3. $\dfrac{(x^2-4)\cdot(x+3)}{|x+4|} \ge 0 \Rightarrow$ **ÇK(SS) = ?**

A) R
B) $[-3, -2]$
C) $[-3, -2] \cup [2, \infty)$
D) $[-3, 2] \cup [2, \infty) \cup \{-4\}$
E) $\varnothing$

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

4. $\dfrac{x^2-3x-4}{(x+1)^2} < 0 \Rightarrow ? < x < ?$

A) $-4 < x < 1$
B) $0 < x < 4$
C) $-1 < x < 1$
D) $-1 < x < 4$
E) $1 < x < 4$

[ERCİYES ÜNİVERSİTESİ – YÖS 2017]

5. $f(x) = \sqrt{5 - |x+2|} \Rightarrow$ **ÇK(SS) = ?**

A) $[-2, 5]$ B) $(-2, 5)$ C) $(-7, 7)$ D) $[-7, 3]$ E) $[-3, 3]$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2017]

6. $4^{2-\frac{x}{2}} \le 1 \le 3^{6-x}$ ve/and $x \in Z \Rightarrow \sum x = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2017]

7. $\dfrac{2}{5} < x < \dfrac{3}{4}$

$\Rightarrow x = ?$

A) $\dfrac{3}{10}$ B) $\dfrac{1}{3}$ C) $\dfrac{1}{2}$ D) $\dfrac{4}{5}$ E) $\dfrac{5}{6}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2013]

8. $f(x) = \sqrt{4 - x^2} \Rightarrow$ **ÇK(SS) = ?**

A) $R - \{-4\}$
B) $R - \{-4, 4\}$
C) $R - \{-1\}$
D) $[-4, 4]$
E) $[-2, 2]$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2012]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	D	C	D	D	C	C	E

BÖLÜM CHAPTER 4

TARİHSEL NOT / HISTORICAL NOTE

HÂRİZMÎ [850 - 780 BC]

El-Harezmi'nin hayatına dair kesin olarak bilinen ayrıntı az sayıdadır. İranlı bir ailede Büyük Horasan'ın Harezm şehrinde (modern Hive, Harezm bölgesi, Özbekistan) doğmuştur. Matematik, Coğrafya, Astronomi ve Haritacılığa katkısı, cebir ve trigonometride yeniliğin temelini oluşturdu. Doğrusal ve ikinci dereceden denklemleri çözmeye yönelik sistematik yaklaşımıyla cebirin ortaya çıkmasına neden olan kitabının başlığı şöyledir, "Tamamlama ve Dengeleme ile Hesaplama Üzerine Özlü Kitap".

There is only a small number of known facts about Al-Khwarezmi's life. He was born in an Iranian family in Harezm city of Horasan (modern Hive, Harezm region, Uzbekistan). He has contribution to mathematics, geography, astronomy and cartography and constituted the basis of innovation in algebra and trigonometry. The title of his book, which leads to the emergence of algebra with the systematic approach to solve linear and quadratic equations, is as follows: "The Compendious Book on Calculation by Completion and Balancing".

İKİNCİ DERECEDEN FONKSİYONLAR
QUADRATIC FUNCTIONS

Bu bölüm 32 alıştırma sorusu, 92 test sorusu, 8 YÖS sorusu içermektedir.

This chapter includes 32 exercise questions, 92 test questions, and 8 YÖS questions.

BÖLÜM / CHAPTER 4

İKİNCİ DERECEDEN FONKSİYONLAR / QUADRATIC FUNCTIONS

İKİNCİ DERECEDEN FONKSİYONLAR
QUADRATIC FUNCTIONS

1. $f(x) = x^2 - 4x + 3 \Rightarrow \min(f(x)) = ?$

Yanıt / The Answer is -1

2. $f(x) = -x^2 + 5x - 6 \Rightarrow \max(f(x)) = ?$

Yanıt / The Answer is $\frac{1}{4}$

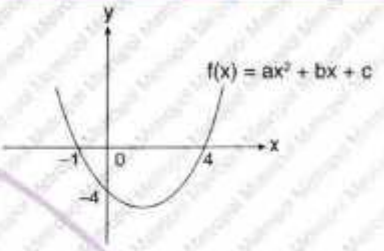
3. $f(x) = -x^2 + 8x + n$,
$\max(f(x)) = 3 \Rightarrow n = ?$

Yanıt / The Answer is -13

4. $f(x) = x^2 + 2x + 1$,
$T(r, k) \Rightarrow r \cdot k = ?$

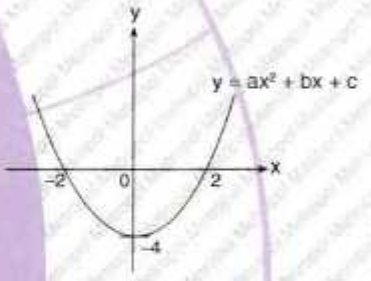
Yanıt / The Answer is 0

5. $f(x) = ?$



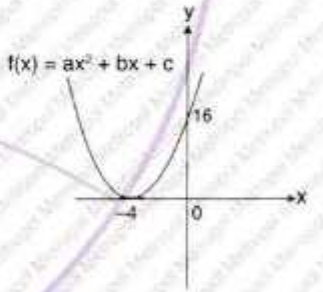
Yanıt / The Answer is $f(x) = (x+1)\cdot(x-4)$

6. $a + b + c = ?$



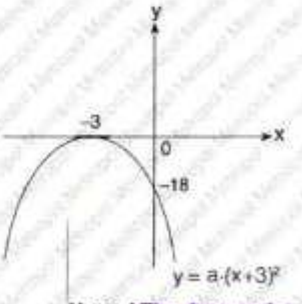
Yanıt / The Answer is -3

7. $f(x) = ?$



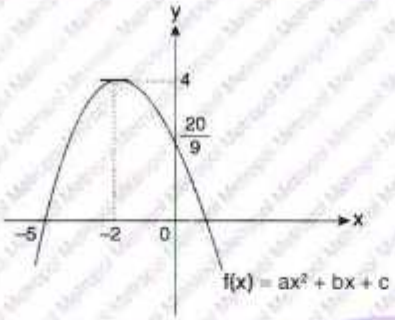
Yanıt / The Answer is $f(x) = (x+4)^2$

8. $a = ?$



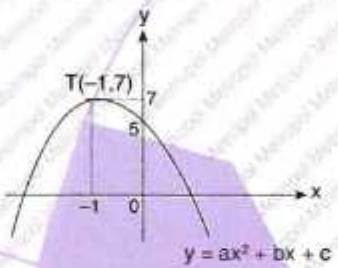
Yanıt / The Answer is -2

9. $c = ?$



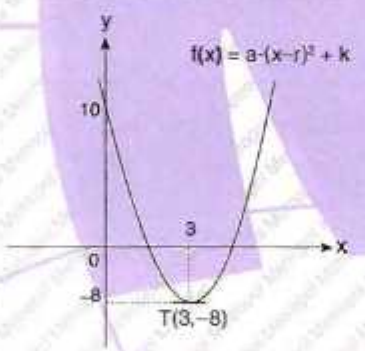
Yanıt / The Answer is $\frac{20}{9}$

10. $c = ?$



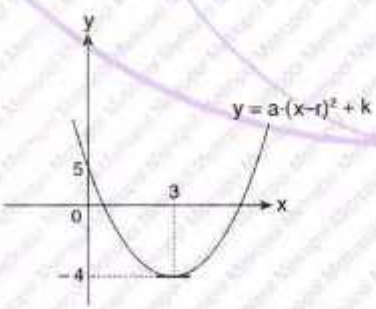
Yanıt / The Answer is 5

11. $f(x) = ?$



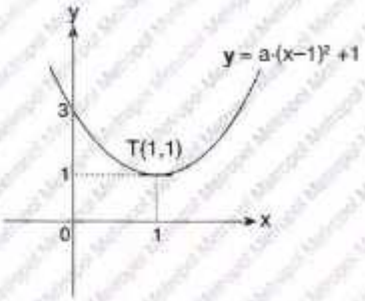
Yanıt / The Answer is $f(x) = 2\cdot(x-3)^2 - 8$

12. $r - k = ?$



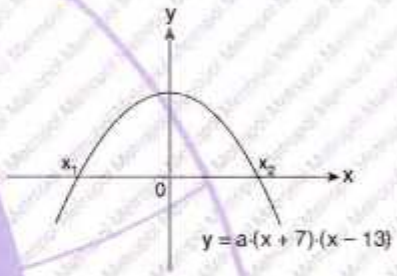
Yanıt / The Answer is 7

13. $a = ?$



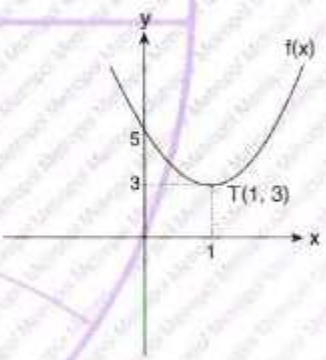
Yanıt / The Answer is 2

14. $\frac{x_1}{x_2} = ?$



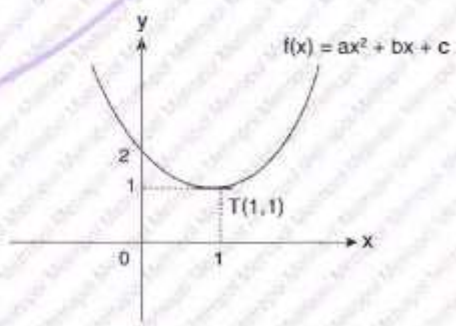
Yanıt / The Answer is $-\frac{7}{13}$

15. $f(x) = ?$



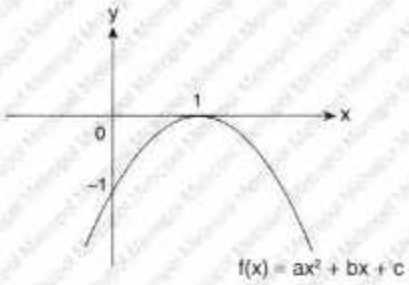
Yanıt / The Answer is $2x^2 - 4x + 5$

16. $a + b + c = ?$



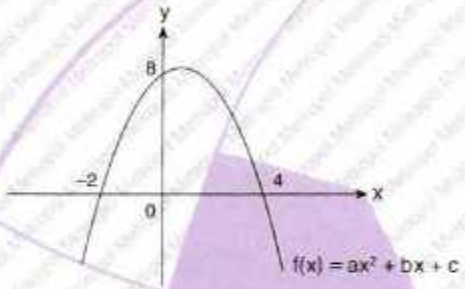
Yanıt / The Answer is 1

17. $a \cdot b \cdot c = ?$



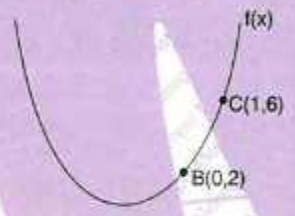
Yanıt / The Answer is 2

18. $a + b - c = ?$



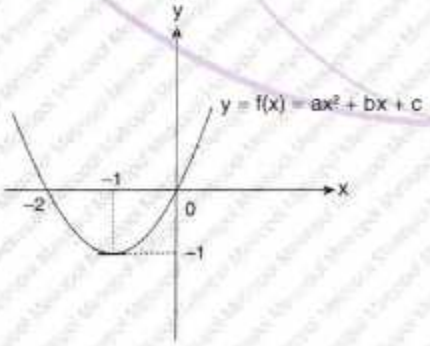
Yanıt / The Answer is −7

19. $f(x) = x^2 + bx + c = ?$



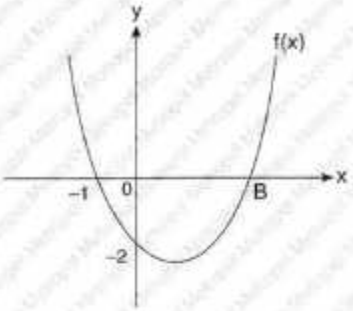
Yanıt / The Answer is $f(x) = x^2 + 3x + 2$

20. $f(-3) + f(1) = ?$



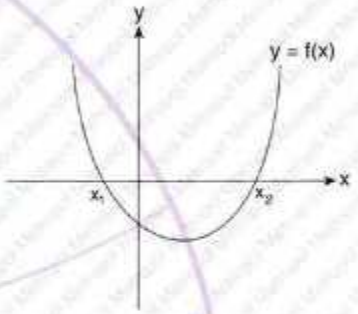
Yanıt / The Answer is 6

21. $f(x) = x^2 + bx + c$
$\Rightarrow B(x,y) = ?$



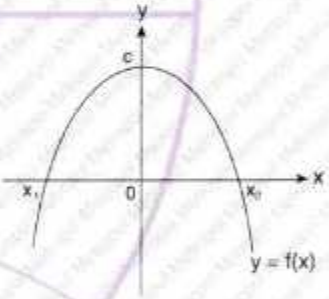
Yanıt / The Answer is (2,0)

22. $y = x^2 - (m-1)x + m^2 - 9,$
$|x_1| < x_2$
$\Rightarrow ? < m < ?$



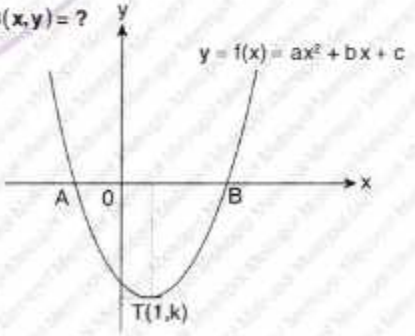
Yanıt / The Answer is (1,3)

23. $y = -x^2 - (m+2)x - 2m + 8,$
$|x_1| = x_2 \Rightarrow c = ?$



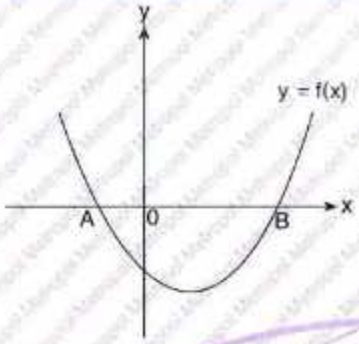
Yanıt / The Answer is 12

24. $|OB| = 3\ |AO| \Rightarrow B(x,y) = ?$



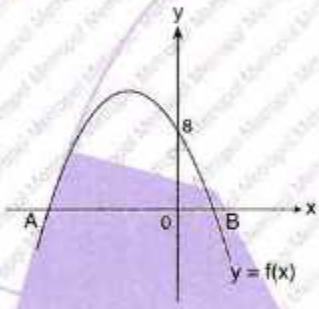
Yanıt / The Answer is (3,0)

25. $y = x^2 + kx - 12$,
$3 \cdot |AO| = |OB| \Rightarrow$ **k = ?**



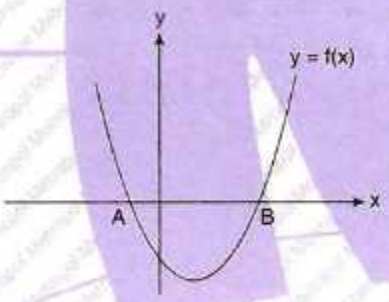
Yanıt / The Answer is -4

26. $y = -x^2 + bx + c$
$|AO| = 2 \cdot |OB| \Rightarrow$ **b = ?**



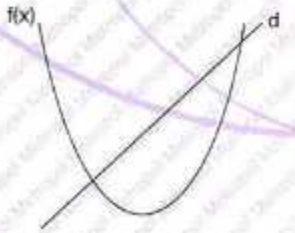
Yanıt / The Answer is -2

27. $y = x^2 - 4x - a + 2$,
$|AB| = 8 \Rightarrow$ **a = ?**



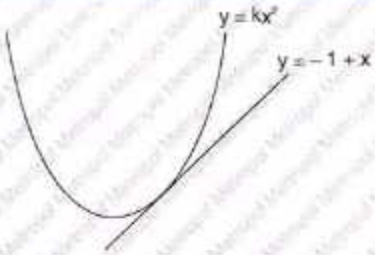
Yanıt / The Answer is 14

28. $f(x) = x^2 - 4x + 3$,
$d: y = -x + k - 1$
$\Rightarrow$ **? < k < ?**



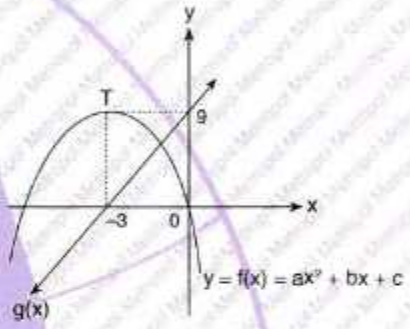
Yanıt / The Answer is $\frac{7}{4} < k < \infty$

29. **k = ?**



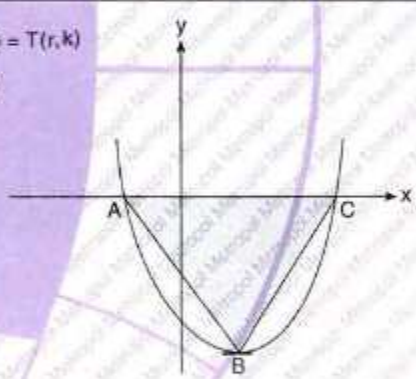
Yanıt / The Answer is $\frac{1}{4}$

30. **(gof)(−1) = ?**



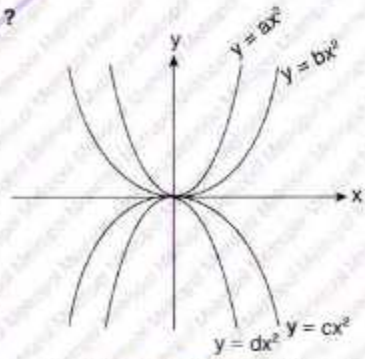
Yanıt / The Answer is 24

31. $y = x^2 - 3x - 4$, $B = T(r, k)$
$\Rightarrow$ **$A(\widehat{ABC})$ = ?**



Yanıt / The Answer is $\frac{125}{8}$

32. **|b − a| + |a − c| + |d − b| = ?**



Yanıt / The Answer is 2a − c − d

1. $y = f(x) = x^2 - x - 2$

$\Rightarrow$ **min(y) = ?**

A) -1 B) $-\frac{3}{2}$ C) $-\frac{9}{4}$ D) -3 E) -4

2. $y = 2x^2 + 3x - 2$

$\Rightarrow$ **min(y) = ?**

A) -5 B) -6 C) $-\frac{25}{8}$ D) -7 E) $-\frac{29}{5}$

3. $f(x) = 3x^2 - 6x + 5$

$\Rightarrow$ **min(f(x)) = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

4. $f(x) = -x^2 - 2x + m - 1$,

$\max(f(x)) = 4 \Rightarrow$ **m = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

5. $A = 2x - 12$

$B = -2x + 24$

$\Rightarrow$ **max(A · B) = ?**

A) 20 B) 32 C) 36 D) 40 E) 42

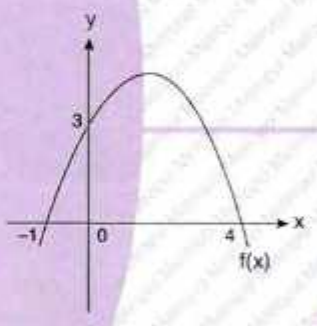
6. $f(x) = mx^2 - (2m - 8)x + 1$,

$T(r, k) = (-1, k)$

$\Rightarrow$ **m = ?**

A) -3 B) -1 C) 1 D) 2 E) 3

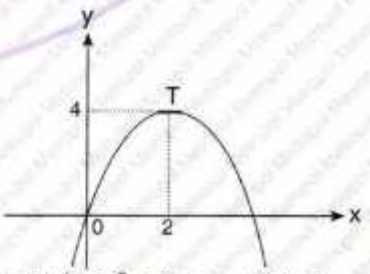
7.



$y = f(x) = ax^2 + bx + c \Rightarrow$ **f(1) = ?**

A) $\frac{5}{2}$ B) 3 C) $\frac{7}{2}$ D) 4 E) $\frac{9}{2}$

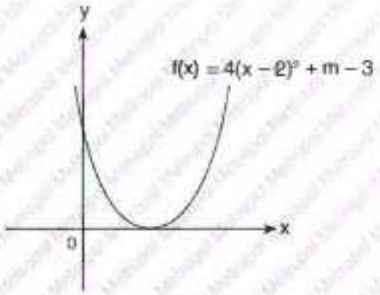
8.



$T(2,4)$, $y = f(x) = ax^2 + bx + c \Rightarrow$ **f(1) = ?**

A) 1 B) $\frac{5}{2}$ C) 3 D) $\frac{7}{2}$ E) 4

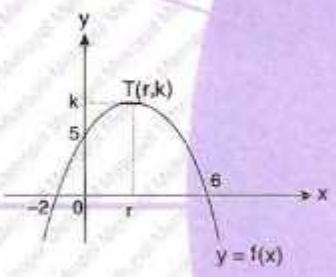
9.



⇒ **m = ?**

A) 2 B) 3 C) 4 D) 5 E) 6

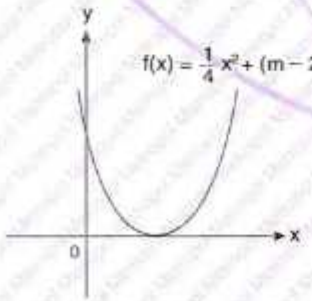
10.



⇒ **k = ?**

A) 5 B) $\frac{20}{3}$ C) $\frac{25}{7}$ D) 9 E) 15

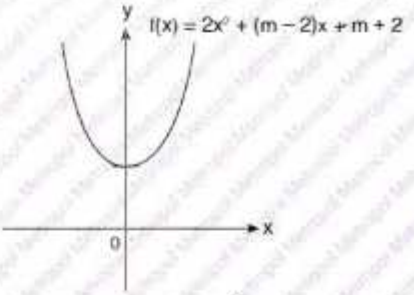
11.



⇒ $\sum$ **m = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

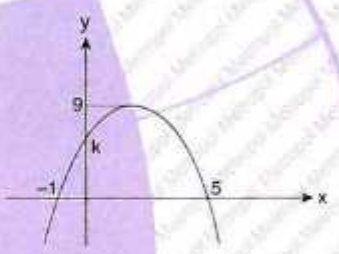
12.



⇒ **m = ?**

A) −2 B) −1 C) 2 D) 3 E) 4

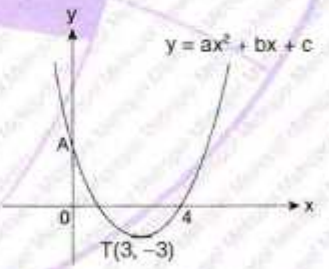
13.



⇒ **k = ?**

A) 2 B) 3 C) 5 D) 6 E) 7

14.



⇒ **|OA| = ?**

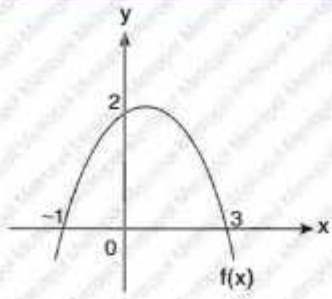
A) 20 B) 22 C) 24 D) 25 E) 26

YANITLAR / ANSWERS

1	2	3	4	5	6	7
C	C	B	D	C	D	E
8	**9**	**10**	**11**	**12**	**13**	**14**
C	B	B	D	C	C	C

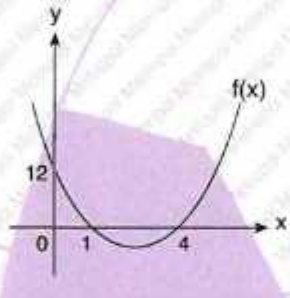
1. **f(2) = ?**

A) 1
B) 2
C) 3
D) 4
E) 5



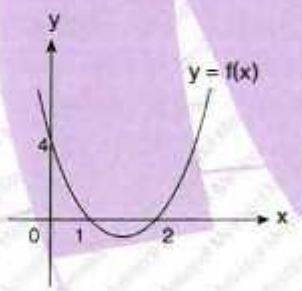
2. **f(1) = ?**

A) 0
B) 4
C) 6
D) 8
E) 10

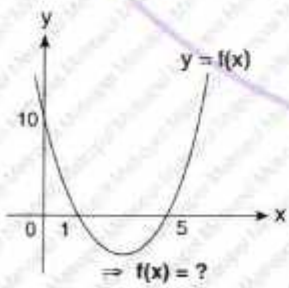


3. **f(4) = ?**

A) 6
B) 7
C) 9
D) 10
E) 12



4.

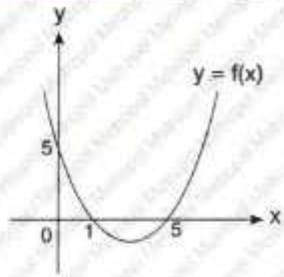


⇒ **f(x) = ?**

A) $x^2 - 6x + 5$
B) $2x^2 - 6x + 5$
C) $2x^2 - 12x + 10$
D) $x^2 + 6x - 5$
E) $2x^2 + 12x - 10$

5. **min(y) = ?**

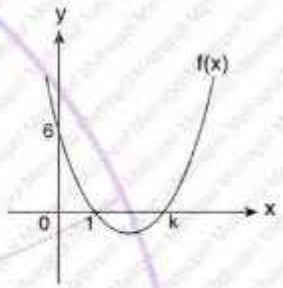
A) –5
B) –4
C) –3
D) –2
E) –1



6. $y = ax^2 + bx + c$

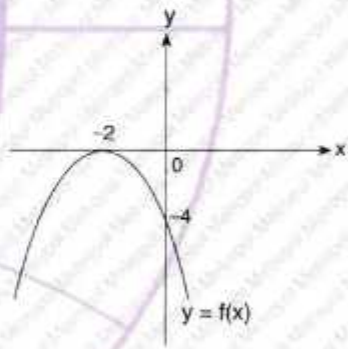
⇒ **a + b = ?**

A) –6
B) –5
C) 0
D) 5
E) 6



7. **f(5) = ?**

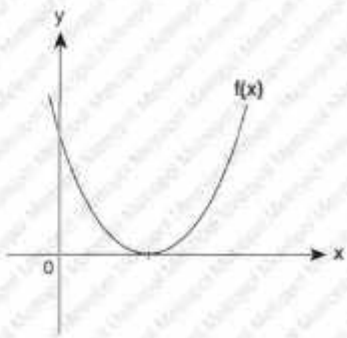
A) –28
B) –29
C) –32
D) –49
E) –51



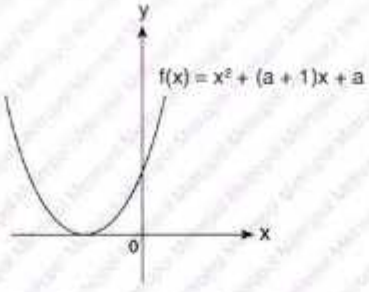
8. $f(x) = 3x^2 - 6x + a$

⇒ **a = ?**

A) 9
B) 6
C) 3
D) –3
E) 5

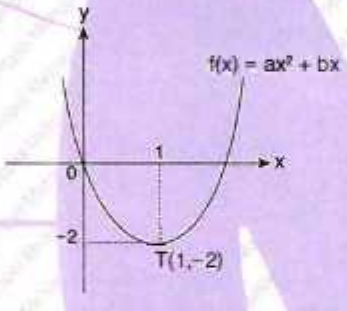


9. **a = ?**



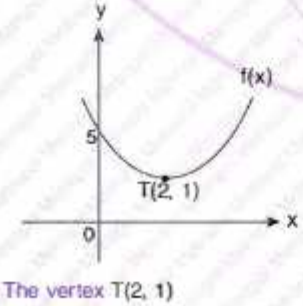
A) −1
B) 0
C) 1
D) 2
E) 3

10. **f(4) = ?**



A) 12
B) 14
C) 15
D) 16
E) 18

11.

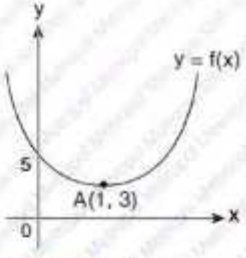


Tepe noktası / The vertex T(2, 1)

⇒ **f(3) = ?**

A) −1 B) 2 C) −3 D) 5 E) 4

12.



Tepe noktası / The vertex A(1, 3),

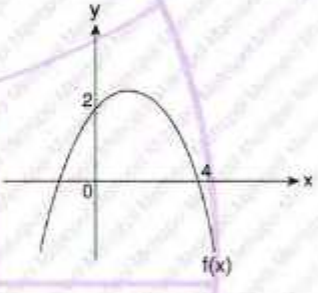
$y = f(x) = ax^2 + bx + c$

⇒ **f(−1) = ?**

A) 9 B) 10 C) 11 D) 12 E) 13

13. $f(x) = -x^2 + kx + m$

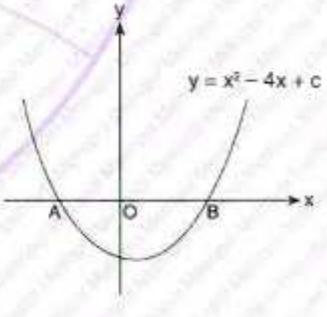
⇒ **f(2) = ?**



A) 1
B) 3
C) 5
D) 7
E) 9

14. 5·|AO| = |OB|

⇒ **c = ?**



A) −5
B) −4
C) −3
D) −2
E) −1

YANITLAR / ANSWERS

1	2	3	4	5	6	7
B	A	E	C	B	A	D
8	**9**	**10**	**11**	**12**	**13**	**14**
C	C	D	B	C	C	A

1. $\left.\begin{array}{l} A = x^2 + 4x - 5 \\ B = -x^2 + 2x \end{array}\right\} \Rightarrow$ **max(B) + min(A) = ?**

A) −8 B) −10 C) −12 D) −14 E) −16

2. $y = -2x^2 + 4x + k$, max(y) = 2

→ **k = ?**

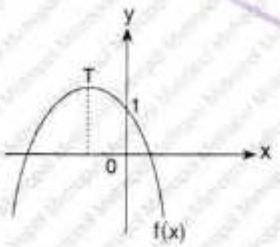
A) −3 B) −2 C) −1 D) 0 E) 1

3. $f : R \to R$, $f(x) = x^2 - 8x + 4(a + 2)$,

min(f(x)) = 4 → **a = ?**

A) −4 B) −3 C) 0 D) 3 E) 4

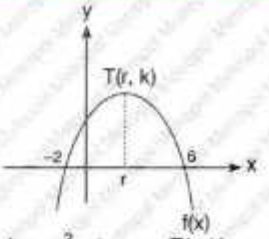
4.



$f(x) = ax^2 + bx + c \Rightarrow$ **c = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

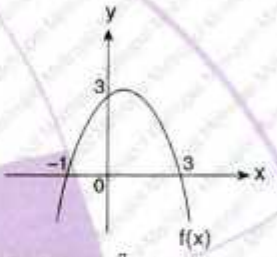
5.



$f(x) = ax^2 + bx + c$, $T(r, k) \Rightarrow$ **r = ?**

A) 3 B) 2 C) 1 D) 4 E) −1

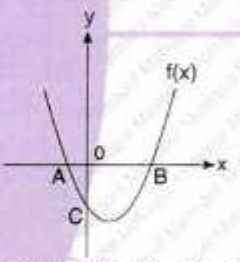
6.



$f : R \to R$, $f(x) = ax^2 + bx + c \Rightarrow$ **max(f(x)) = ?**

A) 3 B) 4 C) 6 D) 9 E) 11

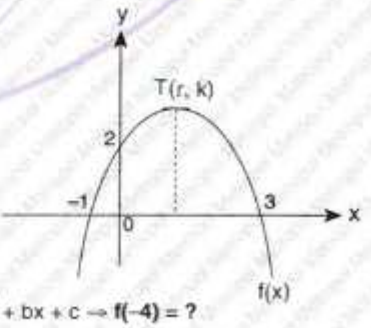
7.



$f(x) = x^2 - ax + b$, C(0, −9), |AB| = 10 cm ⇒ **min(f(x)) = ?**

A) 10 B) −10 C) 25 D) −5 E) −25

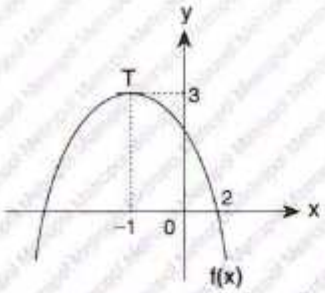
8.



$f(x) = ax^2 + bx + c \Rightarrow$ **f(−4) = ?**

A) −19 B) −17 C) −16 D) −14 E) −10

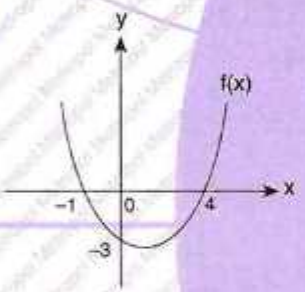
9.



$f(x) = ax^2 + bx + c \Rightarrow f(5) = ?$

A) −6 B) −5 C) −7 D) −4 E) −9

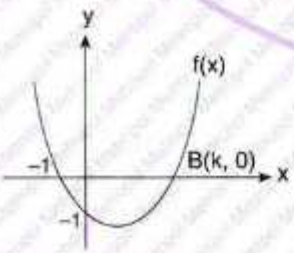
10.



$f(x) = (ax + b)\cdot(x + 1) \Rightarrow a = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) $\frac{5}{4}$ E) 1

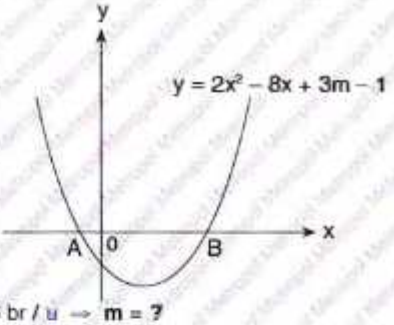
11.



$f(x) = x^2 + ax + b \Rightarrow k = ?$

A) 1 B) 3 C) 5 D) 7 E) 9

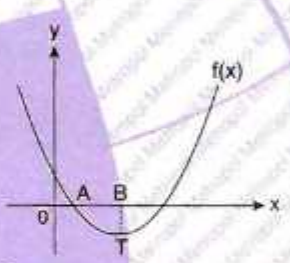
12.



$|AB| = 6$ br / u $\Rightarrow m = ?$

A) −7 B) −6 C) −5 D) −4 E) −3

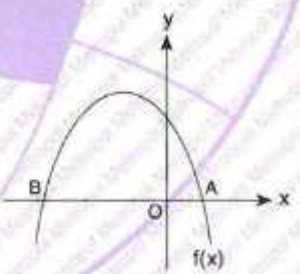
13.



$f(x) = x^2 - 12x + m + 8$, $|AB| = 2|AO| \Rightarrow m = ?$

A) 24 B) 12 C) 6 D) 1 E) −6

14.



$3\cdot|OA| = |OB|$, $f(x) = -x^2 - 4x + m \Rightarrow m = ?$

A) 3 B) 6 C) 9 D) 12 E) 15

YANITLAR / ANSWERS

1	2	3	4	5	6	7
A	D	D	B	B	B	E
8	**9**	**10**	**11**	**12**	**13**	**14**
D	E	C	A	E	B	D

1. $y = f(x) = x^2 + bx + c$,

$f(1) = f(2) = 0 \Rightarrow$ **b + c = ?**

A) 0 B) −1 C) 2 D) 1 E) −2

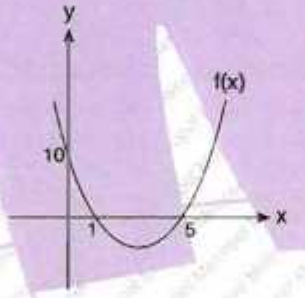
2. $f(x) = kx^2 + (3k - 1)x + 5$,

Tepe noktası / The vertex T(1, t) $\Rightarrow$ **k = ?**

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) 1

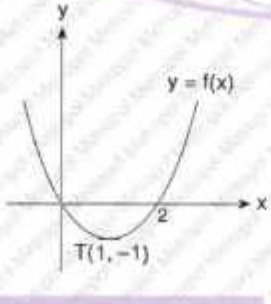
3. $f(x) = 4 \Rightarrow \prod x = ?$

A) 1
B) 2
C) 3
D) 4
E) 5



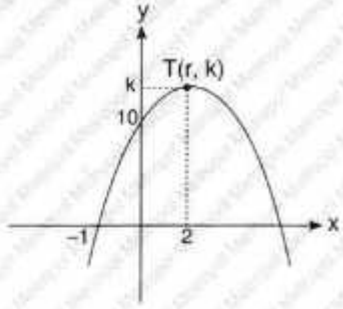
4. **f(3) = ?**

A) 1
B) 2
C) 3
D) 4
E) 6



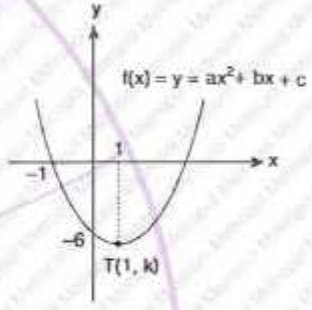
5. **r + k = ?**

A) 20
B) 21
C) 22
D) 23
E) 24



6. **k = ?**

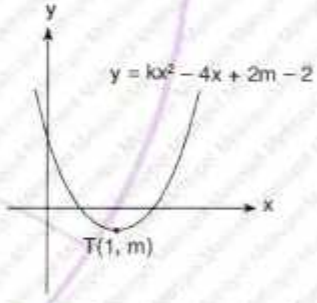
A) −2
B) −4
C) −6
D) −8
E) −10



7. Tepe noktası / The vertex T(1, m)

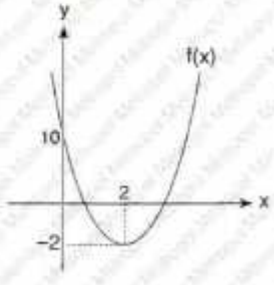
$\Rightarrow$ **m = ?**

A) −2
B) −1
C) 1
D) 2
E) 4

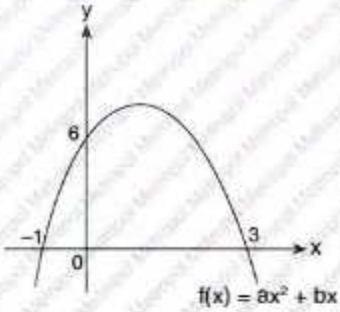


8. **f(3) = ?**

A) 1
B) 2
C) 3
D) 4
E) 5



9.

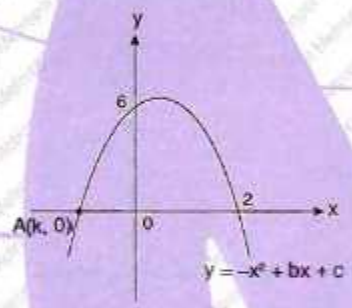


$\Rightarrow$ **f(4) + a + b + c = ?**

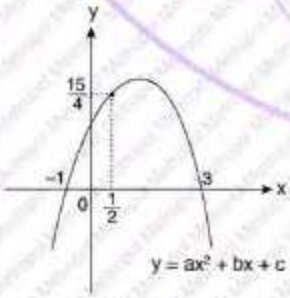
A) –6 B) 2 C) 6 D) 18 E) –2

10. **k = ?**

A) –1
B) –2
C) –3
D) –4
E) –5



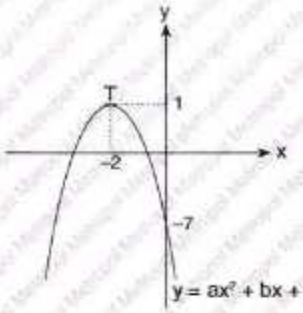
11.



$\Rightarrow$ **a + b + c = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

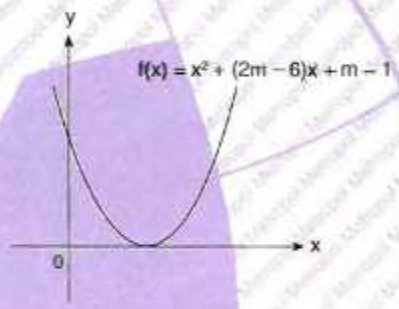
12.



$\Rightarrow$ **f(–a) = ?**

A) –27 B) –29 C) –31 D) –33 E) –35

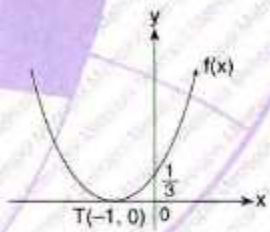
13. m ≠ 5,



$\Rightarrow$ **m = ?**

A) 1 B) 2 C) 3 D) 4 E) 6

14.



y = f(x) = ax² + bx + c

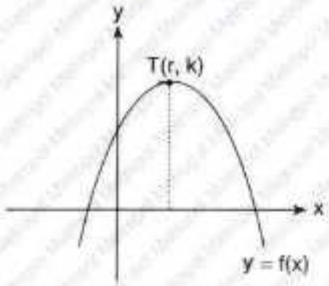
$\Rightarrow$ **(fof)(–2) = ?**

A) $\frac{16}{27}$ B) $\frac{5}{9}$ C) $\frac{4}{9}$ D) $\frac{10}{27}$ E) $\frac{16}{9}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
B	A	C	C	A	D	E
8	**9**	**10**	**11**	**12**	**13**	**14**
A	E	C	D	C	B	A

1.



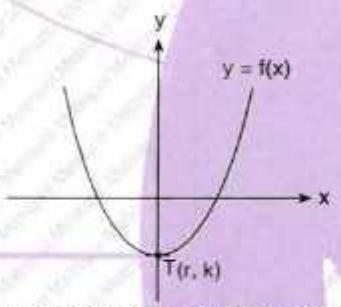
$f(x) = ax^2 + bx + c$ ise aşağıdakilerden hangisi yanlıştır?

If $f(x) = ax^2 + bx + c$, which of the following is not true?

A) $4ac - b^2 < 0$ B) $c > \frac{b^2}{4a}$ C) $-\frac{b}{a} > 0$

D) $a^2 \cdot b \cdot c > 0$ E) $\frac{c^2}{a^3} > 0$

2.



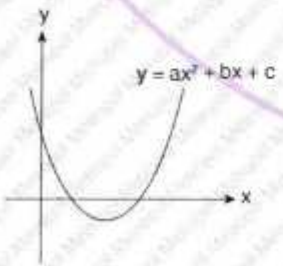
$f(x) = ax^2 + bx + c$ ise aşağıdakilerden hangisi yanlıştır?

If $f(x) = ax^2 + bx + c$, which of the following is not true?

A) $b = 0$ B) $a > 0$ C) $c > 0$

D) $b^2 > 4ac$ E) $a > c$

3.



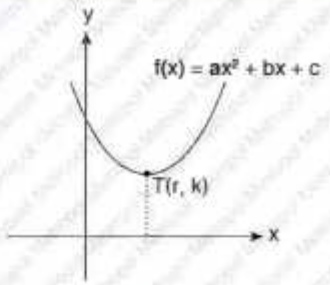
Aşağıdakilerden hangisi doğrudur?

Which of the following is true?

A) $a < 0$ B) $b < 0$ C) $c < 0$

D) $a \cdot c < 0$ E) $a \cdot b > 0$

4.



Tepe noktası / The vertex T(r, k)

⇒ **Aşağıdakilerden hangisi yanlıştır?**

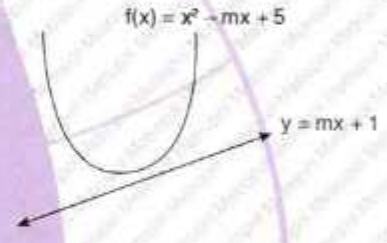
Which of the following is not true?

A) $c > 0$ B) $\Delta < 0$ C) $a > 0$

D) $b > 0$ E) $b < 0$

5. $a < m < b$,

⇒ **(a, b) = ?**



A) (–1, 1)

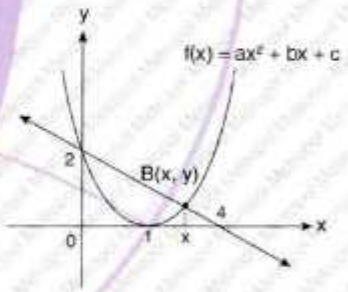
B) (–2, 2)

C) (–1, 2)

D) (1, 2)

E) (–2, –1)

6. **x = ?**



A) $\frac{5}{3}$

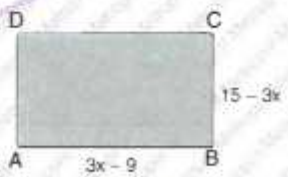
B) $\frac{5}{2}$

C) $\frac{5}{4}$

D) $\frac{7}{4}$

E) $\frac{9}{4}$

7.



ABCD bir dikdörtgendir. / ABCD is a rectangle.

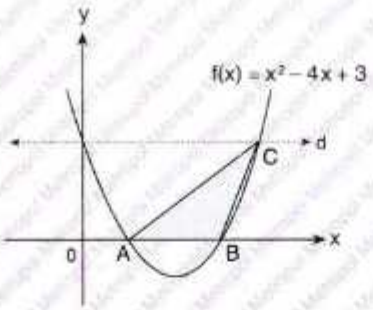
⇒ **max(Alan / Area(ABCD)) = ? br^2 / u^2**

A) 9 B) $\frac{49}{4}$ C) 16 D) $\frac{81}{4}$ E) 25

8. d // Ox

$\Rightarrow$ **A($\widehat{ABC}$) = ?**

A) 1
B) 2
C) 3
D) 5
E) 6



9. $y = x^2 + (m + 2)x - 12$,

Tepe noktası / The vertex T(2, k) $\Rightarrow$ **k = ?**

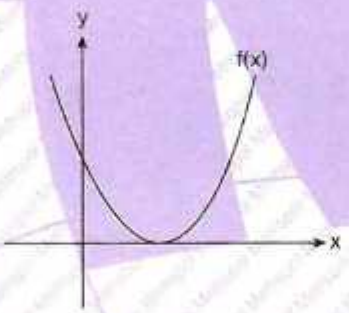
A) −16 B) −12 C) −8 D) −4 E) 0

10. $a \in Z$,

$f(x) = 3x^2 - ax + 4a$

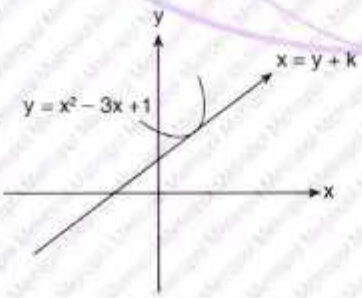
$\rightarrow \sum$ **a = ?**

A) 44
B) 46
C) 48
D) 49
E) 50



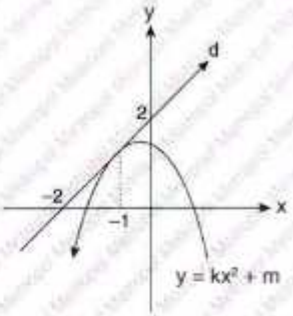
11. **k = ?**

A) 5
B) 4
C) 3
D) 2
E) 1



12. **k + m = ?**

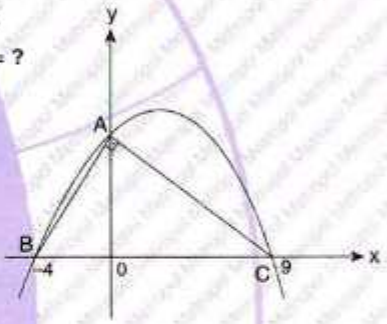
A) 1
B) $\frac{1}{2}$
C) 2
D) $\frac{3}{2}$
E) 3



13. $y = f(x) = ax^2 + bx + c$,

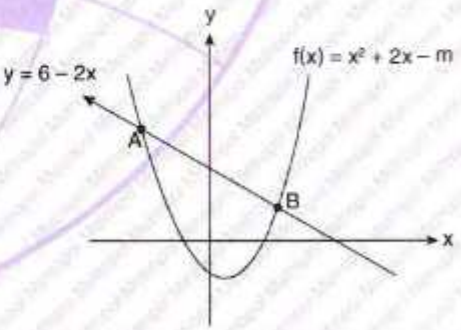
$[AB] \perp [AC] \Rightarrow$ **f(2) = ?**

A) 9
B) 8
C) 7
D) 6
E) 5



14. **max(m) = ?**

A) −10
B) −11
C) −9
D) −8
E) −7

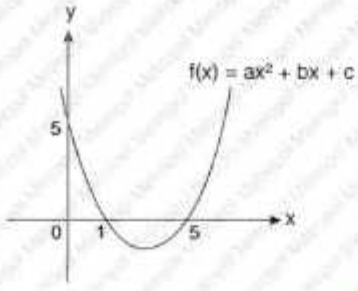


YANITLAR / ANSWERS

1	2	3	4	5	6	7
E	C	B	D	B	D	A
8	**9**	**10**	**11**	**12**	**13**	**14**
C	A	D	C	A	C	C

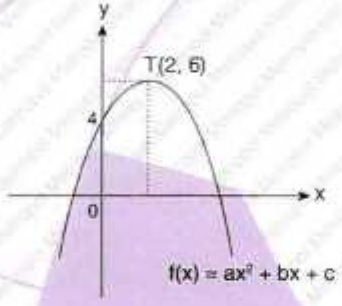
1. **3a + b + c = ?**

A) 5
B) 4
C) 3
D) 2
E) 1



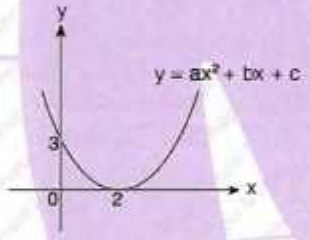
2. **f(4) = ?**

A) −6
B) 6
C) 0
D) −4
E) 4

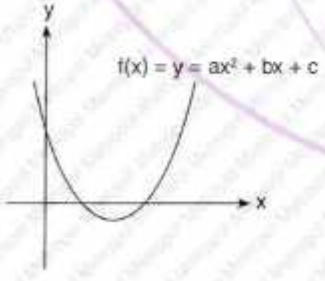


3. **a + b + c = ?**

A) $\frac{1}{4}$
B) $\frac{1}{2}$
C) $\frac{3}{4}$
D) $\frac{4}{3}$
E) 2



4.



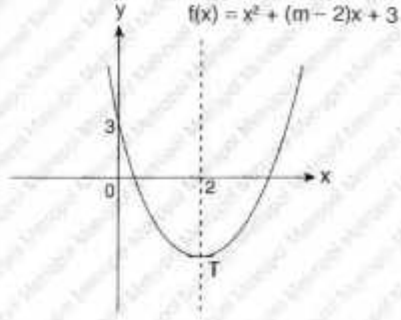
a, b, c nin işareti aşağıdakilerden hangisidir?

Which of the following is the sign of a, b, and c ?

A) +, +, + B) −, −, − C) +, −, −
D) +, −, + E) −, +, +

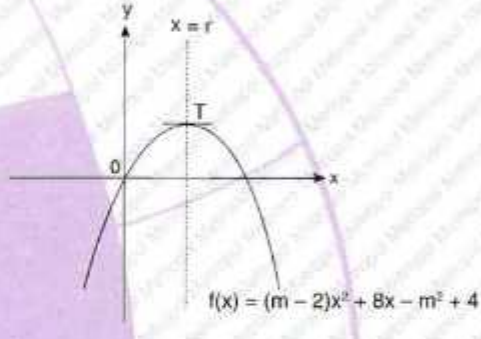
5. **m = ?**

A) −2
B) 2
C) −4
D) 5
E) 6



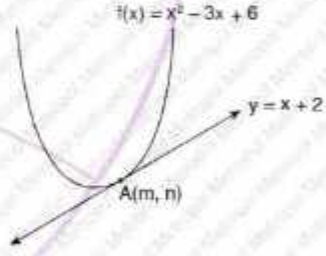
6. **r = ?**

A) 10
B) 5
C) 4
D) 2
E) 1



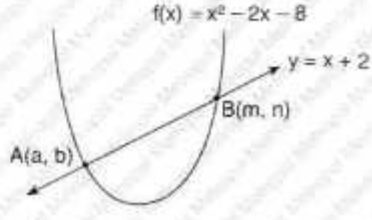
7. **m + n = ?**

A) 22
B) 18
C) 6
D) 4
E) 3



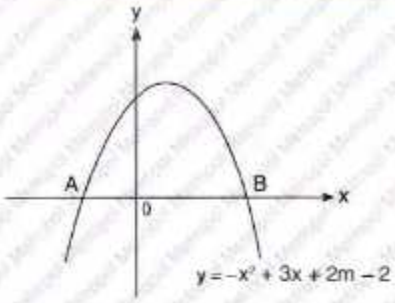
8. **b + n = ?**

A) 28
B) 21
C) 14
D) 7
E) 1



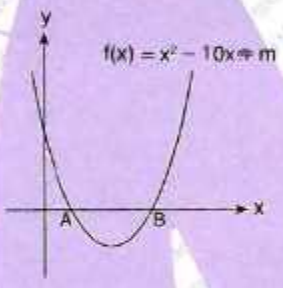
9. $\frac{|OA|}{|OB|} = \frac{2}{5} \Rightarrow m = ?$

A) 6
B) 5
C) 4
D) 3
E) 2



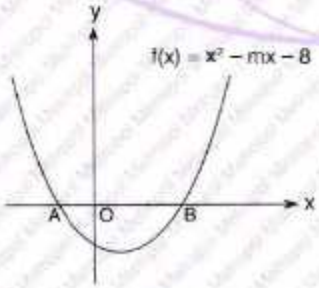
10. $3 \cdot |OA| = |AB|$
$\Rightarrow m = ?$

A) 8
B) 14
C) 16
D) 18
E) 20



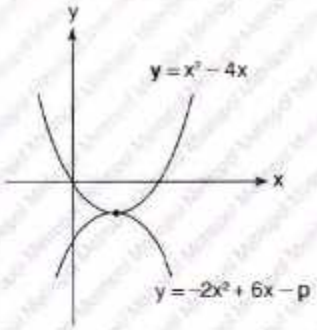
11. $4 \cdot |OA| = |OB|$
$\Rightarrow m = ?$

A) $\sqrt{2}$
B) $2\sqrt{2}$
C) $3\sqrt{2}$
D) $4\sqrt{2}$
E) $6\sqrt{2}$

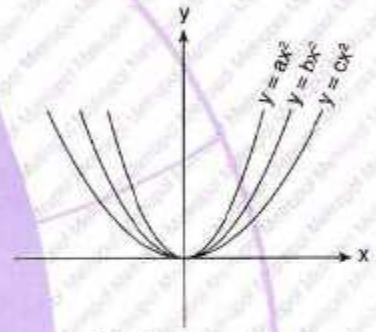


12. $p = ?$

A) $\frac{25}{3}$
B) 9
C) 8
D) 7
E) 6



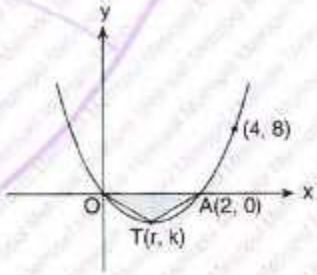
13. $? < ? < ?$



A) $c < b < a$
B) $b < a < c$
C) $a < b < c$
D) $a < c < b$
E) $c < a < b$

14. $A(\widehat{AOT}) = ?\ br^2 / u^2$

A) 1
B) 2
C) 4
D) 8
E) 16



YANITLAR / ANSWERS

1	2	3	4	5	6	7
D	E	C	D	A	E	C
8	**9**	**10**	**11**	**12**	**13**	**14**
D	A	C	C	A	A	A

1. $y = 2x^2 + 6x + 12 \Rightarrow$ **min(y) = ?**

A) $\frac{1}{2}$ B) 3 C) $\frac{6}{5}$ D) $\frac{15}{2}$ E) $\frac{17}{2}$

2. $y = -x^2 + 4x - 10 \Rightarrow$ **max(y) = ?**

A) −7 B) −6 C) −5 D) 0 E) 5

3. $y = x^2 - kx + 10$ parabolü $y = 3x + 1$ doğrusuna teğet ise, $\sum k = ?$

If $y = x^2 - kx + 10$ is tangent to the line $y = 3x + 1$, $\sum k = ?$

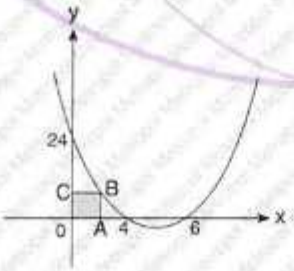
A) −6 B) −5 C) −3 D) −2 E) −1

4. $y = f(x) = ax^2 + bx + c$,

OABC bir karedir.

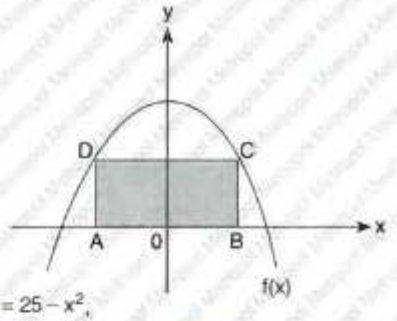
OABC is a square.

$\Rightarrow$ **A(OABC) = ? cm²**



A) 1 B) 4 C) 8 D) 9 E) 12

5.



$y = f(x) = 25 - x^2$,

ABCD bir dikdörtgendir. / ABCD is a rectangle.

Çevre / The perimeter (ABCD) = 34 br / u²

$\Rightarrow$ **A(ABCD) = ? br² / u²**

A) 144 B) 120 C) 100 D) 72 E) 64

6. $y = x^2 - ax + 5$ parabolü ile $y = 2x + 1$ doğrusu kesişmiyorsa, $\prod a = ?$

If the graphs of the parabola $y = x^2 - ax + 5$ and the line $y = 2x + 1$ do not intersect, $\prod a = ?$

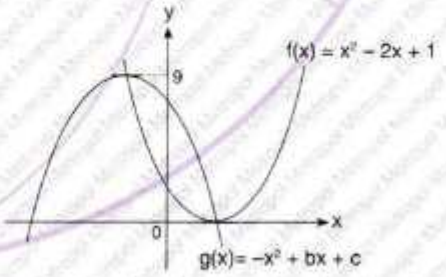
A) 5 B) 0 C) 10 D) 15 E) 20

7. $a \in \mathbb{Z}^+$, $y = x^2 + ax + 6$ parabolü $y = 4x - 1$ doğrusu iki farklı noktada kesiştiğine göre, **min(a) = ?**

$a \in \mathbb{Z}^+$, if the graphs of the parabola $y = x^2 + ax + 6$ and the line $y = 4x - 1$ intersect at two different points, min (a) = ?

A) 8 B) 9 C) 10 D) 11 E) 12

8.



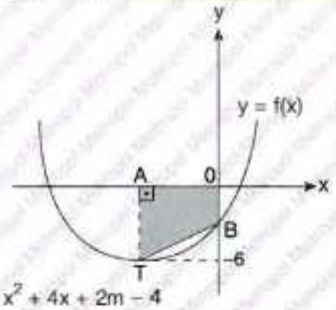
$\Rightarrow$ **g(0) = ?**

A) 3 B) 4 C) 5 D) 6 E) 7

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	B	A	D	D	B	C	C

1.



$y = f(x) = x^2 + 4x + 2m - 4$

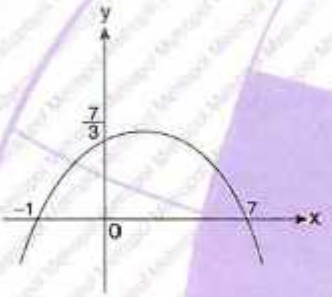
y = f(x) parabol / parabola, T tepe noktası / vertex, AOBT dik yamuk / right trapezoid

⇒ **Taralı Alan / The Shaded Area = ?**

A) 20 B) 16 C) 10 D) 8 E) 4

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2.



Grafiği verilen parabolün denklemi aşağıdakilerden hangisidir?

What is the equation of the parabola whose graph is given in the figure?

A) $-\frac{x^2}{3} + 2x + \frac{7}{3}$ B) $-x^2 + 6x + 7$ C) $x^2 - 6x - 7$ D) $x^2 + 6x + 7$ E) $-\frac{x^2}{3} + 3x + \frac{3}{7}$

[HARRAN ÜNİVERSİTESİ – YÖS 2019]

3. $f: R \to R,\ f(x) = x^2,$

$A = [-1, 4) \Rightarrow$ **f(A) = ?**

A) $[1, 16)$ B) $(1, 16)$ C) $[1, 16]$ D) $[0, 16)$ E) $(0, 16)$

[KARABÜK ÜNİVERSİTESİ – YÖS 2018]

4. $f: R \to R,\ f(x) = x^2,$

$B = (0, 25] \Rightarrow$ **$f^{-1}(B)$ = ?**

A) $[-5, 5]$ B) $(-5, 5)$ C) $(-5, 5) - \{0\}$ D) $[-5, 5] - \{0\}$ E) $(0, 5)$

[KARABÜK ÜNİVERSİTESİ – YÖS 2018]

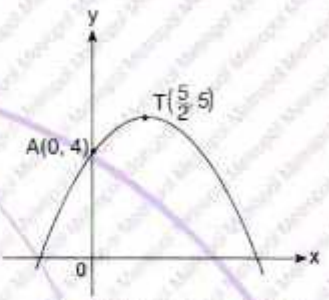
5. $f: R \to R,\ f(x) = x^2,$

$C = [-1, 4] \Rightarrow$ **$f^{-1}(C)$ = ?**

A) $[0, 2]$ B) $(0, 2)$ C) $[-2, 2]$ D) $[-2, 2] - \{0\}$ E) $(-2, 2] - \{0\}$

[KARABÜK ÜNİVERSİTESİ – YÖS 2018]

6.

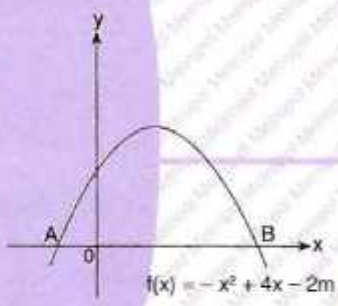


$y = ax^2 + bx + c \Rightarrow$ **b = ?**

A) $-\frac{4}{25}$ B) $-\frac{4}{5}$ C) $\frac{4}{25}$ D) $\frac{4}{5}$ E) $\frac{5}{4}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2013]

7.



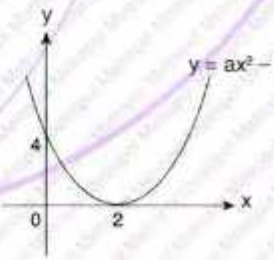
$f(x) = -x^2 + 4x - 2m - 2$

$|OB| = 3 \cdot |OA| \Rightarrow$ **m = ?**

A) −4 B) −5 C) −6 D) −7 E) −8

[ANKARA ÜNİVERSİTESİ – YÖS 2013]

8.



⇒ **a + b = ?**

A) 4 B) 5 C) 6 D) 7 E) 8

[YÖS 2003]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	A	D	D	C	D	D	B

BÖLÜM CHAPTER 5

TARİHSEL NOT / HISTORICAL NOTE

EBU'L VEFA EL-BUZCANİ [998 - 940 BC]

İranlı matematikçi ve astronom. Bilim sahasında, matematik bilimini tahsil etti ve özellikle trigonometri üzerinde çalışmalar yaptı. Trigonometrinin altı esas oranı arasındaki trigonometrik ilişkileri ilk defa ortaya koymuştur. Bu oranlar günümüzde aynen kullanılmaktadır.

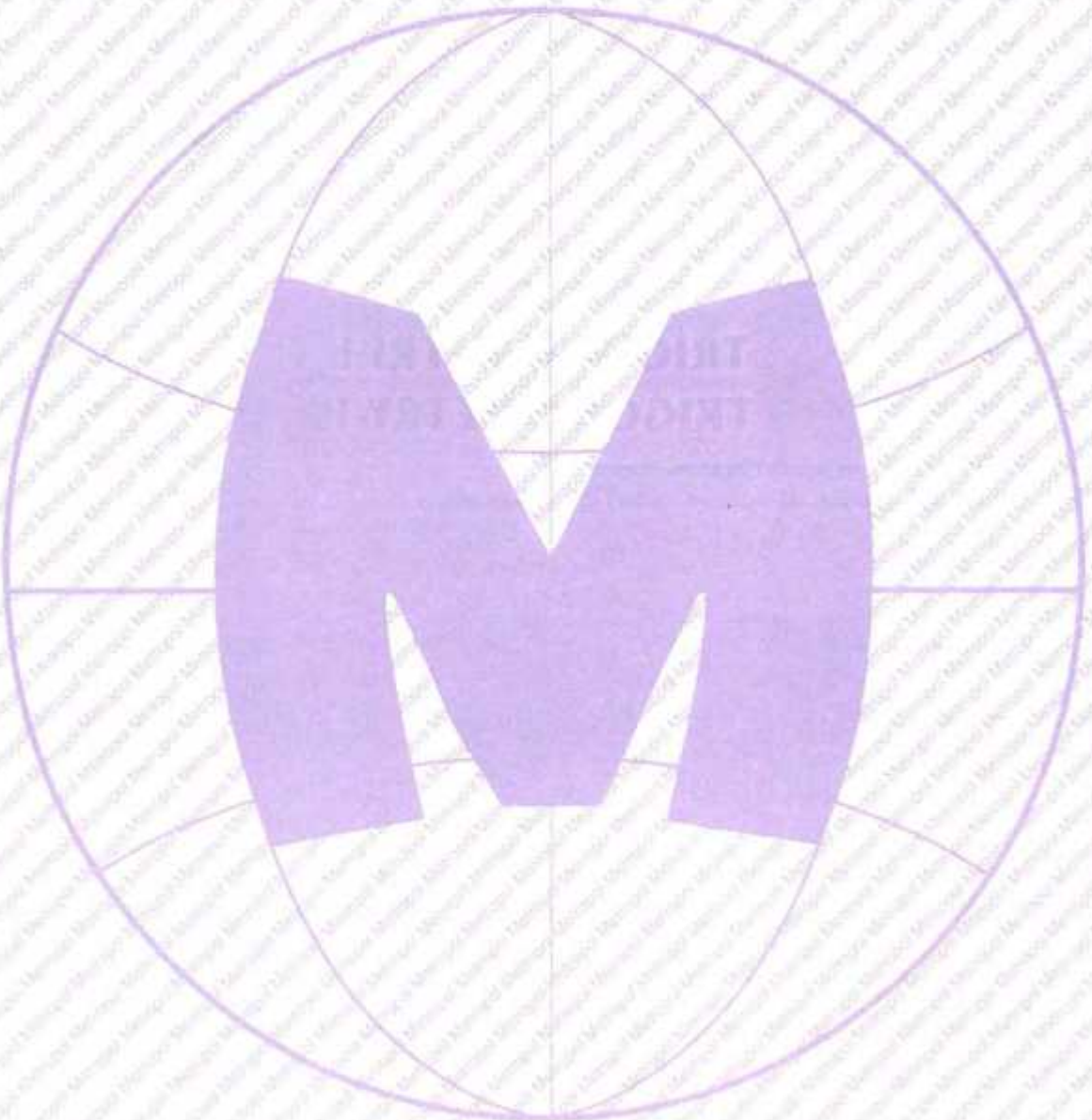
TRİGONOMETRİ I
TRIGONOMETRY I

Bu bölüm 80 alıştırma sorusu, 168 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 80 exercise questions, 168 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 5

TRİGONOMETRİ I / TRIGONOMETRY I



1. $63' = x^\circ y'$ $\Rightarrow$ $x + y = ?$

Yanıt / The Answer is 4

2. $3665' = x^\circ y' z'$ $\Rightarrow$ $x + y + z = ?$

Yanıt / The Answer is 7

3. $\left.\begin{array}{l} m(\widehat{A}) = 25^\circ\ 32'\ 23'' \\ m(\widehat{B}) = 13^\circ\ 47'\ 51'' \end{array}\right\} \Rightarrow m(\widehat{A}) + m(\widehat{B}) = ?$

Yanıt / The Answer is $39^\circ\ 20'\ 14''$

4. $\left.\begin{array}{l} m(\widehat{A}) = 43^\circ\ 35'\ 27'' \\ m(\widehat{B}) = 32^\circ\ 44'\ 32'' \end{array}\right\} \Rightarrow m(\widehat{A}) - m(\widehat{B}) = ?$

Yanıt / The Answer is $10^\circ\ 50'\ 55''$

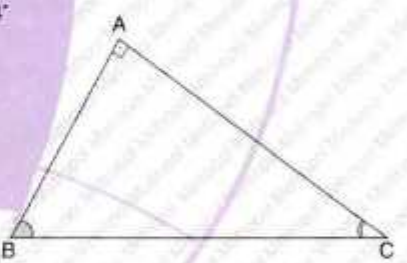
5. $\alpha = 45^\circ\ 24'$ $\Rightarrow$ $\frac{\alpha}{3} = ?$

Yanıt / The Answer is $15^\circ 8'$

6. $\beta = 47^\circ\ 12'$ $\Rightarrow$ $\frac{\beta}{4} = ?$

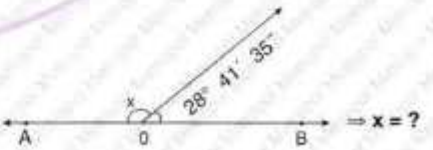
Yanıt / The Answer is $11^\circ 48'$

7. $m(\widehat{B}) = 50^\circ\ 25'\ 14''$
$\Rightarrow m(\widehat{C}) = ?$



Yanıt / The Answer is $39^\circ\ 34'\ 46''$

8.



$\Rightarrow x = ?$

Yanıt / The Answer is $151^\circ\ 18'\ 25''$

9. $\frac{7\pi}{10} = x^\circ \Rightarrow x = ?$

Yanıt / The Answer is 126

10. $\frac{5\pi}{9} = x^\circ \Rightarrow x = ?$

Yanıt / The Answer is 100

11. $120^\circ = x \cdot \pi \Rightarrow x = ?$

Yanıt / The Answer is $\frac{2}{3}$

12. $216^\circ = x \cdot \pi \Rightarrow x = ?$

Yanıt / The Answer is $\frac{6}{5}$

13. $144^\circ = x \cdot \pi \Rightarrow x = ?$

Yanıt / The Answer is $\frac{4}{5}$

14. $\left.\begin{array}{l} m(\widehat{A}) = \frac{3\pi}{8} \\ m(\widehat{B}) = \frac{\pi}{8} \end{array}\right\} \Rightarrow m(\widehat{A}) + m(\widehat{B}) = ?$

Yanıt / The Answer is $\frac{\pi}{2}$

15. $1500^\circ = \alpha + k \cdot 360^\circ \Rightarrow \alpha = ?$

Yanıt / The Answer is 60°

16. $-1600^\circ = \alpha + k \cdot 360^\circ \Rightarrow \alpha = ?$

Yanıt / The Answer is 200°

17. $79\pi = \alpha + k \cdot 2\pi \Rightarrow \alpha = ?$

Yanıt / The Answer is π

18. $-33\pi = \alpha + k \cdot 2\pi \Rightarrow \alpha = ?$

Yanıt / The Answer is π

19. $\frac{43\pi}{5} = \alpha + k \cdot 2\pi \Rightarrow \alpha = ?$

Yanıt / The Answer is $\frac{3\pi}{5}$

20. $\frac{34\pi}{3} = \alpha + k \cdot 2\pi \Rightarrow \alpha = ?$

Yanıt / The Answer is $\frac{4\pi}{3}$

21. $-\frac{25\pi}{3} = \alpha + k \cdot 2\pi \Rightarrow \alpha = ?$

Yanıt / The Answer is $\frac{5\pi}{3}$

22. $-\frac{32\pi}{5} = \alpha + k \cdot 2\pi \Rightarrow \alpha = ?$

Yanıt / The Answer is $\frac{8\pi}{5}$

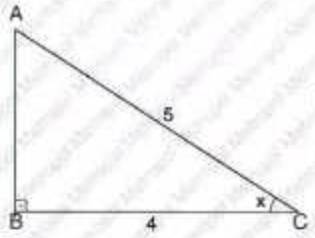
23. $\frac{51\pi}{4} = \alpha + k \cdot 2\pi \Rightarrow \alpha = ?$

Yanıt / The Answer is $\frac{3\pi}{4}$

24. $\frac{36\pi}{5} = \alpha + k \cdot 2\pi \Rightarrow \alpha = ?$

Yanıt / The Answer is $\frac{6\pi}{5}$

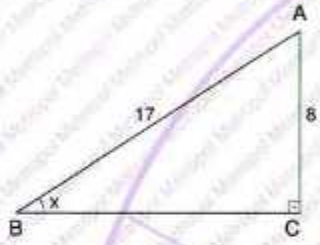
25.



$\Rightarrow$ **tanx = ?**

Yanıt / The Answer is $\frac{3}{4}$

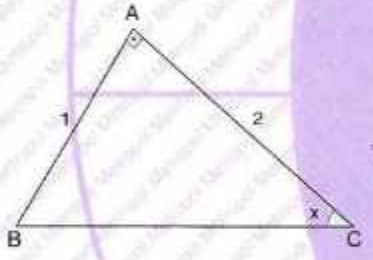
26.



$\Rightarrow$ **cosx = ?**

Yanıt / The Answer is $\frac{15}{17}$

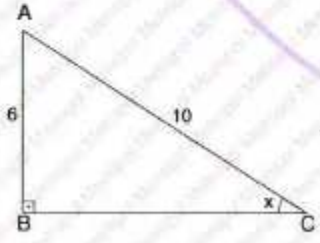
27.



$\Rightarrow$ **sinx + cosx = ?**

Yanıt / The Answer is $\frac{3}{\sqrt{5}}$

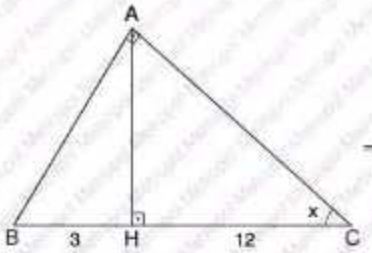
28.



$\Rightarrow$ **cotx + cosx = ?**

Yanıt / The Answer is $\frac{32}{15}$

29.



$\Rightarrow$ **tanx = ?**

Yanıt / The Answer is $\frac{1}{2}$

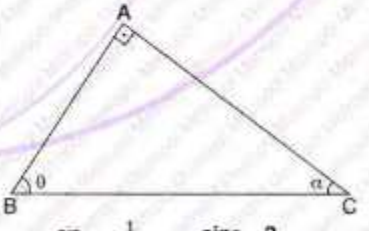
30. $0 < x < 90°$, $\sin x = \frac{3}{5}$ $\Rightarrow$ **tan x = ?**

Yanıt / The Answer is $\frac{3}{4}$

31. $0 < x < \frac{\pi}{2}$, $\cos x = \frac{12}{13}$ $\Rightarrow$ **sin x · tan x = ?**

Yanıt / The Answer is $\frac{25}{156}$

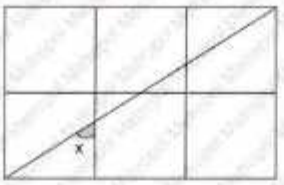
32.



$\sin\alpha = \frac{1}{3}$ $\Rightarrow$ **sinθ = ?**

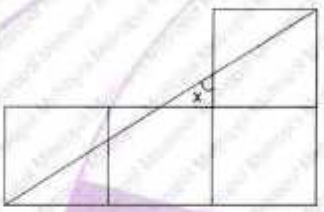
Yanıt / The Answer is $\frac{2\sqrt{2}}{3}$

33. $\cot x = ?$



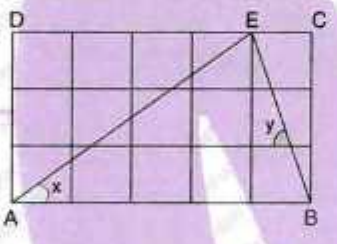
Yanıt / The Answer is $\frac{2}{3}$

34. $\cos x = ?$



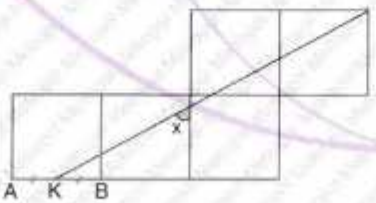
Yanıt / The Answer is $\frac{2}{\sqrt{13}}$

35. $\frac{\tan y}{\sin x} = ?$



Yanıt / The Answer is 5

36. $|AK| = |KB| \Rightarrow \tan x = ?$

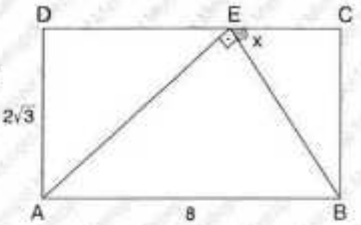


Yanıt / The Answer is $\frac{7}{4}$

37. ABCD bir dikdörtgendir.

ABCD is a rectangle.

$|DE| > |EC| \Rightarrow \tan x = ?$



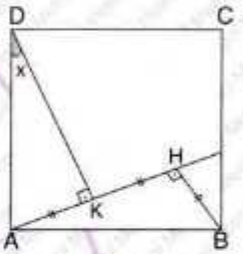
Yanıt / The Answer is $\sqrt{3}$

38. ABCD bir karedir.

ABCD is a square.

$|AK| = |KH| = |BH|$

$\Rightarrow \cos x = ?$



Yanıt / The Answer is $\frac{2}{\sqrt{5}}$

39. $5 \cdot \sin x = 3 \cdot \cos x \Rightarrow \tan x = ?$

Yanıt / The Answer is $\frac{3}{5}$

40. $0 < x < 90°$, $\frac{\cos x + \sin x}{\sin x - \cos x} = \frac{3}{2} \Rightarrow \cot x = ?$

Yanıt / The Answer is $\frac{1}{5}$

41. $0 < x < 90°$, $\tan x = \frac{1}{2} \Rightarrow \frac{\sin x + \cos x}{\cos x - \sin x} = ?$

Yanıt / The Answer is 3

42. $0 < x < \frac{\pi}{2}$, $\cot x = 3 \Rightarrow \frac{\cos x - \sin x}{\sin x} = ?$

Yanıt / The Answer is 2

43. $\frac{\tan x \cdot \cot x}{2 \cdot \tan 15° \cdot \cot 15°} = ?$

Yanıt / The Answer is $\frac{1}{2}$

44. $1 - \sin^2 x - \cos^2 x = ?$

Yanıt / The Answer is 0

45. $\tan x - \cot x = 3$

$\Rightarrow \tan^2 x + \cot^2 x = ?$

Yanıt / The Answer is 11

46. $\frac{1}{\cos^2 x} - 1 = ?$

Yanıt / The Answer is $\tan^2 x$

47. $\frac{1}{\sin^2 x} - \frac{1}{\tan^2 x} = ?$

Yanıt / The Answer is 1

48. $\frac{3\sin^2 x + 4\cos^2 x - 3}{1 - \sin^2 x} = ?$

Yanıt / The Answer is 1

49. $\frac{\tan x}{\sin x} \cdot \frac{\cot x}{\cos x} = ?$

Yanıt / The Answer is $\tan x$

50. $\frac{(\sin x + \cos x)^2}{\cos x} - 2 \cdot \sin x = ?$

Yanıt / The Answer is $\sec x$

51. $\frac{\sin x}{1 + \cos x} + \frac{1 + \cos x}{\sin x} = ?$

Yanıt / The Answer is $2 \cdot \operatorname{cosec} x$

52. $\sin x + \cos x = \frac{1}{3}$

$\Rightarrow \sin x \cdot \cos x = ?$

Yanıt / The Answer is $-\frac{4}{9}$

53. $\sin^2 50^\circ + \tan 20^\circ \cdot \tan 70^\circ + \sin^2 40^\circ = ?$

Yanıt / The Answer is 2

54. $\frac{\sin 35^\circ + \cos 55^\circ}{3 \cdot \sin 35^\circ} = ?$

Yanıt / The Answer is $\frac{2}{3}$

55. $\frac{\tan 25^\circ + \cot 65^\circ}{4 \cdot \cot 65^\circ} = ?$

Yanıt / The Answer is $\frac{1}{2}$

56. $\frac{\sin 23^\circ}{\cos 67^\circ} + \frac{\tan 20^\circ}{\cot 70^\circ} = ?$

Yanıt / The Answer is 2

57. $x+y=\frac{\pi}{2}$, $\sin x=\frac{3}{4} \Rightarrow \cos y=?$

Yanıt / The Answer is $\frac{3}{4}$

58. $x+y=\frac{\pi}{2}$, $\sin x=\frac{5}{13} \Rightarrow \cos\left(\frac{\pi}{2}-y\right)=?$

Yanıt / The Answer is $\frac{12}{13}$

59. $x+y=\frac{\pi}{2}$, $\tan x=\frac{2}{3} \Rightarrow \cot y=?$

Yanıt / The Answer is $\frac{2}{3}$

60. $\frac{\sin 45^\circ+\cos 45^\circ}{\cos 60^\circ}=?$

Yanıt / The Answer is $2\sqrt{2}$

61. $\frac{\sin 30^\circ+1}{\cos 60^\circ-1}=?$

Yanıt / The Answer is -3

62. $\frac{\tan 45^\circ+2\cos 60^\circ}{2\sin 30^\circ+\cot 45^\circ}=?$

Yanıt / The Answer is 1

63. $\sqrt{5\cdot\cos 60^\circ+4\cdot\sin 30^\circ}=?$

Yanıt / The Answer is $\frac{3}{\sqrt{2}}$

64. $\sqrt{10-\tan\frac{\pi}{4}}+\sqrt{1+\tan^2\frac{\pi}{3}}=?$

Yanıt / The Answer is 5

65. $\left(\cos\frac{\pi}{3}\right)^x = 16 \Rightarrow x = ?$

Yanıt / The Answer is -4

66. $x = \sin 42°$
$y = \sin 55°$
$z = \cos 25° \Rightarrow ? < ? < ?$

Yanıt / The Answer is $x < y < z$

67. $x = \sin 35°$
$y = \cos 65°$
$z = \tan 46° \Rightarrow ? < ? < ?$

Yanıt / The Answer is $y < x < z$

68. $x = \cot 40°$
$y = \cos 50°$
$z = \sin 70° \Rightarrow ? < ? < ?$

Yanıt / The Answer is $y < z < x$

69. $2 \cdot \sin x - 3 \cdot \cos y = A \Rightarrow \min(A) = ?$

Yanıt / The Answer is -5

70. $4 \cdot \sin x - 8 \cdot \cos y = A \Rightarrow \max(A) = ?$

Yanıt / The Answer is 12

71. $6 \cdot \sin x + 8 \cdot \cos x = B \Rightarrow \min(B) = ?$

Yanıt / The Answer is -10

72. $9 \cdot \sin x - 12 \cdot \cos x = B \Rightarrow \max(B) = ?$

Yanıt / The Answer is 15

73. $f(x) = \sin 3x - \cos 4x \Rightarrow f\left(\frac{\pi}{2}\right) = ?$

Yanıt / The Answer is -2

74. $\cos\left(\frac{3\pi}{2} + x\right) - \sin(\pi - x) = ?$

Yanıt / The Answer is 0

75. $\cot\frac{27\pi}{4} \cdot \cos\frac{7\pi}{6} = ?$

Yanıt / The Answer is $\frac{\sqrt{3}}{2}$

76. $\sin\frac{25\pi}{6} \cdot \cos\frac{8\pi}{3} = ?$

Yanıt / The Answer is $-\frac{1}{4}$

77. $f(x) = \tan\left(\frac{\pi}{2} + x\right) \Rightarrow f\left(\frac{\pi}{4}\right) = ?$

Yanıt / The Answer is -1

78. $f(x) = \sin\left(\frac{3\pi}{2} + x\right) + \cos(3\pi - x) \Rightarrow f\left(\frac{\pi}{6}\right) = ?$

Yanıt / The Answer is $-\sqrt{3}$

79. $f(x) = \dfrac{\cos\left(\frac{\pi}{2} + x\right)}{\tan(\pi + x)} \Rightarrow f\left(\frac{4\pi}{3}\right) = ?$

Yanıt / The Answer is $\frac{1}{2}$

80. $f\left(x + \frac{\pi}{2}\right) = \cos 2x + \sin 3x \Rightarrow f(\pi) = ?$

Yanıt / The Answer is -2

1. $123' = x^\circ y'$ $\Rightarrow$ $x \cdot y = ?$

A) 12 B) 6 C) 0 D) 24 E) 48

2. $3692'' = x^\circ y' z''$ $\Rightarrow$ $x + y + z = ?$

A) 30 B) 31 C) 32 D) 33 E) 34

3. $12532'' = x^\circ y' z''$ $\Rightarrow$ $x + y + z = ?$

A) 75 B) 78 C) 80 D) 83 E) 85

4. $\alpha = 46^\circ 18'$ $\Rightarrow$ $\frac{\alpha}{3} = ?$

A) $16^\circ 24'$ B) $16^\circ 26'$ C) $15^\circ 24'$ D) $15^\circ 26'$ E) $15^\circ 27'$

5. $A = 24^\circ 16' 36''$

$B = 35^\circ 48' 56''$

$A + B = x^\circ y' z''$ $\Rightarrow$ $x + y + z = ?$

A) 92 B) 94 C) 96 D) 97 E) 98

6.

$$\begin{array}{r} 15^\circ\ 21'\ 52'' \\ +\ 48^\circ\ 40'\ 10'' \\ \hline x^\circ\ \ y'\ \ z'' \end{array} \Rightarrow x + y + z = ?$$

A) 60 B) 62 C) 64 D) 66 E) 68

7. $k \in Z$,

$675^\circ = x + k \cdot 360^\circ$ $\Rightarrow$ $x = ?$

A) 315° B) 330° C) 335° D) 340° E) 345°

8. $k \in Z$,

$1995^\circ = x + k \cdot 360^\circ$ $\Rightarrow$ $x = ?$

A) 125° B) 145° C) 165° D) 195° E) 205°

9. $k \in Z$,

$1250° = x + k \cdot 360° \rightarrow x = ?$

A) 150° B) 160° C) 170° D) 180° E) 200°

10. $k \in Z$,

$1917° = x + k \cdot 360° \Rightarrow x = ?$

A) 117° B) 127° C) 137° D) 147° E) 157°

11. $k \in Z$,

$-120° = x + k \cdot 360° \Rightarrow x = ?$

A) 220° B) 230° C) 240° D) 260° E) 280°

12. $k \in Z$,

$-1500° = x + k \cdot 360° \Rightarrow x = ?$

A) 300° B) 240° C) 180° D) 120° E) 60°

13. $k \in Z$,

$-2320° = x + k \cdot 360° \Rightarrow x = ?$

A) 160° B) 180° C) 200° D) 220° E) 240°

14. $k \in Z$,

$-2970° = x + k \cdot 360° \Rightarrow x = ?$

A) 90° B) 120° C) 180° D) 270° E) 300°

15. $k \in Z$,

$\frac{47\pi}{5} = x + 2k\pi \Rightarrow x = ?$

A) $\frac{3\pi}{5}$ B) $\frac{4\pi}{5}$ C) $\frac{6\pi}{5}$ D) $\frac{7\pi}{5}$ E) $\frac{8\pi}{5}$

16. $k \in Z$,

$\frac{62\pi}{3} = x + 2k\pi \Rightarrow x = ?$

A) $\frac{\pi}{3}$ B) $\frac{2\pi}{3}$ C) $\frac{5\pi}{6}$ D) π E) $\frac{4\pi}{3}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	E	D	D	D	E	A	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	C	A	C	D	D	B

1. $k \in Z$,
$\frac{31\pi}{2} = x + 2k\pi \Rightarrow x = ?$

A) $\frac{\pi}{4}$ B) $\frac{\pi}{2}$ C) $\frac{2\pi}{3}$ D) π E) $\frac{3\pi}{2}$

2. $k \in Z$,
$\frac{89\pi}{6} = x + 2k\pi \Rightarrow x = ?$

A) $\frac{4\pi}{3}$ B) $\frac{5\pi}{3}$ C) $\frac{5\pi}{6}$ D) $\frac{7\pi}{6}$ E) $\frac{11\pi}{6}$

3. $k \in Z$,
$\frac{137\pi}{3} = x + 2k\pi \Rightarrow x = ?$

A) $\frac{2\pi}{3}$ B) $\frac{4\pi}{3}$ C) $\frac{5\pi}{3}$ D) $\frac{5\pi}{6}$ E) $\frac{7\pi}{6}$

4. $-\frac{7\pi}{12} = x + 2k\pi \Rightarrow x = ?$

A) $\frac{5\pi}{12}$ B) $\frac{3\pi}{4}$ C) $\frac{\pi}{12}$ D) $\frac{7\pi}{12}$ E) $\frac{17\pi}{12}$

5. $k \in Z$,
$-\frac{27\pi}{2} = x + 2k\pi \Rightarrow x = ?$

A) $\frac{\pi}{6}$ B) $\frac{\pi}{5}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{3}$ E) $\frac{\pi}{2}$

6. $-\frac{48\pi}{5} = x + 2k\pi \Rightarrow x = ?$

A) $\frac{4\pi}{5}$ B) $\frac{3\pi}{5}$ C) $\frac{2\pi}{5}$ D) $\frac{\pi}{5}$ E) 0

7. $k \in Z$,
$-\frac{51\pi}{4} = x + k \cdot 360° \Rightarrow x = ?$

A) 45° B) 135° C) 225° D) 245° E) 335°

8. $48° = x \cdot R \Rightarrow x = ?$

A) $\frac{2\pi}{15}$ B) $\frac{\pi}{5}$ C) $\frac{4\pi}{15}$ D) $\frac{2\pi}{5}$ E) $\frac{7\pi}{15}$

9. $144° = x \cdot R \Rightarrow x = ?$

A) $\frac{\pi}{5}$ B) $\frac{2\pi}{5}$ C) $\frac{3\pi}{5}$ D) $\frac{4\pi}{5}$ E) π

10. $210° = x \cdot R \Rightarrow x = ?$

A) $\frac{\pi}{2}$ B) $\frac{7\pi}{6}$ C) $\frac{2\pi}{3}$ D) $\frac{3\pi}{4}$ E) $\frac{5\pi}{6}$

11. $\frac{5\pi}{12} \cdot R = x° \Rightarrow x = ?$

A) 30 B) 40 C) 55 D) 60 E) 75

12. $\frac{8\pi}{5} \cdot R = x° \Rightarrow x = ?$

A) 144 B) 188 C) 216 D) 256 E) 288

13. $\sin 210° = ?$

A) $\frac{1}{2}$ B) $-\frac{1}{\sqrt{2}}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{\sqrt{2}}{2}$ E) $-\frac{1}{2}$

14. $\cos(-1500°) = ?$

A) $\frac{1}{\sqrt{2}}$ B) $\frac{1}{2}$ C) $\frac{\sqrt{3}}{2}$ D) $\sqrt{3}$ E) $\sqrt{2}$

15. $\tan(-1200°) = ?$

A) $\sqrt{3}$ B) $-\sqrt{3}$ C) $\frac{1}{\sqrt{3}}$ D) 1 E) $-\frac{1}{\sqrt{3}}$

16. $\sin 210° - \cos 240° + \tan 225° = ?$

A) $\frac{1}{\sqrt{2}}$ B) $\sqrt{2}$ C) 1 D) 2 E) $2\sqrt{2}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	C	C	E	E	C	C	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	B	E	E	E	B	A	C

1. $k \in Z$,
$1120° = k \cdot 360° + \alpha \Rightarrow \alpha = ?$

A) 20° B) 25° C) 30° D) 35° E) 40°

2. $k \in Z$,
$-1330° = k \cdot 360° + \alpha \Rightarrow \alpha = ?$

A) 80° B) 110° C) 140° D) 170° E) 200°

3. $k \in Z$,
$\frac{77\pi}{12} = k \cdot 2\pi + \alpha \Rightarrow \alpha = ?$

A) $\frac{\pi}{6}$ B) $\frac{\pi}{12}$ C) $\frac{\pi}{2}$ D) $\frac{\pi}{4}$ E) $\frac{5\pi}{12}$

4. $k \in Z$,
$\frac{109\pi}{7} = k \cdot 2\pi + \alpha \Rightarrow \alpha = ?$

A) $\frac{3\pi}{7}$ B) $\frac{2\pi}{7}$ C) $\frac{\pi}{7}$ D) $\frac{\pi}{14}$ E) $\frac{\pi}{28}$

5. $\sin 240° = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{1}{2}$ D) $\frac{\sqrt{2}}{2}$ E) $\sqrt{2}$

6. $\cos 930° = ?$

A) -1 B) 1 C) $\frac{1}{2}$ D) $\frac{\sqrt{3}}{2}$ E) $-\frac{\sqrt{3}}{2}$

7. $\cos 143° + \sin 53° = ?$

A) -2 B) -1 C) 0 D) 1 E) $\frac{1}{2}$

8. $\sin(-3735°) = ?$

A) $-\frac{1}{\sqrt{2}}$ B) $-\frac{1}{2}$ C) $-\frac{\sqrt{3}}{2}$ D) -1 E) 0

9. $\sin\left(-\frac{35\pi}{6}\right)+\tan\frac{29\pi}{4}=?$

A) $\frac{7}{2}$ B) 3 C) $\frac{5}{2}$ D) 2 E) $\frac{3}{2}$

10. $a=\sin48°$,
$b=\sin152°$,
$c=\cos91°$
$\Rightarrow ?>?>?$

A) $c>a>b$ B) $c>b>a$
C) $b>c>a$ D) $a>b>c$
E) $a>c>b$

11. $a=\sin48°$,
$b=\cos13°$,
$c=\sin117°$
$\Rightarrow ?<?<?$

A) $a<b<c$ B) $a<c<b$
C) $b<c<a$ D) $b<a<c$
E) $c<a<b$

12. $a=\sin120°$,
$b=\tan213°$,
$c=\cot278°$
$\Rightarrow a,b,c=?,?,?$

A) +,+,+ B) +,+,− C) −,+,−
D) −,−,− E) −,−,+

13. $5\cdot\sin x+12\cdot\cos x=A \Rightarrow \max(A)=?$

A) 17 B) 16 C) 13 D) 8 E) 5

14. $y\in Z$,
$y=\frac{5+3\cos x}{4} \Rightarrow \sum y=?$

A) 9 B) 6 C) 3 D) 0 E) −3

15. $\tan480°\cdot\cos510°=?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) $\frac{5}{2}$ E) $\sqrt{3}$

16. $\frac{\sin230°\cdot\cot(-20°)\cdot\cos120°}{\cos400°\cdot\tan250°}=?$

A) $\frac{1}{2}$ B) $-\frac{1}{2}$ C) $\frac{3}{2}$ D) $-\frac{3}{2}$ E) $\frac{7}{2}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	B	E	A	A	E	C	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	D	B	B	C	C	C	B

1. $B = 3 \cdot \sin x + 4 \cdot \cos x$

$\Rightarrow$ **max(B) = ?**

A) 3 B) 4 C) 5 D) 7 E) 8

2. $T = 5 \cdot \sin x - 12 \cdot \cos x$

$\Rightarrow$ **min(T) = ?**

A) −13 B) −12 C) −7 D) −5 E) −3

3. $4 - 3a = 2 \cdot \cos 3x \Rightarrow$ **? ≤ a ≤ ?**

A) $\frac{2}{3} \le a \le 1$ B) $-\frac{2}{3} \le a \le 2$

C) $-2 \le a \le \frac{2}{3}$ D) $\frac{2}{3} \le a \le 2$

E) $-2 \le a \le -\frac{2}{3}$

4. $A = 5 \cdot \sin x - 7 \cdot \cos y$

$\Rightarrow$ **max(A) + min(A) = ?**

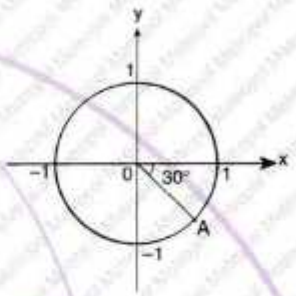
A) −2 B) 0 C) 2 D) 5 E) 7

5. $3 \cdot \sin 5x + 5 \cdot \cos 3y = A,$

$m \le A \le n \Rightarrow$ **n − m = ?**

A) −8 B) 0 C) 8 D) 16 E) 18

6.

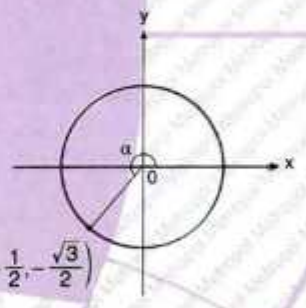


$\Rightarrow$ **A = ?**

A) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ B) $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ C) $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

D) $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ E) $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

7.



$\Rightarrow$ **α = ?**

A) $\frac{4\pi}{3}$ B) $\frac{5\pi}{3}$ C) $\frac{3\pi}{2}$

D) $\frac{7\pi}{4}$ E) $\frac{7\pi}{5}$

8. $\left.\begin{array}{l} a = \sin 72^\circ \\ b = \cos 72^\circ \\ c = \tan 72^\circ \end{array}\right\} \Rightarrow$ **? < ? < ?**

A) b < a < c B) c < b < a

C) b < c < a D) c < a < b

E) a < b < c

9. $a = \sin 68°$, $b = \cos 385°$, $c = \cos 13°$

$\Rightarrow$ **? < ? < ?**

A) $b < a < c$ B) $a < b < c$
C) $b < c < a$ D) $c < b < a$
E) $c < a < b$

10. $a = \tan 50°$, $b = \sin 80°$, $c = \cos 70°$, $d = \cot 70°$ $\Rightarrow$ **? > ? > ? > ?**

A) $a > c > b > d$ B) $a > b > d > c$
C) $a > b > c > d$ D) $b > a > c > d$
E) $b > a > d > c$

11. $\dfrac{3 \cdot \cos^2 30° + \sin^2 30° - 2}{2\cos 30°} = ?$

A) $2\sqrt{3}$ B) $\sqrt{3}$ C) 1 D) $\frac{1}{2}$ E) $\frac{1}{2\sqrt{3}}$

12. $(\tan 25° \cdot \tan 65°) + (\sin^2 58° + \sin^2 32°) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $\cot^2 x + 1 = ?$

A) 1 B) $\sin^2 x$ C) $\cos^2 x$
D) $\sec^2 x$ E) $\text{cosec}^2 x$

14. $\dfrac{\sin 40° \cdot \cos 40°}{\sin 50° \cdot \cos 50°} + \cot 35° \cdot \cot 55° = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

15. $\dfrac{1 + \cot x}{1 + \tan x} = ?$

A) $\tan x$ B) $\cot x$ C) $\sin x$
D) $\cos x$ E) 1

16. $\dfrac{1}{1 + \tan^2 30°} + \dfrac{1}{1 + \cot^2 30°} = ?$

A) $\sqrt{3}$ B) 1 C) $\frac{1}{2}$ D) $\frac{1}{\sqrt{3}}$ E) $\frac{1}{\sqrt{2}}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	A	D	B	D	E	A	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	B	E	B	E	E	B	B

1. $\sin x + \cot x \cdot \cos x - \operatorname{cosec} x = ?$

A) 1 B) 0 C) cosx D) 2secx E) 2tanx

2. $\dfrac{1}{1-\tan x} + \dfrac{1}{1-\cot x} = ?$

A) 0 B) $\frac{1}{2}$ C) 1 D) tanx E) cotx

3. $\dfrac{\sin^2 x}{1+\cos x} - 1 = ?$

A) −sinx B) −cosx C) secx D) cosecx E) 1

4. $\sin x \cdot \operatorname{cosec} x - \dfrac{\sin^2 x}{1+\cos x} = ?$

A) secx B) cosecx C) tanx D) sinx E) cosx

5. $\dfrac{\sec x + \sin x}{\cos x + \operatorname{cosec} x} = ?$

A) sinx B) cosx C) tanx D) cotx E) secx

6. $\dfrac{\sin^2 x}{1-\cos x} + \dfrac{\sin^2 x}{1+\cos x} = ?$

A) 1 B) 2 C) sinx D) cosx E) tanx

7. $\dfrac{4 \cdot \cos 32^\circ + 2 \cdot \sin 58^\circ}{3 \cdot \sin 58^\circ} = ?$

A) $\frac{2}{3}$ B) 2sin58° C) 2cos58° D) 2 E) $\frac{2}{3} \cdot \cos 32^\circ$

8. $\dfrac{5 \cdot \sin x - 4 \cdot \cos x}{5 \cdot \sin x + 4 \cdot \cos x} = \dfrac{1}{3} \Rightarrow \tan x = ?$

A) $\frac{4}{5}$ B) 1 C) $\frac{7}{5}$ D) $\frac{8}{5}$ E) 2

9. $\frac{3\cdot\sin x - 2\cdot\cos x}{\sin x + \cos x} = 2 \Rightarrow \tan x = ?$

A) $\frac{1}{4}$ B) 1 C) 2 D) 4 E) $\frac{9}{2}$

10. $\tan x - \cot x = 3$
$\Rightarrow \tan^3 x - \cot^3 x = ?$

A) 12 B) 18 C) 24 D) 27 E) 36

11. $\tan x + \cot x = 2$
$\Rightarrow \tan^3 x + \cot^3 x = ?$

A) 14 B) 10 C) 8 D) 6 E) 2

12. $\frac{\cos x}{\sin x + 1} + \frac{1 + \sin x}{\cos x} = ?$

A) $\sec x$ B) $2\cdot\sec x$ C) $\operatorname{cosec} x$
D) $2\operatorname{cosec} x$ E) $-\sec x$

13. $1 - \cot^2 x + \frac{1}{\sin^2 x} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

14. $\frac{\cos 150^\circ \cdot \sin 120^\circ}{\sin(-150^\circ)} = ?$

A) $-\frac{1}{2}$ B) $-\frac{2}{3}$ C) $\frac{1}{2}$ D) $\frac{2}{3}$ E) $\frac{3}{2}$

15. $\frac{\sin 150^\circ + \cos 120^\circ}{\tan 135^\circ + \cos 135^\circ} = ?$

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) $\sqrt{\frac{2}{3}}$ E) $\sqrt{\frac{3}{2}}$

16. $\sin 20^\circ = m$
$\Rightarrow \sin 920^\circ + \cos(-4030^\circ) = ?$

A) -1 B) 1 C) 0 D) 2 E) 4

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	C	B	E	C	B	D	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	E	E	B	E	E	B	C

1. $\sin 120° = ?$

A) $\frac{1}{2}$ B) $-\frac{1}{2}$ C) $\sqrt{3}$ D) $\frac{\sqrt{3}}{2}$ E) $-\frac{\sqrt{3}}{2}$

2. $\frac{\cos 40°}{\sin 140°} \cdot \tan 320° \cdot \sin 210° = ?$

A) -1 B) $\frac{1}{2}$ C) 1 D) $\frac{\sqrt{3}}{2}$ E) $-\frac{\sqrt{3}}{2}$

3. $f(x) = \sin 2x + 1 \Rightarrow f\left(\frac{5\pi}{12}\right) = ?$

A) $\frac{1}{2}$ B) 2 C) $\frac{3}{2}$ D) 1 E) $\frac{5}{2}$

4. $\cos\left(\alpha - \frac{3\pi}{2}\right) \cdot \tan\left(\frac{\pi}{2} - \alpha\right) = ?$

A) $\sin\alpha$ B) $\cos\alpha$ C) $-\tan\alpha$ D) $-\sin\alpha$ E) $-\cos\alpha$

5. $\sin\left(x + \frac{\pi}{2}\right) + \cos(x - 5\pi) = ?$

A) $\frac{3}{2}$ B) $\frac{1}{2}$ C) 0 D) 1 E) -1

6. $\frac{\cos(-\alpha)}{\cot(\pi + \alpha)} - \frac{\sin(2\pi + \alpha)}{\cos(\alpha - \pi)} = ?$

A) $\cos\alpha - \sin\alpha$ B) $\cos\alpha + \sin\alpha$ C) $\tan\alpha + \cot\alpha$ D) $\sin\alpha + \tan\alpha$ E) $-\tan\alpha - \cot\alpha$

7. $\pi < x < \frac{3\pi}{2}$,

$3 \cdot \sin x = 3 \cdot \cos x - \cos\left(\frac{\pi}{2} - x\right) \Rightarrow \cos x = ?$

A) $-\frac{1}{5}$ B) $-\frac{2}{5}$ C) $-\frac{3}{5}$ D) $-\frac{4}{5}$ E) -1

8. $\sin\left(\frac{5\pi}{2} - x\right) + \cos(3\pi - x) - \cot\left(\frac{11\pi}{2} + x\right) = ?$

A) $\sin x$ B) $\cos x$ C) $\tan x$ D) $\cot x$ E) $\sec x$

9. $f(x) = 2\cdot\cos(\pi - x) + \sin\left(\frac{\pi}{2} - x\right) + 1 \Rightarrow f\left(\frac{\pi}{3}\right) = ?$

A) 2 B) 4 C) $\frac{1}{4}$ D) $\frac{3}{2}$ E) $\frac{1}{2}$

10. $0 < \alpha < \frac{\pi}{2}$, $\sin\alpha = \frac{3}{5} \Rightarrow \frac{\cos\alpha + \tan\alpha}{1 - \cos\alpha} = ?$

A) $\frac{3}{4}$ B) $\frac{7}{4}$ C) $\frac{11}{4}$ D) $\frac{17}{4}$ E) $\frac{31}{4}$

11. $x \in \left(\frac{3\pi}{2}, 2\pi\right)$ ve/and $\tan x = -\frac{2}{3}$

$\Rightarrow \sin x \cdot \cos x = ?$

A) $-\frac{2}{13}$ B) $-\frac{6}{13}$ C) $-\frac{12}{13}$ D) $-\frac{18}{13}$ E) $-\frac{21}{13}$

12. $\pi < x < \frac{3\pi}{2}$, $\tan x = 3 \Rightarrow \sin x = ?$

A) $\sqrt{10}$ B) $-\sqrt{10}$ C) $\frac{3\sqrt{10}}{10}$ D) $-\frac{3\sqrt{10}}{10}$ E) $9\sqrt{10}$

13. $\frac{3\pi}{2} < x < 2\pi$, $\cos x = \frac{3}{5} \Rightarrow \tan x = ?$

A) $-\frac{4}{3}$ B) $-\frac{5}{3}$ C) -2 D) $-\frac{7}{3}$ E) $-\frac{8}{3}$

14. $0 < x < \frac{\pi}{2}$, $\sin x = a \Rightarrow \tan x = ?$

A) $\sqrt{1-a^2}$ B) $\frac{a}{\sqrt{1-a^2}}$ C) $-\frac{a}{\sqrt{1-a^2}}$ D) $-\sqrt{1-a^2}$ E) $a\sqrt{1-a^2}$

15. $\frac{\pi}{2} < x < \pi$ ve/and $\frac{\cos^2 x}{1+\sin x} = \frac{1}{5} \Rightarrow \tan x = ?$

A) $\frac{\sqrt{3}}{3}$ B) $\sqrt{3}$ C) $-\sqrt{3}$ D) $-\frac{1}{3}$ E) $-\frac{4}{3}$

16. $\sin x + \operatorname{cosec} x = \frac{7}{4} \Rightarrow 1 - \cos^2 x + \operatorname{cosec}^2 x = ?$

A) $\frac{1}{16}$ B) $\frac{9}{16}$ C) $\frac{17}{16}$ D) $\frac{25}{16}$ E) $\frac{33}{16}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	B	C	E	C	D	D	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	E	B	D	A	B	E	C

1. $0 < x < \frac{\pi}{2}$, $\sin x = \frac{1}{2} \Rightarrow \tan x + \cot x = ?$

A) $\frac{4\sqrt{3}}{3}$ B) $\frac{\sqrt{3}}{3}$ C) $\frac{1}{3}$ D) $\frac{2}{3}$ E) $\frac{4}{3}$

2. $0 < x < \frac{\pi}{2}$, $\sin x = \frac{2}{3} \Rightarrow \frac{\cos x}{\tan x} = ?$

A) $\frac{2}{5}$ B) $\frac{5}{3}$ C) $\frac{2\sqrt{5}}{5}$ D) $\frac{\sqrt{5}}{3}$ E) $\frac{5}{6}$

3. $0 < x < \frac{\pi}{2}$, $\tan x = \frac{2}{5} \Rightarrow \sin x = ?$

A) $\frac{1}{\sqrt{29}}$ B) $\frac{2}{\sqrt{29}}$ C) $\frac{3}{\sqrt{29}}$ D) $\frac{4}{\sqrt{29}}$ E) $\frac{5}{\sqrt{29}}$

4. $\pi < x < \frac{3\pi}{2}$, $\tan x = \frac{4}{3} \Rightarrow \sin x + \cos x = ?$

A) -1 B) $-\frac{6}{5}$ C) $-\frac{7}{5}$ D) $-\frac{8}{5}$ E) $-\frac{9}{5}$

5. $\pi < x < \frac{3\pi}{2}$,

$\sin x = -\frac{3}{5} \Rightarrow \frac{\sec x}{\operatorname{cosec} x} + \cot x = ?$

A) $-\frac{25}{12}$ B) $-\frac{7}{12}$ C) $\frac{1}{2}$ D) $\frac{7}{12}$ E) $\frac{25}{12}$

6. $0 < x < \frac{\pi}{2}$,

$\sec x = \frac{\sqrt{5}}{2} \Rightarrow \frac{\operatorname{cosec} x}{\cos x + \sin x} = ?$

A) $\frac{3}{5}$ B) $\frac{4}{5}$ C) $\frac{4}{3}$ D) $\frac{5}{3}$ E) 1

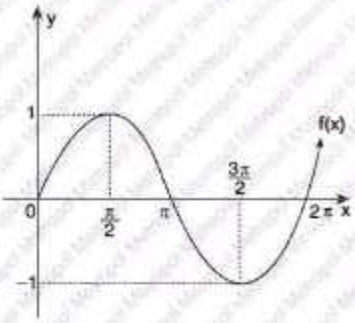
7. $\pi < x < \frac{3\pi}{2}$, $\cos x = -\frac{12}{13} \Rightarrow \frac{\tan x + \sec x}{\operatorname{cosec} x - \cot x} = ?$

A) $-\frac{5}{13}$ B) $-\frac{2}{13}$ C) $-\frac{2}{15}$ D) $\frac{2}{15}$ E) $\frac{5}{13}$

8. $\frac{\pi}{2} < x < \pi$, $\frac{2 \cdot \sin x + \cos x}{\sin x - \cos x} = \frac{2}{3} \Rightarrow \tan x = ?$

A) $-\frac{1}{4}$ B) $-\frac{1}{2}$ C) $-\frac{3}{4}$ D) $-\frac{5}{4}$ E) $-\frac{5}{2}$

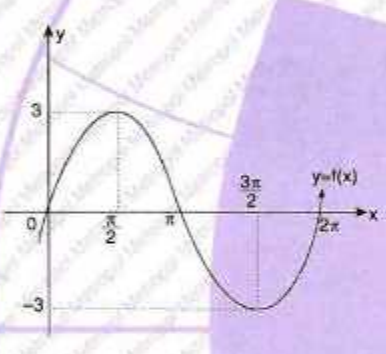
9.



$\Rightarrow$ **f(x) = ?**

A) cosx B) tanx C) sinx D) secx E) cotx

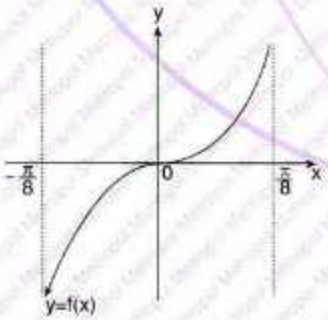
10.



$\Rightarrow$ **y = f(x) = ?**

A) $y = 3 \cdot \sin 2x$ B) $y = 3 \cdot \cos 2x$ C) $y = 3 \cdot \cos x$ D) $y = 3 \cdot \sin x$ E) $y = \sin 3x$

11.



$\Rightarrow$ **y = f(x) = ?**

A) $y = \tan 4x$ B) $y = \cot 4x$ C) $y = 4 \cdot \tan x$ D) $y = 4 \cdot \cot x$ E) $y = 2 \cdot \tan 2x$

12. $\frac{\pi}{2} < x < \pi$,

$9 \cdot \sin^2 x = 16 \cdot \cos^2 x$

$\Rightarrow$ **$\sin x + \tan x$ = ?**

A) $-\frac{8}{15}$ B) $-\frac{2}{5}$ C) $\frac{2}{5}$ D) $\frac{8}{15}$ E) $\frac{2}{3}$

13. **$\tan 27° \cdot \tan 63° \cdot \cos 150° \cdot \tan 210°$ = ?**

A) $-\frac{1}{2}$ B) $-\frac{2}{3}$ C) $\frac{1}{2}$ D) $-\frac{\sqrt{2}}{3}$ E) $\frac{\sqrt{3}}{2}$

14. **$\tan 2° \cdot \tan 4° \cdot \tan 6° \cdot \ldots \cdot \tan 88°$ = ?**

A) −2 B) −1 C) 0 D) 1 E) tan4°

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1	2	3	4	5	6	7
A	E	B	C	E	D	D
8	**9**	**10**	**11**	**12**	**13**	**14**
D	C	D	A	A	A	D

1. $\cot 1^\circ \cdot \cot 2^\circ \cdot \cot 3^\circ \cdot \ldots \cdot \cot 89^\circ = ?$

A) 0 B) 1 C) $\frac{1}{2}$ D) -1 E) $-\frac{1}{2}$

2. $\left(1-\frac{1}{\cos^2 x}\right)\cdot\left(1-\frac{1}{\sin^2 x}\right) = ?$

A) -1 B) -2 C) 0 D) 2 E) 1

3. $\tan x + \cot x = ?$

A) $\sec x \cdot \tan x$ B) $-\sec x \cdot \tan x$

C) $\sec x \cdot \operatorname{cosec} x$ D) $-x \cdot \sec x$

E) $\sin x \cdot \cos x$

4. $\frac{\sec x \cdot \cot x}{1+\cot^2 x} = ?$

A) $\sin x$ B) $\cos x$ C) $\tan x$ D) $\cot x$ E) $\sec x$

5. $\frac{1-\sin\alpha}{\cos\alpha} + \frac{\cos\alpha}{1-\sin\alpha} = ?$

A) $2 \cdot \sin\alpha$ B) $2 \cdot \tan\alpha$ C) $2 \cdot \cot\alpha$

D) $2 \cdot \sec\alpha$ E) $2 \cdot \sin 2\alpha$

6. $\frac{\sin^2 x + \cos^2 x}{2+\sin\left(\frac{\pi}{2}+x\right)+\cos(\pi - x)} = ?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

7. $\frac{2-2\cdot\cos^2 x+3\cdot\sin^2 x}{-5+5\cdot\cos^2 x} = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

8. $(\sec x + 1)\cdot(\cot x - \operatorname{cosec} x) = ?$

A) $-\sin x$ B) $-\cos x$ C) $-\tan x$

D) $-\cot x$ E) $-\sec x$

9. $\dfrac{\sin\theta}{1+\cos\theta}+\dfrac{1+\cos\theta}{\sin\theta}=?$

A) $2\cdot\sec\theta$ B) $2\cdot\operatorname{cosec}\theta$
C) $2\cdot\tan\theta$ D) $-2\cdot\operatorname{cosec}\theta$
E) $-2\cdot\sec\theta$

10. $\dfrac{1}{\cot x}\cdot\left(\operatorname{cosec}x-\dfrac{\sin x}{1+\cos x}\right)=?$

A) 4 B) 2 C) 1 D) 0 E) $\frac{1}{4}$

11. $\dfrac{\sin x}{1-\cot x}-\dfrac{\cos x}{1-\tan x}=?$

A) $\sin x+\cos x$ B) $\tan x+\cot x$
C) $(\sin x+\cos x)^{-1}$ D) $(\sin x-\cos x)^{-1}$
E) $2\cdot(\sin x+\cos x)^{-1}$

12. $\left(\dfrac{\cos^2 x}{1-\sin x}\right):\left(1+\dfrac{1}{\sin x}\right)=?$

A) $\sin x$ B) $\sin 2x$ C) $\cos x$ D) $\cos 2x$ E) $\tan 2x$

13. $0<x<\pi,\ \dfrac{\sin x+\cos x}{\tan^2 x+1}=0 \Rightarrow x=?$

A) $\frac{\pi}{2}$ B) $\frac{\pi}{3}$ C) $\frac{2\pi}{3}$ D) $\frac{3\pi}{4}$ E) $\frac{3\pi}{8}$

14. $\dfrac{\sin^3 x+\cos^3 x}{1-\sin x\cdot\cos x}=?$

A) 1 B) $\sin x\cdot\cos x$ C) $\cos x-\sin x$
D) $\sin x+\cos x$ E) $\sin x-\cos x$

15. $\dfrac{\sin x}{\sin x-\cos x}-\dfrac{\cos x}{\sin x+\cos x}=A \Rightarrow A\cdot(\sin^2 x-\cos^2 x)=?$

A) 1 B) $\sin 2x$ C) $\cos 2x$
D) $\sin 2x+\cos 2x$ E) $\tan 2x$

16. $0<\sin x<\sin y$,
$\cos x<\cos y \Rightarrow ?<?<?$

A) $0<x<y<90^\circ$ B) $0<y<x<90^\circ$
C) $90^\circ<x<y<180^\circ$ D) $90^\circ<y<x<180^\circ$
E) $0<x<90^\circ<y<180^\circ$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	E	C	A	D	A	E	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	C	D	A	D	D	A	D

1. $\sin(x+\pi)-\cos(x-\pi)+\cos\left(x-\frac{3\pi}{2}\right)+\sin\left(x-\frac{\pi}{2}\right)=?$

A) 0 B) $-2\sin x$ C) $-2\cos x$ D) $\cos x-\sin x$ E) $\sin x-\cos x$

2. $0<x<\frac{\pi}{2},\ \cos x=\frac{1}{3} \Rightarrow \cos\left(\frac{\pi}{2}+x\right)=?$

A) $\frac{\sqrt{2}}{2}$ B) $\frac{2\sqrt{2}}{3}$ C) $-\frac{2\sqrt{2}}{3}$ D) $\frac{\sqrt{2}}{3}$ E) $-\frac{\sqrt{2}}{3}$

3. $\tan x=3 \Rightarrow \dfrac{\tan\left(\frac{\pi}{2}+x\right)-\cot\left(\frac{3\pi}{2}-x\right)}{\tan\left(x-\frac{3\pi}{2}\right)\cdot\tan(\pi+x)}=?$

A) $-\frac{10}{3}$ B) $-\frac{8}{3}$ C) -1 D) $\frac{8}{3}$ E) $\frac{10}{3}$

4. $\sin 20^\circ=x \Rightarrow$

$\dfrac{\sin 250^\circ-\sin 70^\circ}{\cot 200^\circ\cdot\sin 160^\circ}\cdot\cos 70^\circ=?$

A) $-2x$ B) $-x$ C) x^2 D) $2x$ E) $\frac{2}{x}$

5. $\tan 15^\circ=a \Rightarrow \dfrac{\tan 195^\circ+\tan 165^\circ}{\cot 165^\circ}=?$

A) a B) a^2 C) 0 D) $-2a^2$ E) $-2a$

6. $\cot 75^\circ=a \Rightarrow \cot 105^\circ+\cot 225^\circ=?$

A) $-a$ B) $-\frac{a}{1+a}$ C) a D) $1-a$ E) $1+a$

7. $\sin 15^\circ=a \Rightarrow \dfrac{\sin 195^\circ+2\cdot\sin 345^\circ}{\cos 75^\circ+\cos 285^\circ}=?$

A) $\frac{3}{2}$ B) $-\frac{3}{2}$ C) $2a$ D) a E) $-a$

8. $\tan 10^\circ=x \Rightarrow \dfrac{\tan 225^\circ+\tan 190^\circ}{\cot 170^\circ+\tan 135^\circ}=?$

A) 1 B) x C) $-x$ D) $2x$ E) $-2x$

9. $f(x) = \cos 4x + 3 + 3\tan 2x \Rightarrow f\left(-\frac{\pi}{8}\right) = ?$

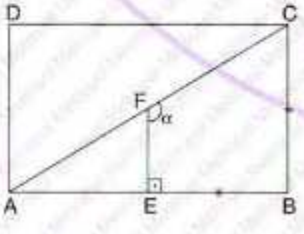
A) -3 B) -1 C) 0 D) 1 E) 3

10. $f(x) = \begin{cases} \tan x + \cot x, & x < \frac{\pi}{4} \\ \sin x \cdot \cos x, & \frac{\pi}{4} \le x \end{cases}$

$\Rightarrow f\left(\frac{\pi}{6}\right) - f\left(\frac{\pi}{3}\right) = ?$

A) $\frac{\sqrt{3}}{12}$ B) $\frac{5\sqrt{3}}{12}$ C) $\frac{7\sqrt{3}}{12}$ D) $\frac{13\sqrt{3}}{12}$ E) $\frac{19\sqrt{3}}{12}$

11.

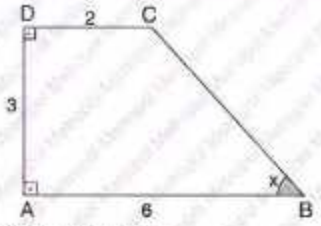


ABCD bir dikdörtgendir.
ABCD is a rectangle.

$|EB| = |BC|$, $|AF| = |FC| \Rightarrow \tan\alpha = ?$

A) -2 B) -1 C) $\frac{1}{2}$ D) 1 E) 2

12.

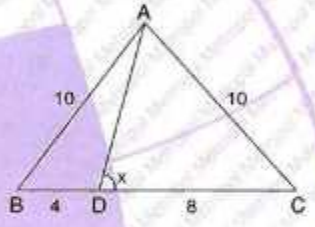


ABCD bir yamuktur.
ABCD is a trapezoid.

$\Rightarrow \cos x = ?$

A) $\frac{3}{4}$ B) $\frac{4}{3}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) $\frac{1}{2}$

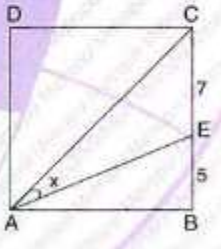
13.



$\Rightarrow \tan x = ?$

A) 4 B) 3 C) $\frac{4}{3}$ D) $\frac{1}{3}$ E) $\frac{1}{4}$

14.



ABCD bir karedir.
ABCD is a square.

$\Rightarrow \tan x = ?$

A) $\frac{4}{13}$ B) $\frac{6}{13}$ C) $\frac{9}{13}$ D) $\frac{5}{17}$ E) $\frac{7}{17}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
B	C	E	A	C	D	B
8	**9**	**10**	**11**	**12**	**13**	**14**
C	C	D	A	D	A	E

1. $f(x) = 2\cdot\cos\left(\frac{\pi}{2} + x\right) + \sin x \Rightarrow \mathbf{f\left(\frac{\pi}{2}\right) = ?}$

A) $-\frac{1}{2}$ B) $-\frac{1}{3}$ C) $-\frac{1}{4}$ D) -1 E) $-\frac{1}{5}$

2. $f(x) = \cos(-x) - \sin(-x) \Rightarrow \mathbf{f\left(\frac{\pi}{4}\right) = ?}$

A) $\sqrt{2}$ B) $\frac{\sqrt{3}}{2}$ C) $-\frac{\sqrt{3}}{2}$ D) $\frac{1}{\sqrt{2}}$ E) $-\sqrt{2}$

3. $\tan^2 x + \cot^2 x = 11 \Rightarrow \mathbf{|\tan x - \cot x| = ?}$

A) 1 B) 3 C) 5 D) 7 E) 9

4. $\mathbf{\frac{1+\sin^3 x}{1+\sin x} + \sin x = ?}$

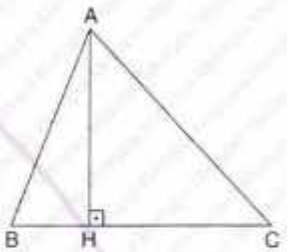
A) $\sin^2 x$ B) $\cos^2 x$ C) $1+\sin^2 x$ D) $2-\sin^2 x$ E) $2+\cos^2 x$

5. $\mathbf{\frac{\sin x}{1+\cos x} - \operatorname{cosec} x = ?}$

A) $-\sin x$ B) $-\cos x$ C) $-\cot x$ D) $-\tan x$ E) $-\sec x$

6. $2\cdot|BC| = 3\cdot|AH|$

$\Rightarrow \mathbf{\cot\widehat{B} + \cot\widehat{C} = ?}$



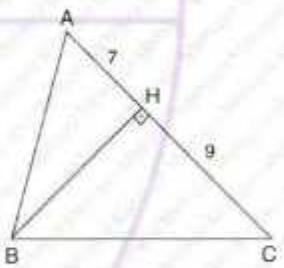
A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) 3

7. $|AH| = 7$ cm,

$|CH| = 9$ cm,

$\cot\widehat{A} + \cot\widehat{C} = 4$

$\Rightarrow \mathbf{A(\widehat{ABC}) = ?\,cm^2}$



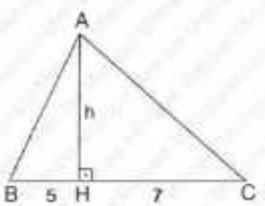
A) 128 B) 64 C) 32 D) 16 E) 8

8. $|BH| = 5$ cm,

$|CH| = 7$ cm,

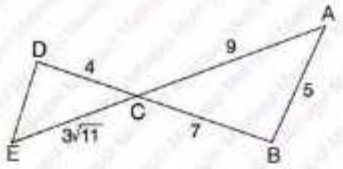
$\tan\widehat{B} + \tan\widehat{C} = 3$

$\Rightarrow \mathbf{A(\widehat{ABC}) = ?\,cm^2}$



A) 50 B) 52 C) 52,5 D) 54 E) 54,5

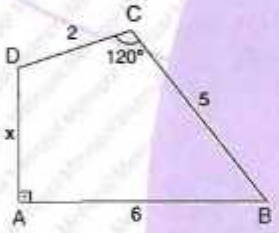
9.



$\Rightarrow$ **$A(\widehat{DEC}) = ?\ cm^2$**

A) 8 B) 11 C) 14 D) 17 E) 20

10.

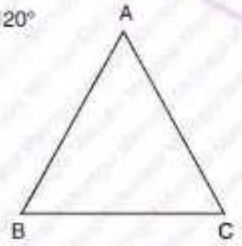


$\Rightarrow$ **$|AD| = x = ?$ cm**

A) $3\sqrt{3}$ B) $2\sqrt{3}$ C) $\sqrt{2}$ D) $\sqrt{3}$ E) 1

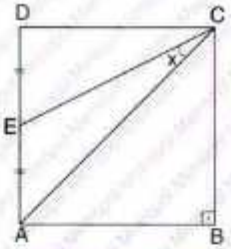
11. $m(\widehat{A}) + m(\widehat{B}) = 120°$

$\Rightarrow$ **$\cot\widehat{C} = ?$**



A) $\sqrt{3}$ B) $\frac{1}{\sqrt{3}}$ C) $\sqrt{2}$ D) $\frac{1}{\sqrt{2}}$ E) $2\sqrt{2}$

12.

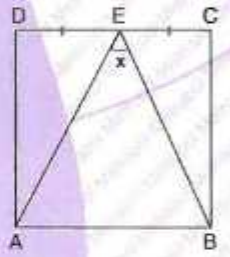


ABCD bir karedir. / ABCD is a square.

$|DE| = |AE| \Rightarrow$ **$\cot x = ?$**

A) 9 B) 3 C) 1 D) $\frac{1}{\sqrt{3}}$ E) $\frac{1}{3\sqrt{3}}$

13.

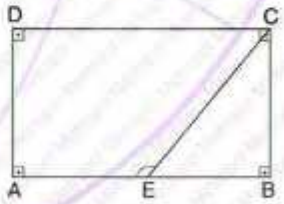


ABCD bir karedir. / ABCD is a square.

$|DE| = |EC|$, $m(\widehat{AEB}) = x \Rightarrow$ **$\tan x = ?$**

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) 1 D) $\frac{4}{3}$ E) $\frac{5}{3}$

14.



$\sin(\widehat{ECB}) = \frac{2}{3} \Rightarrow$ **$\cos(\widehat{AEC}) = ?$**

A) $-\frac{7}{3}$ B) -2 C) $-\frac{5}{3}$ D) $-\frac{4}{3}$ E) $-\frac{2}{3}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
D	A	B	C	C	C	C
8	**9**	**10**	**11**	**12**	**13**	**14**
C	B	D	B	B	D	E

1. $\sin x + \cot x \cdot \cos x = 2$

$\Rightarrow$ **$\cos^2 x + 1 = ?$**

A) $\frac{1}{7}$ B) $\frac{3}{7}$ C) $\frac{4}{7}$ D) $\frac{7}{4}$ E) $\frac{7}{3}$

2. $\frac{3\pi}{2} < x < 2\pi$,

$\cot x = -3 \Rightarrow$ **$\cos x = ?$**

A) $-\frac{1}{\sqrt{10}}$ B) $\frac{1}{\sqrt{10}}$ C) $\frac{3}{\sqrt{10}}$ D) $-\frac{3}{\sqrt{10}}$ E) $-\frac{3}{10}$

3. $\frac{\pi}{2} < x < \pi$,

$2\cos^2 x - \sin x - 1 = 0$

$\Rightarrow$ **$\sec x = ?$**

A) $\frac{1}{\sqrt{3}}$ B) $-\frac{2}{\sqrt{3}}$ C) $\frac{2}{\sqrt{3}}$ D) $-\frac{1}{\sqrt{3}}$ E) $\frac{1}{2}$

4. **$(1 - \sec^2 x)\cdot(1 - \operatorname{cosec}^2 x) = ?$**

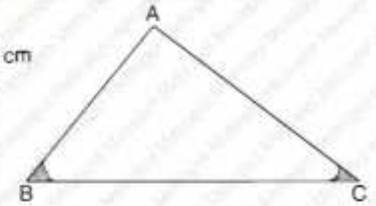
A) 0 B) 1 C) $\sin^2 x \cdot \cos^2 x$

D) -1 E) $2 \cdot \sin x \cdot \cos x$

5. $m(\widehat{ABC}) = 2 \cdot m(\widehat{ACB})$

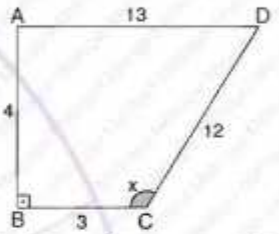
$|AB| = 10$ cm, $|AC| = 16$ cm

$\Rightarrow$ **$\sin(\widehat{C}) + \cos(\widehat{C}) = ?$**



A) $\frac{1}{7}$ B) $\frac{\sqrt{7}}{2}$ C) $\frac{7}{2}$ D) $\frac{7}{5}$ E) $\frac{7}{3}$

6. **$\cos x = ?$**



A) $-\frac{1}{5}$ B) $-\frac{3}{5}$ C) $-\frac{4}{5}$ D) $-\frac{9}{5}$ E) $-\frac{13}{5}$

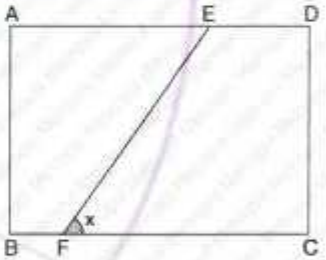
7. ABCD dikdörtgen / rectangle

$5 \cdot |BF| = |FC|$

$3 \cdot |DC| = |AD|$

$2 \cdot |ED| = |AE|$

$\Rightarrow$ **$\tan x = ?$**



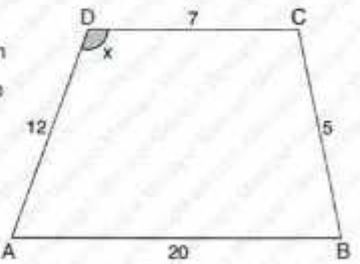
A) $\frac{1}{5}$ B) $\frac{5}{2}$ C) $\frac{3}{2}$ D) $\frac{2}{3}$ E) $\frac{1}{3}$

8. $m(\widehat{ADC}) = x$

$|AD| = 12$ cm, $|DC| = 7$ cm

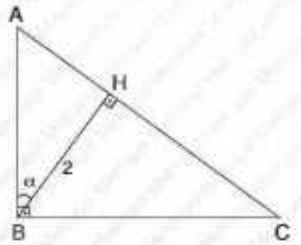
$|BC| = 5$ cm, $|AB| = 20$ cm

$\Rightarrow$ **$\sin x = ?$**



A) $\frac{7}{13}$ B) $\frac{5}{13}$ C) $\frac{12}{13}$ D) $\frac{13}{5}$ E) $\frac{12}{5}$

9.



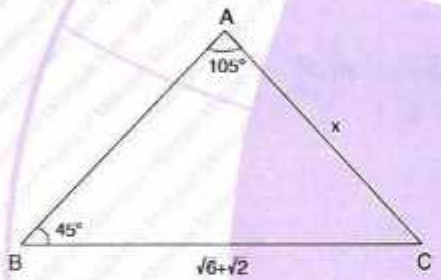
⇒ **|AC| = ?**

A) $2 \cdot \sec\alpha$ B) $2 \cdot \operatorname{cosec}\alpha$

C) $2 \cdot \tan\alpha$ D) $2\sec\alpha \cdot \operatorname{cosec}\alpha$

E) $\sec\alpha \cdot \operatorname{cosec}\alpha$

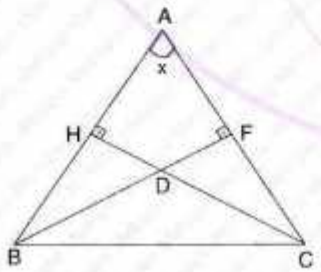
10.



⇒ **x = ?**

A) 1 B) $\sqrt{2}$ C) $\sqrt{3}$ D) 2 E) $2\sqrt{2}$

11.

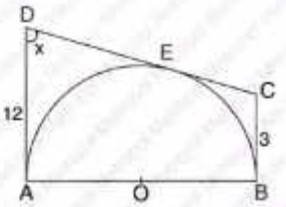


$m(\widehat{ABC}) = y$, $2 \cdot |CD| = 3 \cdot |HD|$

⇒ **$\tan x \cdot \tan y$ = ?**

A) 1 B) 2 C) $\frac{5}{2}$ D) 6 E) $\frac{13}{2}$

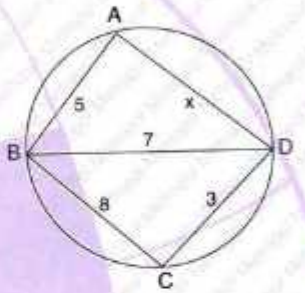
12.



⇒ **$\tan x$ = ?**

A) $\frac{3}{5}$ B) $\frac{4}{5}$ C) $\frac{3}{4}$ D) $\frac{4}{3}$ E) 1

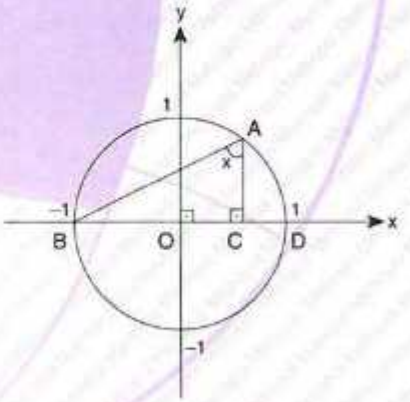
13.



⇒ **x = ?**

A) 3 B) 4 C) 5 D) 6 E) 7

14.



$|OC| = 2 \cdot |CD|$ ⇒ **$\tan x$ = ?**

A) $\frac{1}{\sqrt{3}}$ B) $\frac{1}{\sqrt{5}}$ C) $\sqrt{3}$ D) 2 E) $\sqrt{5}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
D	C	B	B	D	C	D
8	**9**	**10**	**11**	**12**	**13**	**14**
B	D	E	C	D	A	E

1. $0 < x < \pi$,
$2\sin^2 x - \cos x - 1 = 0 \Rightarrow$ **$\cos x = ?$**

A) $\frac{1}{2}$ B) $-\frac{1}{\sqrt{3}}$ C) $-\frac{\sqrt{3}}{2}$ D) $\sqrt{3}$ E) $\frac{\sqrt{2}}{2}$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2. $\cos x + \tan x \cdot \sin x = 2$
$\rightarrow$ **$1 - 2\sin^2 x = ?$**

A) $-\frac{3}{4}$ B) $-\frac{1}{2}$ C) -1 D) $\frac{1}{2}$ E) $\frac{1}{4}$

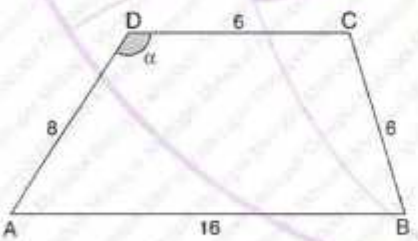
[GAZİANTEP ÜNİVERSİTESİ – YÖS 2019]

3. $0 < x < \pi$,
$\tan x = -2 \rightarrow$ **$\sin x = ?$**

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) $-\frac{2\sqrt{5}}{5}$ E) $\frac{2\sqrt{5}}{5}$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

4.

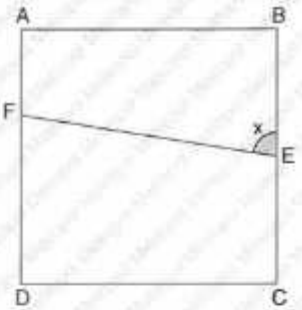


[AB] // [CD],
|AB| = 16 cm,
|BC| = |CD| = 6 cm,
|AD| = 8 cm,
$m(\widehat{ADC}) = \alpha \rightarrow$ **$\cos\alpha = ?$**

A) $-\frac{4}{5}$ B) $-\frac{2}{3}$ C) $-\frac{2}{5}$ D) $\frac{2}{3}$ E) $\frac{4}{5}$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

5.

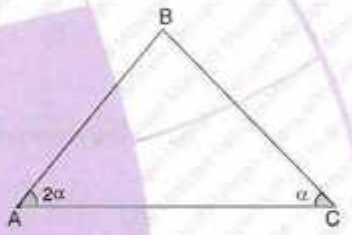


ABCD kare / square
2·|AF| = |FD|, |BE| = |EC|
$m(\widehat{FEB}) = x \rightarrow$ **$\tan x = ?$**

A) 2 B) 3 C) 4 D) 5 E) 6

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

6.



|AB| = 8, |BC| = 12 $\Rightarrow$ **$\tan\alpha = ?$**

A) $\frac{\sqrt{7}}{7}$ B) $\frac{\sqrt{7}}{4}$ C) $\frac{\sqrt{3}}{4}$ D) $\frac{\sqrt{7}}{3}$ E) $\frac{3}{4}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2018]

7. **$\tan\left(\frac{-28\pi}{3}\right) = ?$**

A) $-\sqrt{3}$ B) $\frac{-1}{\sqrt{3}}$ C) $\frac{1}{\sqrt{3}}$ D) $\sqrt{3}$ E) 1

[ATATÜRK ÜNİVERSİTESİ – YÖS 2016]

8. **$\sin(-2580°) = ?$**

A) $-\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) -1

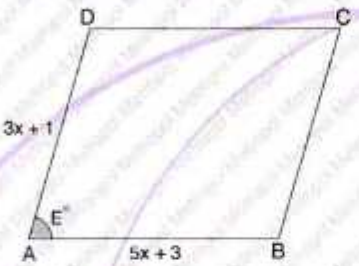
[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2015]

9. $\sin 45^\circ \cdot \cos 225^\circ + \tan 60^\circ \cdot \sin 120^\circ = ?$

A) 1 B) $3\sqrt{2}$ C) 2 D) $\sqrt{3} + \sqrt{2}$ E) $\sqrt{2}$

[AKDENİZ ÜNİVERSİTESİ – YÖS 2014]

10. ABCD, çevresi 56 cm ve alanı 90 cm² olan bir paralelkenardır.
The paralellogram ABCD has a perimeter of 56 cm and area of 90 cm².



$|AD| = 3x + 1$

$|AB| = 5x + 3$

$m(\widehat{DAB}) = E^\circ \Rightarrow \sin E^\circ = ?$

A) 0,5 B) 0,75 C) 1 D) 1,5 E) 2

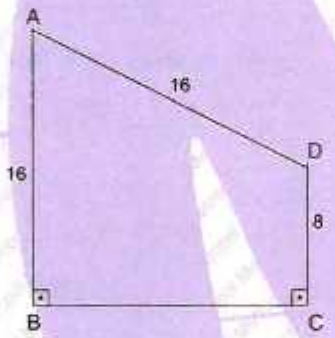
[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

11. $[DC] \perp [BC]$

$[AB] \perp [BC]$

$|AB| = |AD| = 16$

$|DC| = 8 \Rightarrow \tan(\widehat{A}) = ?$



A) 1 B) $\sqrt{2}$ C) $\frac{\sqrt{3}}{3}$ D) $\sqrt{3}$ E) -1

[ANKARA ÜNİVERSİTESİ – YÖS 2014]

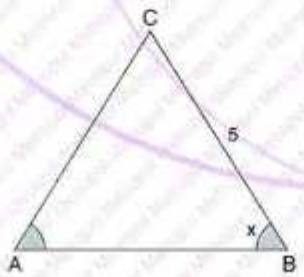
12. ABC bir üçgendir.
ABC is a triangle.

$\sin(A) = 0,5$

$|CB| = 5$

$|AC| = 5\sqrt{3}$

$\Rightarrow m(\widehat{B}) = x^\circ = ?$



A) 15 B) 45 C) 60 D) 75 E) 80

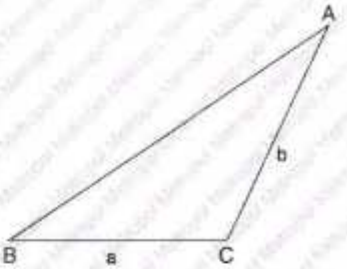
[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

13. $m(\widehat{B}) = 2 \cdot m(\widehat{A})$

$|BC| = a$

$|AC| = b$

$\Rightarrow \cos A = ?$



A) $\frac{b}{a}$ B) $\frac{b}{2a}$ C) $\frac{b}{3a}$ D) $\frac{a}{b}$ E) $\frac{b}{4a}$

[ANKARA ÜNİVERSİTESİ – YÖS 2014]

14. $\dfrac{\tan x - \sin x}{1 - \sec x} = ?$

A) $-\sin x$ B) $-\cos x$ C) $\cos x$ D) $\sin x$ E) $\tan x$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2013]

15. $0 < x < \frac{\pi}{2}$,

$\tan x = \frac{4}{3} \Rightarrow \sin x + \cos x = ?$

A) 1 B) $\frac{6}{5}$ C) $\frac{7}{5}$ D) $\frac{8}{5}$ E) $\frac{9}{5}$

[EGE ÜNİVERSİTESİ – YÖS 2013]

16. $\dfrac{\cos 310^\circ \cdot \sin 290^\circ}{\sin 40^\circ \cdot \cos 20^\circ} = ?$

A) 0 B) -1 C) 1 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

[ANADOLU ÜNİVERSİTESİ – YÖS 2011]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	B	E	E	E	D	A	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	C	D	C	B	A	C	B

BÖLÜM CHAPTER 6

TARİHSEL NOT / HISTORICAL NOTE

SOFİA VASİLYEVNA KOVALEVSKAYA [1850 - 1891]

İlk büyük kadın Rus matematikçisidir. Analiz, diferansiyel denklemler ve mekanik alanlarına birçok orijinal katkıda bulunmuştur. Kuzey Avrupa'da ilk kez tam profesörlük alan kadındır. Ayrıca bilimsel bir dergide editör olarak çalışan ilk kadınlardandır.

TRİGONOMETRİ II
TRIGONOMETRY II

Bu bölüm 80 alıştırma sorusu, 198 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 80 exercise questions, 198 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 6

TRİGONOMETRİ II / TRIGONOMETRY II

1. $\sin 75° = ?$

Yanıt / The Answer is $\frac{\sqrt{6}+\sqrt{2}}{4}$

2. $\cos 105° = ?$

Yanıt / The Answer is $\frac{\sqrt{2}-\sqrt{6}}{4}$

3. $\tan 15° = ?$

Yanıt / The Answer is $2-\sqrt{3}$

4. $A = \tan 25° + \tan 20°$

$B = 1 - \tan 25° \cdot \tan 20°$

$\Rightarrow \frac{A}{B} = ?$

Yanıt / The Answer is 1

5. $A = \sin 75° \cdot \cos 15°$

$B = \sin 15° \cdot \cos 75° \Rightarrow A + B = ?$

Yanıt / The Answer is 1

6. $A = \sin 43° \cdot \sin 17°$

$B = \cos 43° \cdot \cos 17° \Rightarrow B - A = ?$

Yanıt / The Answer is $\frac{1}{2}$

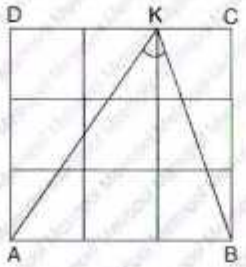
7. $\frac{\cos 72° \cdot \cos 12° + \sin 72° \cdot \sin 12°}{\sin 45° \cdot \cos 15° + \cos 45° \cdot \sin 15°} = ?$

Yanıt / The Answer is $\frac{1}{\sqrt{3}}$

8. $\frac{\tan 95° - \tan 35°}{1 + \tan 95° \cdot \tan 35°} = ?$

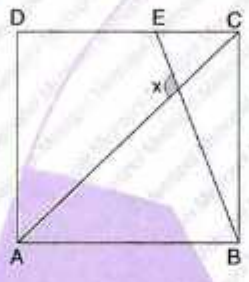
Yanıt / The Answer is $\sqrt{3}$

9. $\tan(\widehat{AKB}) = ?$



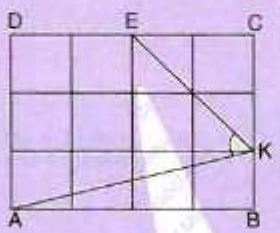
Yanıt / The Answer is $\frac{9}{7}$

10. ABCD bir karedir.
ABCD is a square.
$|DE| = 3 \cdot |EC|$
$\Rightarrow \tan x = ?$



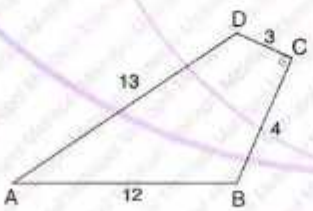
Yanıt / The Answer is $-\frac{5}{3}$

11. $\tan(\widehat{AKE}) = ?$



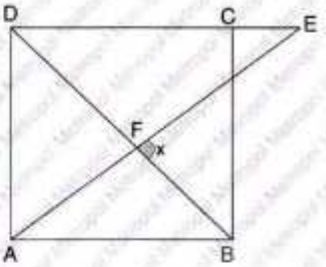
Yanıt / The Answer is $\frac{5}{3}$

12. $\sin(\widehat{BAD}) = ?$



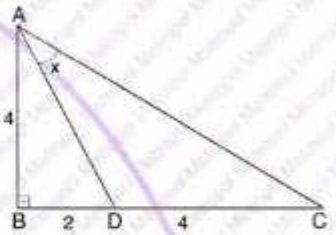
Yanıt / The Answer is $\frac{5}{13}$

13. ABCD bir karedir.
ABCD is a square.
$|ABI| = 2 \cdot |CEI|$
$\Rightarrow \tan x = ?$



Yanıt / The Answer is 5

14. $\tan x = ?$



Yanıt / The Answer is $\frac{4}{7}$

15. $2 \cdot \sin 15^\circ \cdot \cos 15^\circ = ?$

Yanıt / The Answer is $\frac{1}{2}$

16. $\sin x + \cos x = \frac{1}{2} \Rightarrow \sin 2x = ?$

Yanıt / The Answer is $-\frac{3}{4}$

17. $A = \cos 15° - \sin 15°$

$B = \sin 15° \cdot \cos 15° \Rightarrow \mathbf{A^2 - 2B = ?}$

Yanıt / The Answer is **0**

18. $\tan x = \frac{1}{2} \Rightarrow \mathbf{\sin 2x = ?}$

Yanıt / The Answer is $\frac{4}{5}$

19. $\sin x - \cos x = \frac{1}{\sqrt{3}} \Rightarrow \mathbf{\cos 2x = ?}$

Yanıt / The Answer is $\frac{\sqrt{5}}{3}$

20. $0 < x < \frac{\pi}{4}$, $\tan 2x = \frac{3}{4} \Rightarrow \mathbf{\tan x = ?}$

Yanıt / The Answer is $\frac{1}{3}$

21. $x + y = 30°$

$\Rightarrow \mathbf{(\sin x + \cos y)^2 + (\sin y + \cos x)^2 = ?}$

Yanıt / The Answer is **3**

22. $\mathbf{\cos^2 75° - \sin^2 75° = ?}$

Yanıt / The Answer is $-\frac{\sqrt{3}}{2}$

23. $\mathbf{2 \cdot \cos^2 \frac{\pi}{8} - 1 = ?}$

Yanıt / The Answer is $\frac{\sqrt{2}}{2}$

24. $\mathbf{1 - 2 \cdot \sin^2 75° = ?}$

Yanıt / The Answer is $-\frac{\sqrt{3}}{2}$

25. $\dfrac{2\cdot\tan 75^\circ}{1-\tan^2 75^\circ} = ?$

Yanıt / The Answer is $-\dfrac{1}{\sqrt{3}}$

26. $\sin 75^\circ \cdot \cos 75^\circ = ?$

Yanıt / The Answer is $\dfrac{1}{4}$

27. $\sin\dfrac{\pi}{6}\left(1-2\cdot\sin^2\dfrac{\pi}{12}\right) = ?$

Yanıt / The Answer is $\dfrac{\sqrt{3}}{4}$

28. $\tan x = 2 \Rightarrow \cos 2x = ?$

Yanıt / The Answer is $-\dfrac{3}{5}$

29. $\sin 18^\circ = x \Rightarrow \cos 36^\circ = ?$

Yanıt / The Answer is $1-2x^2$

30. $\cos 12^\circ = x \Rightarrow \cos 24^\circ = ?$

Yanıt / The Answer is $2x^2-1$

31. $\dfrac{\cos 2x-1}{\cos 2x+1} = ?$

Yanıt / The Answer is $-\tan^2 x$

32. $\dfrac{\sin 2x}{\cos 2x-1} = ?$

Yanıt / The Answer is $-\cot x$

33. $0 < x < \frac{\pi}{2}$,

$\frac{\cos 2x + 1}{\sin 2x} = \frac{3}{4} \Rightarrow \sin x = ?$

Yanıt / The Answer is $\frac{4}{5}$

34. $\tan 8° = x \Rightarrow \frac{1 + \cos 16°}{\sin 16°} = ?$

Yanıt / The Answer is $\frac{1}{x}$

35. $0 < x < \frac{\pi}{2}$, $\frac{\cos 2x - 1}{\sin 2x} = -\sqrt{3} \Rightarrow \cos x = ?$

Yanıt / The Answer is $\frac{1}{2}$

36. $\frac{1 - \cos 24°}{\sin 6° \cdot \cos 6°} = ?$

Yanıt / The Answer is $4 \cdot \sin 12°$

37. $\frac{\sin 7x \cdot \cos 5x - \cos 7x \cdot \sin 5x}{\sin x \cdot \cos x} = ?$

Yanıt / The Answer is 2

38. $\frac{\cos 50° \cdot \cos 16° - \sin 50° \cdot \sin 16°}{2 \cdot \sin 12° \cdot \cos 12°} = ?$

Yanıt / The Answer is 1

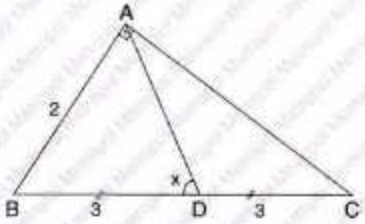
39. $\frac{\sin 15°}{\cos 15°} + \frac{\cos 15°}{\sin 15°} = ?$

Yanıt / The Answer is 4

40. $\frac{\sin 3x}{\cos x} + \frac{\cos 3x}{\sin x} = ?$

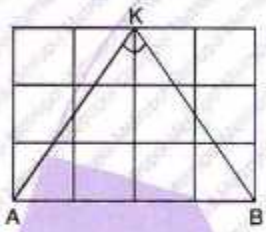
Yanıt / The Answer is $2 \cdot \cot 2x$

41. $\cos x = ?$



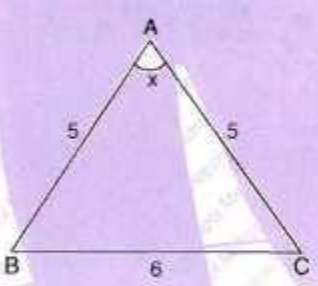
Yanıt / The Answer is $\frac{7}{9}$

42. $\tan(\widehat{AKB}) = ?$



Yanıt / The Answer is $\frac{12}{5}$

43. $\cos x = ?$



Yanıt / The Answer is $\frac{7}{25}$

44. $0 < x < \frac{\pi}{4}$, $\tan 2x = \frac{4}{3} \Rightarrow \tan x = ?$

Yanıt / The Answer is $\frac{1}{2}$

45. $0 < x < \frac{\pi}{4}$, $\sin 2x = \frac{3}{5} \Rightarrow \tan x = ?$

Yanıt / The Answer is $\frac{1}{3}$

46. $\frac{\tan 45^\circ}{\sin 15^\circ} - \frac{\cot 45^\circ}{\cos 15^\circ} = ?$

Yanıt / The Answer is $2\sqrt{2}$

47. $(1 - 2 \cdot \sin^2(7{,}5^\circ)) \cdot \sin 15^\circ = ?$

Yanıt / The Answer is $\frac{1}{4}$

48. $\cot 2x = -5 \Rightarrow \frac{\sin^4 x - \cos^4 x}{\sin 2x} = ?$

Yanıt / The Answer is 5

49. $(\sin 15° + \cos 15°)^2 - (\sin 15° - \cos 15°)^2 = ?$

Yanıt / The Answer is 1

50. $A = \sin 18° \cdot \cos 36° \Rightarrow A = ?$

Yanıt / The Answer is $\frac{1}{4}$

51. $\frac{\cos 6x - \cos 2x}{\sin 5x + \sin 3x} = ?$

Yanıt / The Answer is $-2 \cdot \sin x$

52. $\frac{\cos 40° + \cos 20°}{\sin 80°} = ?$

Yanıt / The Answer is $\sqrt{3}$

53. $\frac{\sin 50° + \sin 40°}{\cos 50° + \cos 40°} = ?$

Yanıt / The Answer is 1

54. $\frac{\sin 6x - \sin 2x}{\cos 4x} = ?$

Yanıt / The Answer is $2 \cdot \sin 2x$

55. $8x = \pi \Rightarrow \frac{\sin 9x - \sin x}{\sin 7x + \sin x} = ?$

Yanıt / The Answer is -1

56. $\arcsin \frac{\sqrt{3}}{2} = ?$

Yanıt / The Answer is 60°

57. $\arccos\frac{1}{2} = ?$

Yanıt / The Answer is 60°

58. $\arctan\frac{1}{\sqrt{3}} = ?$

Yanıt / The Answer is 30°

59. $\arcsin\frac{\sqrt{2}}{2} + \arccos\frac{\sqrt{3}}{2} = ?$

Yanıt / The Answer is 75°

60. $\arccos\left(-\frac{1}{2}\right) + \arctan(-\sqrt{3}) = ?$

Yanıt / The Answer is 60°

61. $\arccos\left(-\frac{\sqrt{3}}{2}\right) + \operatorname{arccot}(-1) = ?$

Yanıt / The Answer is 285°

62. $\cos\left(\arcsin\frac{1}{2}\right) + \sin\left(\arccos\frac{\sqrt{3}}{2}\right) = ?$

Yanıt / The Answer is $\frac{\sqrt{3}+1}{2}$

63. $\sin\left(\arccos\frac{\sqrt{2}}{2}\right) + \cos\left(\arcsin\frac{\sqrt{2}}{2}\right) = ?$

Yanıt / The Answer is $\sqrt{2}$

64. $\tan\left(\arcsin\frac{5}{13}\right) = ?$

Yanıt / The Answer is $\frac{5}{12}$

65. $\cos\left(\arcsin\frac{2\sqrt{2}}{3}\right) = ?$

Yanıt / The Answer is $\frac{1}{3}$

66. $\cos\left(2\pi - \arctan\frac{\sqrt{5}}{2}\right) = ?$

Yanıt / The Answer is $\frac{2}{3}$

67. $\tan\left(\frac{\pi}{2} - \arcsin\frac{2}{\sqrt{5}}\right) = ?$

Yanıt / The Answer is $\frac{1}{2}$

68. $\sin\left(\frac{\pi}{2} - \arctan\frac{4}{3}\right) = ?$

Yanıt / The Answer is $\frac{3}{5}$

69. $\arccos\left(\frac{x-2}{4}\right) = \frac{\pi}{3} \Rightarrow x = ?$

Yanıt / The Answer is 4

70. $\arcsin\left(\frac{3x+4}{3}\right) = \frac{\pi}{6} \Rightarrow x = ?$

Yanıt / The Answer is $-\frac{5}{6}$

71. $0 < x < 180°,\ \sin x = \frac{\sqrt{3}}{2} \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{60°, 120°\}$

72. $0 < x < 2\pi,\ \cos x = \frac{1}{2} \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left\{\frac{\pi}{3}, \frac{5\pi}{3}\right\}$

73. $0 < x < 180°,\ \cos 2x = -1 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{90°\}$

74. $0 < x < \frac{\pi}{2},\ \sin 5x = \frac{1}{2} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\left\{\frac{\pi}{30}, \frac{\pi}{6}, \frac{13\pi}{30}\right\}$

75. $0 < x < 90°,\ \sin(3x + 25°) = \sin(85°) \Rightarrow$ **min(x) = ?**

Yanıt / The Answer is $20°$

76. $0 < x < \frac{\pi}{2},\ \cos\left(7x - \frac{\pi}{4}\right) = \cos\frac{\pi}{3} \Rightarrow$ **min(x) = ?**

Yanıt / The Answer is $\frac{\pi}{12}$

77. $0 < x < 90°,\ \tan x = 1 \Rightarrow$ **x = ?**

Yanıt / The Answer is $45°$

78. $0 < x < \pi,\ \tan\left(2x - \frac{\pi}{3}\right) = \frac{1}{\sqrt{3}} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\left\{\frac{\pi}{4}, \frac{3\pi}{4}\right\}$

79. $0 < x < 90°,\ \cot 3x = \frac{1}{\sqrt{3}} \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{20°, 80°\}$

80. $x \in \mathbb{N}^+,\ \sin(2x - 5) = \cos(4x + 11)$
$\Rightarrow$ **min(x) = ?**

Yanıt / The Answer is $14°$

1. $\cos 65^\circ \cdot \cos 55^\circ - \cos 25^\circ \cdot \cos 35^\circ = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

2. $\frac{\cos 24^\circ}{\cos 8^\circ} - \frac{\sin 24^\circ}{\sin 8^\circ} = ?$

A) 2 B) $\frac{1}{2}$ C) $-\frac{1}{2}$ D) -1 E) -2

3. $\frac{\sin 50^\circ}{\sin 20^\circ} - \frac{\cos 50^\circ}{\cos 20^\circ} = ?$

A) $\sin 40^\circ$ B) $\cos 40^\circ$ C) $\sec 40^\circ$ D) $\operatorname{cosec} 40^\circ$ E) $2 \cdot \operatorname{cosec} 40^\circ$

4. $\frac{\cos 35^\circ \cdot \cos 25^\circ - \sin 35^\circ \cdot \sin 25^\circ}{2} = ?$

A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{1}{4}$ D) $\frac{\sqrt{3}}{4}$ E) 1

5. $\frac{\sin 13^\circ \cdot \cos 15^\circ + \sin 15^\circ \cdot \cos 13^\circ}{2 \cdot \sin 14^\circ} = ?$

A) $\sin 14^\circ$ B) $\cos 14^\circ$ C) $\tan 14^\circ$ D) $\cot 14^\circ$ E) $\sec 14^\circ$

6. $\frac{\sin 20^\circ + \sqrt{3} \cdot \cos 20^\circ}{\cos 10^\circ} = ?$

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) $\frac{\sqrt{3}}{2}$ E) 2

7. $\frac{\tan 60^\circ - \tan 30^\circ}{1 + \tan 60^\circ \cdot \tan 30^\circ} = ?$

A) $\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{6}}{2}$ C) $\sqrt{3}$ D) $\frac{\sqrt{3}}{3}$ E) 1

8. $\cos 83^\circ \cdot \cos 38^\circ + \sin 83^\circ \cdot \sin 38^\circ = ?$

A) $\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{2}}{2}$ C) $\frac{1}{2}$ D) $-\frac{\sqrt{2}}{2}$ E) $-\frac{\sqrt{3}}{2}$

9. $x + y = \frac{5\pi}{6} \Rightarrow (\sin x - \cos y)^2 + (\sin y - \cos x)^2 = ?$

A) 1 B) 2 C) $2 - \sqrt{3}$ D) $2 - \frac{\sqrt{3}}{2}$ E) $\frac{3}{2}$

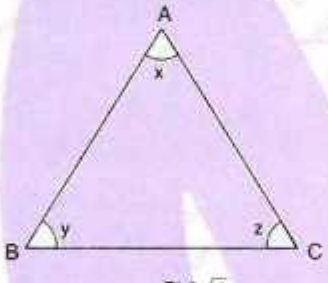
10. $\dfrac{\sin 84^\circ \cdot \cos 46^\circ + \cos 84^\circ \cdot \sin 46^\circ}{\cos 68^\circ \cdot \cos 18^\circ + \sin 68^\circ \cdot \sin 18^\circ} = ?$

A) $-\cot 50^\circ$ B) $\cot 50^\circ$ C) $\tan 50^\circ$ D) $-\tan 50^\circ$ E) 1

11. $z < 90^\circ$,

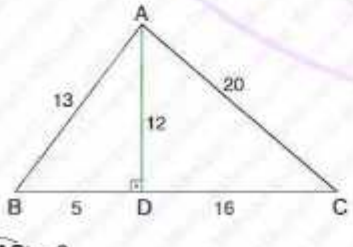
$\sin x \cdot \cos y + \sin y \cdot \cos x = \frac{1}{3}$

$\Rightarrow \cot z = ?$



A) $\frac{2}{3}$ B) $\frac{\sqrt{2}}{3}$ C) $2\sqrt{2}$ D) $\sqrt{2}$ E) 3

12.



$\Rightarrow \sin(\widehat{BAC}) = ?$

A) $\frac{3}{8}$ B) $\frac{1}{2}$ C) $\frac{27}{29}$ D) $\frac{63}{65}$ E) 1

13. $\sin(-105^\circ) = ?$

A) $-\frac{\sqrt{2}}{4}$ B) $-\left(\frac{\sqrt{2}+\sqrt{6}}{4}\right)$ C) $-\frac{\sqrt{6}}{4}$ D) $\sqrt{2}$ E) $-\frac{1}{2}$

14. $\dfrac{\sin 22^\circ \cdot \cos 23^\circ + \sin 23^\circ \cdot \cos 22^\circ}{\cos 13^\circ \cdot \cos 17^\circ - \sin 17^\circ \cdot \sin 13^\circ} = ?$

A) $\frac{\sqrt{6}}{2}$ B) $\frac{\sqrt{6}}{3}$ C) $\frac{\sqrt{2}}{2}$ D) $\frac{\sqrt{3}}{3}$ E) 1

15. $\tan(x - 45^\circ) = 4 \Rightarrow \cot x = ?$

A) -2 B) $-\frac{3}{5}$ C) $-\frac{1}{3}$ D) $\frac{1}{3}$ E) 1

16. $\tan\left(\frac{5\pi}{12}\right) = ?$

A) $2 + \sqrt{3}$ B) 1 C) $2 - \sqrt{3}$ D) $1 + \sqrt{3}$ E) -2

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	E	D	C	B	E	D	B
9	10	11	12	13	14	15	16
A	C	C	D	B	B	B	A

1. $\sin 43^\circ \cdot \cos 17^\circ + \sin 47^\circ \cdot \sin 17^\circ = ?$

A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) 2 D) $-\frac{1}{2}$ E) $-\frac{\sqrt{3}}{2}$

2. $\frac{\sin 5a}{\sin a} - \frac{\cos 5a}{\cos a} = ?$

A) $\sin 2a$ B) $4 \sin 2a$ C) $\tan 2a$ D) $4 \cos 2a$ E) $4 \tan 2a$

3. $x + y = \frac{\pi}{3}$

$\Rightarrow (\sin x - \sin y)^2 + (\cos x + \cos y)^2 = ?$

A) $3\sqrt{3}$ B) $\sqrt{3}$ C) 3 D) $-\sqrt{3}$ E) $-3\sqrt{3}$

4. $\frac{\cos 129^\circ}{\cos 163^\circ} - \frac{\sin 129^\circ}{\sin 163^\circ} = ?$

A) -8 B) -6 C) -4 D) -2 E) -1

5. $\frac{\sin 3x}{\sin x} - \frac{\cos 3x}{\cos x} = ?$

A) 4 B) 3 C) 2 D) 1 E) 0

6. $\sin 20^\circ + \tan 35^\circ \cdot \cos 20^\circ = ?$

A) -1 B) 0 C) 1 D) $\sin 55^\circ$ E) $\tan 55^\circ$

7. $\left.\begin{array}{l}\tan x = \frac{1}{3} \\ \cot y = 3\end{array}\right\} \Rightarrow \tan(x+y) = ?$

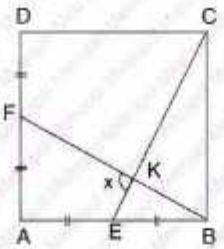
A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) $\frac{5}{4}$ E) $\frac{7}{4}$

8. $\frac{\sin 20^\circ \cdot \cos 15^\circ + \cos 20^\circ \cdot \sin 15^\circ}{\cos 65^\circ \cdot \cos 10^\circ + \sin 65^\circ \cdot \sin 10^\circ} = ?$

A) 0 B) -1 C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) 1

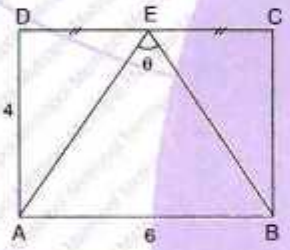
9. ABCD kare / square

$\Rightarrow$ **cotx=?**



A) $\frac{1}{\sqrt{3}}$ B) $\sqrt{3}$ C) 0 D) 1 E) ∞

10.

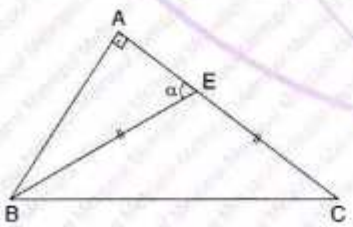


ABCD dikdörtgen / rectangle

$|DE| = |EC| \Rightarrow$ **sinθ = ?**

A) $\frac{7}{25}$ B) $\frac{12}{25}$ C) $\frac{13}{25}$ D) $\frac{17}{25}$ E) $\frac{24}{25}$

11.

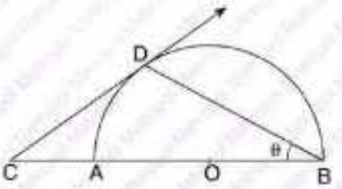


$|BE| = |EC|$, $\tan\alpha = 2\sqrt{2}$

$\rightarrow$ **cos($\widehat{C}$) = ?**

A) $\sqrt{2}$ B) $\sqrt{3}$ C) $\sqrt{6}$ D) $\frac{\sqrt{6}}{2}$ E) $\frac{\sqrt{6}}{3}$

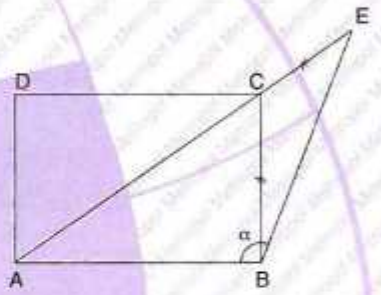
12.



$2\cdot|CA| = |AO| \Rightarrow$ **cosθ = ?**

A) $\sqrt{15}$ B) $\frac{\sqrt{15}}{6}$ C) $\sqrt{30}$ D) $\frac{\sqrt{30}}{6}$ E) $-\sqrt{30}$

13.

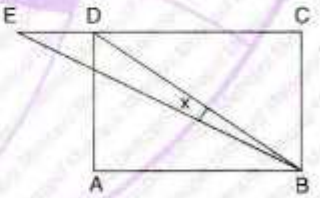


ABCD dikdörtgen / rectangle

$|EC| = |CB|$, $\frac{|AD|}{|AB|} = \frac{3}{4}$, $m(\widehat{EBA}) = \alpha \Rightarrow$ **tanα = ?**

A) $-\frac{3}{4}$ B) -1 C) -2 D) $-\frac{3}{2}$ E) $-\frac{4}{3}$

14.



ABCD dikdörtgen / rectangle

$|DC| = 2\cdot|CB|$, $\frac{|DC|}{|DE|} = \frac{5}{2} \Rightarrow$ **tanx = ?**

A) $\frac{4}{33}$ B) $\frac{3}{33}$ C) $\frac{2}{33}$ D) $\frac{1}{33}$ E) $-\frac{4}{33}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
B	D	C	D	C	C	C
8	**9**	**10**	**11**	**12**	**13**	**14**
E	C	E	E	D	C	A

1. $4 \cdot \sin 75° \cdot \cos 75° = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) $\frac{\sqrt{2}}{2}$ E) 1

2. $\sin\frac{\pi}{8}\left(2 \cdot \sin^2\frac{\pi}{16} - 1\right) = ?$

A) $-\frac{\sqrt{2}}{4}$ B) $-\frac{\sqrt{2}}{2}$ C) $\frac{1}{2}$ D) $\frac{\sqrt{2}}{2}$ E) $\frac{\sqrt{2}}{4}$

3. $\frac{\cos 2x}{\cos x + \sin x} = ?$

A) $\cos x - \sin x$ B) $1 + \sin x$ C) $\cos x + \sin x$ D) $\cos x$ E) $\frac{2}{1 + \cos x}$

4. $\frac{\sqrt{3}}{\cos 20°} + \frac{1}{\sin 20°} = ?$

A) $2 \cdot \cos 40°$ B) $4 \cdot \cot 40°$ C) $\tan 40°$ D) $8 \cdot \cos 40°$ E) $4 \cdot \cos 40°$

5. $\frac{4 \cdot \sin 20° \cdot \sin 70° \cdot \cos 40°}{\cos 10°} = ?$

A) -2 B) -1 C) $\frac{1}{2}$ D) 1 E) 2

6. $\cos 40° = 2m \Rightarrow \sin 25° \cdot \sin 50° \cdot \sin 65° = ?$

A) $\frac{m^3}{2}$ B) $2m^3$ C) $\frac{m^2}{2}$ D) m^2 E) $2m^2$

7. $\sin 35° = a$

$\Rightarrow \sin 160° = ?$

A) $\sqrt{1-a^2}$ B) $1-2a^2$ C) $2a^2$ D) $\frac{\sqrt{1-a^2}}{2}$ E) $1-a^3$

8. $\cos 34° = m \Rightarrow \sin 152° \cdot \cos 28° = ?$

A) $2m$ B) $\frac{m}{2}$ C) $\frac{m}{3}$ D) $3m$ E) $\frac{m}{4}$

9. $\cos 25° = a \Rightarrow \sin 320° = ?$

A) $2a^2 - 1$ B) $1 - 2a^2$ C) $2a \cdot \sqrt{1-a^2}$ D) $2a \cdot \sqrt{1+a^2}$ E) $4a^2$

10. $\cot x = 5 \Rightarrow \cos 2x = ?$

A) $\frac{12}{13}$ B) $\frac{5}{13}$ C) $\frac{12}{5}$ D) $\frac{5}{26}$ E) $\frac{5}{12}$

11. $0 < x < \frac{\pi}{2}$,

$3 \cdot \sin x - 4 \cdot \cos x = 0$

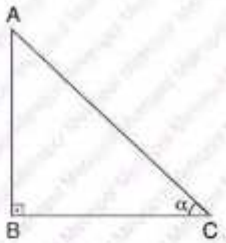
$\Rightarrow \sin 2x = ?$

A) $-\frac{24}{25}$ B) $-\frac{12}{25}$ C) $\frac{7}{25}$ D) $\frac{12}{25}$ E) $\frac{24}{25}$

12. $\frac{\cos 75°}{\cos 25°} - \frac{\sin 75°}{\sin 25°} = ?$

A) -2 B) -1 C) $\frac{1}{2}$ D) 1 E) 2

13.



$3 \cdot |AB| = 4 \cdot |BC|$

$\Rightarrow \tan\frac{\alpha}{2} = ?$

A) 1 B) $\frac{1}{2}$ C) $\frac{1}{3}$ D) $\frac{1}{4}$ E) $\frac{1}{5}$

14. $\tan x = \frac{\sqrt{3}}{2} \Rightarrow \cos 2x = ?$

A) $\frac{\sqrt{3}}{5}$ B) $\frac{1}{5}$ C) $\frac{1}{7}$ D) $\frac{\sqrt{3}}{11}$ E) $\frac{3}{7}$

15. $\sin 74° = x \Rightarrow \frac{\sin 24°}{\sin 8°} + \frac{\cos 24°}{\cos 8°} = ?$

A) 5x B) 4x C) 3x D) 2x E) x

16. $\frac{\sin 144°}{\sin 168°} - \frac{\cos 144°}{\cos 168°} = ?$

A) 3 B) 2 C) 1 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	A	A	B	D	E	B	B
9	10	11	12	13	14	15	16
B	A	E	A	B	C	B	B

1. $(\sin x + \cos x)^2 - \tan x \cdot \cot x = ?$

A) $\cos 2x$ B) $\sin x$ C) $\sin 2x$ D) $\tan 2x$ E) $\cot 2x$

2. $\pi < x < \frac{3\pi}{2}$, $\sin x = -\frac{1}{2} \Rightarrow \cos 2x = ?$

A) $-\frac{1}{2}$ B) $\frac{1}{2}$ C) 1 D) 0 E) $\frac{\sqrt{3}}{2}$

3. $0 < x < \frac{\pi}{2}$, $\tan x = \frac{1}{2} \Rightarrow \cos 2x = ?$

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) 1

4. $\tan x = \frac{1}{2} \Rightarrow \tan 2x = ?$

A) $\frac{4}{3}$ B) 1 C) $\frac{2}{3}$ D) $\frac{1}{3}$ E) -1

5. $0° < x < 90°$,

$\sin x + \cos x = \frac{7}{5} \Rightarrow \sin 2x = ?$

A) $\frac{7}{25}$ B) $\frac{24}{25}$ C) 1 D) $-\frac{7}{25}$ E) $-\frac{24}{25}$

6. $2 \cdot \operatorname{cosec} 2x - \cot x = \frac{1}{2} \Rightarrow \tan 2x = ?$

A) $\frac{4}{3}$ B) $\frac{5}{3}$ C) 2 D) $\frac{7}{3}$ E) $\frac{8}{3}$

7. $\frac{\cos^4 x - \sin^4 x}{\sin 2x} = ?$

A) $\tan 2x$ B) $-\tan 2x$ C) $\cos 2x$ D) $\cot 2x$ E) $-\sec 2x$

8. $\frac{1 + \cos 2a}{\sin 2a} \cdot \frac{1 + \cos a}{\cos a} = ?$

A) $\tan \frac{a}{2}$ B) $\sin \frac{a}{2}$ C) $\cot \frac{a}{2}$ D) $\cos \frac{a}{2}$ E) $\sec \frac{a}{2}$

9. $\cos 25^\circ = a \Rightarrow \sin 40^\circ = ?$

A) $2a^2-1$ B) $2a^2+1$ C) $2a^2+2$ D) $2a^2-2$ E) $2a^2$

10. $\sin 16^\circ = a \Rightarrow \cos 148^\circ = ?$

A) a^2 B) $2a$ C) $4a$ D) $2a^2$ E) $2a^2-1$

11. $\cos 65^\circ = m \Rightarrow \sin 40^\circ = ?$

A) $1-m^2$ B) $1+m^2$ C) $2m^2-1$ D) $1-2m^2$ E) $1+2m^2$

12. $\cos 16^\circ = a \Rightarrow \cos 148^\circ = ?$

A) $1-a^2$ B) $1+a^2$ C) $2a^2-1$ D) $1-2a^2$ E) $1+2a^2$

13. $\sin 17^\circ = x \Rightarrow \sin 56^\circ = ?$

A) $1-x^2$ B) $1+x^2$ C) $2x^2-1$ D) $1-2x^2$ E) x^2

14. $\sin 20^\circ = m \Rightarrow (\sin 10^\circ - \cos 10^\circ)^2 = ?$

A) m B) $2m$ C) $1+m$ D) $2-m$ E) $1-m$

15. $0^\circ < \alpha < 90^\circ$ ve/and $\cos\alpha - \sin\alpha = \frac{1}{\sqrt{5}}$

$\Rightarrow \cos 4\alpha = ?$

A) $-\frac{7}{24}$ B) $\frac{7}{24}$ C) 0 D) $\frac{7}{25}$ E) $-\frac{7}{25}$

16. $\cos 2x = a \Rightarrow \tan x = ?$

A) a^2 B) $\sqrt{1-a}$ C) $\frac{\sqrt{1+a}}{\sqrt{1-a}}$ D) $\frac{\sqrt{1-a}}{\sqrt{1+a}}$ E) $\sqrt{1+a}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	B	C	A	B	A	D	C
9	10	11	12	13	14	15	16
A	E	D	D	D	E	E	D

1. $\dfrac{\cot x}{\tan x + \cot x} = 4\sin x - 3 \Rightarrow \sin x = ?$

A) $3-2\sqrt{2}$ B) $1-\sqrt{3}$ C) $-1+\sqrt{2}$ D) $-1+\sqrt{3}$ E) $-2+2\sqrt{2}$

2. $\sin 10^\circ \cdot \sin 50^\circ \cdot \sin 70^\circ = ?$

A) $\frac{1}{32}$ B) $\frac{1}{16}$ C) $\frac{1}{8}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

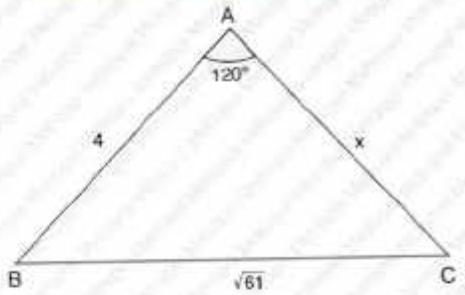
3. $\cos 12^\circ \cdot \cos 24^\circ \cdot \cos 48^\circ \cdot \cos 96^\circ = ?$

A) $-\frac{1}{32}$ B) $-\frac{1}{16}$ C) $-\frac{1}{8}$ D) $-\frac{1}{4}$ E) $-\frac{1}{2}$

4. $\cos 20^\circ \cdot \cos 40^\circ \cdot \cos 80^\circ = ?$

A) $\frac{1}{12}$ B) $\frac{1}{24}$ C) $\frac{1}{16}$ D) $\frac{1}{12}$ E) $\frac{1}{8}$

5.



$\Rightarrow x = ?$

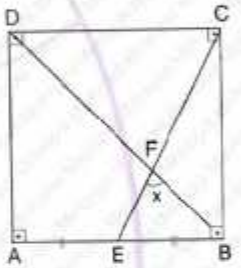
A) 5 B) 6 C) 7 D) 8 E) 9

6. ABCD bir karedir.

ABCD is a square.

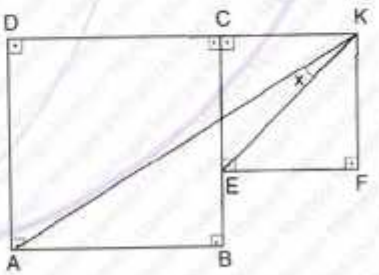
$|AE| = |EB|$

$\Rightarrow \tan x = ?$



A) $\sqrt{3}+\frac{1}{2}$ B) 3 C) $\frac{5\sqrt{3}}{6}$ D) 2 E) $\sqrt{3}-\frac{1}{2}$

7.



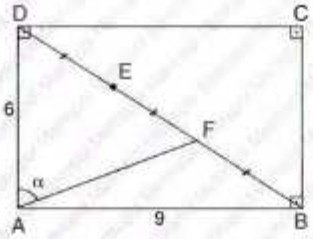
ABCD ve EFKC birer karedir.

ABCD and EFKC are squares.

$|DC| = 3 \cdot |KC|$, $m(\widehat{AKE}) = x \Rightarrow \cos x = ?$

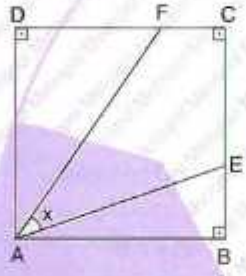
A) $\frac{\sqrt{2}}{10}$ B) $\frac{1}{\sqrt{5}}$ C) $\frac{7\sqrt{2}}{10}$ D) $\frac{2\sqrt{2}}{5}$ E) $\frac{7\sqrt{10}}{5}$

8. ABCD bir dikdörtgendir.
ABCD is a rectangle.
$|DE| = |EF| = |FB|$,
$m(\widehat{DAF}) = \alpha$
$\Rightarrow$ **cot α = ?**



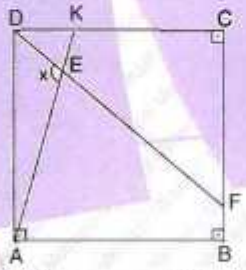
A) $\frac{2}{3}$ B) $\frac{4}{9}$ C) $\frac{1}{3}$ D) $\frac{2}{9}$ E) $\frac{2}{5}$

9. ABCD bir karedir.
ABCD is a square.
$\frac{|CE|}{|EB|} = \frac{|DF|}{|FC|} = 2$
$\Rightarrow$ **cotx = ?**



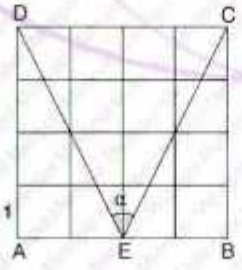
A) 1 B) $\sqrt{2} + 1$ C) $\frac{9}{7}$ D) 2 E) $\frac{4}{3}$

10. ABCD bir karedir.
ABCD is a square.
$|CF| = 3 \cdot |FB|$,
$|KC| = 2 \cdot |KD|$
$\Rightarrow$ **tanx = ?**



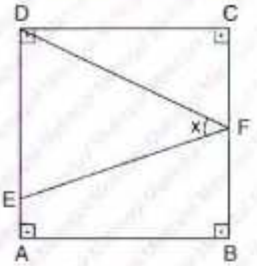
A) −6 B) −5 C) −4 D) −3 E) −2

11. ABCD bir karedir.
ABCD is a square.
$\Rightarrow$ **cosα = ?**



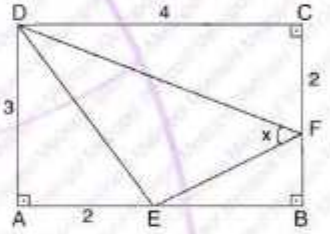
A) $\frac{1}{2}$ B) $\frac{1}{5}$ C) $\frac{2}{5}$ D) $\frac{1}{3}$ E) $\frac{3}{5}$

12. ABCD bir karedir.
ABCD is a square.
$|CF| = |FB|$,
$4 \cdot |AE| = |AD|$
$\Rightarrow$ **tanx = ?**



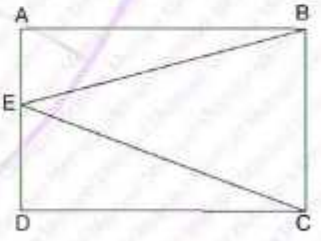
A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{5}{7}$ E) $\frac{6}{7}$

13. ABCD bir dikdörtgendir.
ABCD is a rectangle.
$\Rightarrow$ **cosx = ?**



A) $\frac{3}{\sqrt{13}}$ B) $\frac{5}{\sqrt{13}}$ C) $-\frac{1}{3}$ D) $\frac{4}{5}$ E) $\frac{3}{5}$

14. ABCD bir dikdörtgendir.
ABCD is a rectangle.
$|AB| = 6 \cdot |AE| = 3 \cdot |ED|$
$\Rightarrow$ **$\cot(\widehat{BEC}) = ?$**



A) $\frac{4}{5}$ B) 1 C) $\frac{7}{5}$ D) $\frac{15}{11}$ E) $\frac{17}{9}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
E	C	B	E	A	B	C
8	**9**	**10**	**11**	**12**	**13**	**14**
C	C	D	E	E	E	E

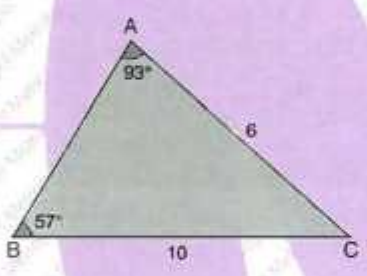
1. $8 \cdot \sin 22{,}5^\circ \cdot \cos 22{,}5^\circ \cdot \cos 135^\circ = ?$

A) $-4\sqrt{2}$ B) -2 C) $-\sqrt{2}$ D) 0 E) $\sqrt{2}$

2. $\dfrac{1}{\sin 20^\circ} - \dfrac{\sqrt{3}}{3 \cdot \cos 20^\circ} = ?$

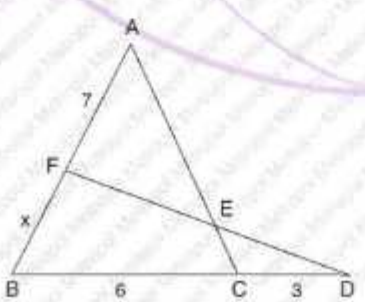
A) $\dfrac{1}{\sqrt{3}}$ B) $\dfrac{2}{\sqrt{3}}$ C) $\sqrt{3}$ D) $\dfrac{4}{\sqrt{3}}$ E) $\dfrac{5}{\sqrt{3}}$

3. $A(\widehat{ABC}) = ?\ br^2 / u^2$



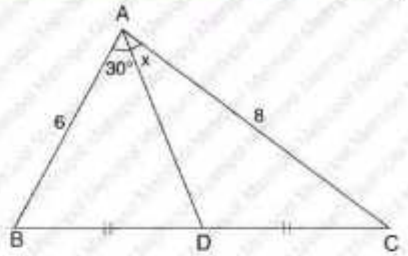
A) 15 B) 20 C) 28 D) 30 E) 36

4. $A(\widehat{ABC}) = 3 \cdot A(\widehat{BDF})$
$\Rightarrow x = ?\ br / u$



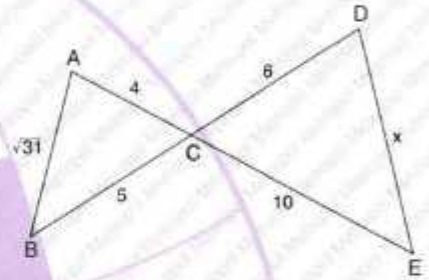
A) 1 B) $\dfrac{3}{2}$ C) 2 D) $\dfrac{5}{2}$ E) 3

5. $\sin x = ?$



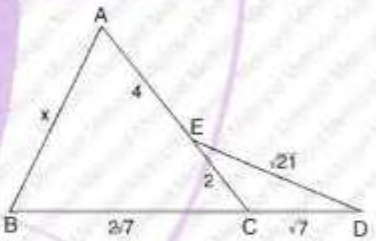
A) $\dfrac{1}{8}$ B) $\dfrac{1}{4}$ C) $\dfrac{3}{8}$ D) $\dfrac{1}{2}$ E) $\dfrac{5}{8}$

6. $x = ?\ br / u$



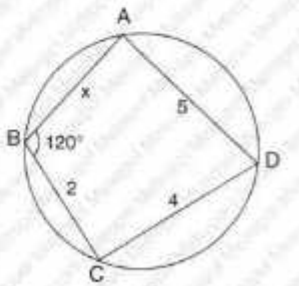
A) $\sqrt{53}$ B) $\sqrt{73}$ C) $\sqrt{86}$ D) $\sqrt{106}$ E) $\sqrt{110}$

7. $x = ?\ br / u$



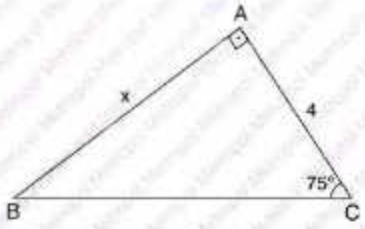
A) 2 B) $\sqrt{5}$ C) $\sqrt{7}$ D) 3 E) $\sqrt{14}$

8. $|AB| = x = ?\ br / u$



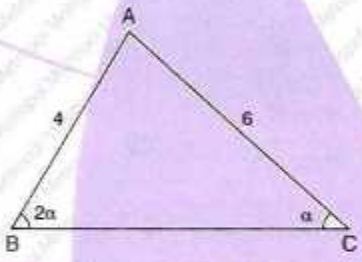
A) $\sqrt{2} - 1$ B) $2\sqrt{2} - 1$ C) $3\sqrt{2} - 1$ D) $\sqrt{2} + 1$ E) $2\sqrt{2} + 1$

9. **|AB| = x = ? br / u**



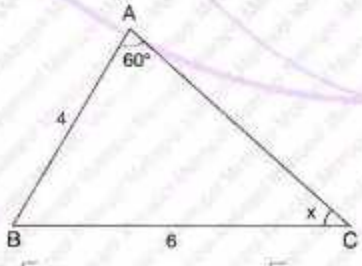
A) $2+\sqrt{3}$ B) $2\cdot(2+\sqrt{3})$ C) $3\cdot(2+\sqrt{3})$ D) $4\cdot(2+\sqrt{3})$ E) $6\cdot(2+\sqrt{3})$

10. **$\cos 2\alpha$ = ?**



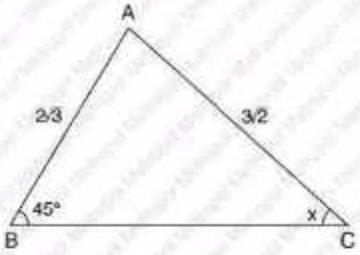
A) $\frac{7}{16}$ B) $\frac{3}{16}$ C) $\frac{1}{8}$ D) $\frac{3}{8}$ E) $\frac{1}{4}$

11. **cosx = ?**



A) $\frac{\sqrt{3}}{3}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{\sqrt{6}}{2}$ D) $\frac{\sqrt{6}}{3}$ E) $\frac{\sqrt{6}}{4}$

12. **tanx = ?**

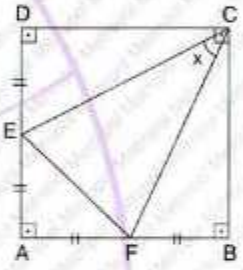


A) $\frac{1}{\sqrt{3}}$ B) $\frac{1}{\sqrt{2}}$ C) 1 D) 2 E) 3

13. ABCD bir karedir.

ABCD is a square.

⇒ **cosx = ?**



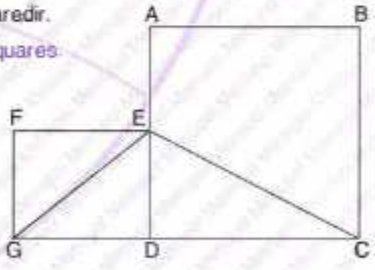
A) $\frac{1}{5}$ B) $\frac{1}{2}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) $\frac{\sqrt{2}}{5}$

14. ABCD ve EDGF birer karedir.

ABCD and EDGF are squares.

|AB| = 2·|FE|

⇒ **$\tan(\widehat{GEC})$ = ?**



A) −3 B) −2 C) $\frac{2}{3}$ D) $\frac{5}{3}$ E) 2

YANITLAR / ANSWERS

1	2	3	4	5	6	7
B	A	A	C	C	D	A
8	**9**	**10**	**11**	**12**	**13**	**14**
C	D	C	D	B	D	A

1. $\sin 75° + \sin 15° = ?$

A) $\frac{\sqrt{6}}{2}$ B) $\frac{\sqrt{6}}{3}$ C) $\frac{\sqrt{6}}{4}$ D) $\frac{\sqrt{6}}{5}$ E) 1

2. $\cos 15° - \sin 15° = ?$

A) $\frac{\sqrt{2}}{2}$ B) $\frac{\sqrt{6}}{2}$ C) $2\sqrt{6}$ D) $-\frac{\sqrt{2}}{2}$ E) $\frac{\sqrt{6}-\sqrt{2}}{2}$

3. $\sin 54° - \sin 18° = ?$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $-\frac{1}{2}$ D) $-\frac{1}{4}$ E) $\frac{5}{8}$

4. $\cos 144° + \cos 72° = ?$

A) -2 B) $-\frac{3}{2}$ C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) 2

5. $\frac{\sin 3x + \sin 5x}{\cos 3x + \cos 5x} = ?$

A) sin2x B) cos2x C) cot2x D) tan2x E) tan4x

6. $\frac{\sin x + \sin 3x}{\cos x - \cos 3x} = ?$

A) tan2x B) cot2x C) cotx D) tanx E) tan3x

7. $\frac{\cos 50° + \cos 10°}{\sin 50° + \sin 10°} = ?$

A) $-\sqrt{3}$ B) -1 C) 0 D) $\frac{\sqrt{3}}{3}$ E) $\sqrt{3}$

8. $\frac{\sin 3x + \sin 5x + \sin 7x}{\cos 3x + \cos 5x + \cos 7x} = ?$

A) sin5x B) cos5x C) tan5x D) cot5x E) 1

9. $\dfrac{\sin 20^\circ + \sin 60^\circ + \sin 100^\circ}{\cos 20^\circ + \cos 60^\circ + \cos 100^\circ} = ?$

A) 0 B) $\dfrac{\sqrt{3}}{3}$ C) 1 D) $\sqrt{3}$ E) $2\sqrt{3}$

10. $\dfrac{\cos x + \cos 6x + \cos 11x}{\sin x + \sin 6x + \sin 11x} = ?$

A) $\cot 6x$ B) $\cot 18x$ C) 1 D) $\cot x + \cot 6x + \cot 11x$ E) 0

11. $\dfrac{\sin 10x - \sin 8x + \sin 6x}{\cos 10x - \cos 8x + \cos 6x} = ?$

A) $-\tan 4x$ B) $\cot 4x$ C) $-\tan 8x$ D) $\tan 8x$ E) $\cot 8x$

12. $14x = \pi \Rightarrow \dfrac{4 \cdot \cos 3x \cdot \cos x}{\cos 12x + \cos 10x}$

A) -4 B) -3 C) -2 D) -1 E) 0

13. $11x = \dfrac{\pi}{2} \Rightarrow \dfrac{4 \cdot \sin x \cdot \cos 4x}{\cos 14x + \cos 6x} = ?$

A) 1 B) 2 C) 3 D) 4 E) 6

14. $19x = \pi \Rightarrow \dfrac{2 \cdot \cos 3x \cdot \cos 15x}{\cos x + \cos 7x} = ?$

A) 2 B) 1 C) $\dfrac{1}{2}$ D) $-\dfrac{1}{2}$ E) -1

15. $26a = \pi \Rightarrow \dfrac{\sin 10a + \sin 6a}{\cos 5a \cdot \cos 2a} = ?$

A) 1 B) $\dfrac{3}{2}$ C) 0 D) 2 E) $\dfrac{1}{2}$

16. $\cos x \cdot \cos 2x = \dfrac{1}{16 \cdot \sin x}$

$\Rightarrow \sin 4x = ?$

A) $\dfrac{1}{2}$ B) $\dfrac{2}{3}$ C) $\dfrac{1}{4}$ D) $\dfrac{\sqrt{2}}{2}$ E) $\dfrac{\sqrt{3}}{2}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	A	A	C	E	C	E	C
9	10	11	12	13	14	15	16
D	A	D	C	B	E	D	C

1. $\cos 20^\circ + \cos 100^\circ - \sin 50^\circ = ?$

A) $\frac{1}{2}$ B) $-\frac{1}{2}$ C) 0 D) -1 E) 1

2. $\dfrac{\sin 5x + \sin 7x}{\cos 5x + \cos 7x} = ?$

A) sin6x B) cos6x C) tan6x D) cot6x E) 0

3. $\dfrac{1}{\cos 75^\circ} + \dfrac{1}{\sin 75^\circ} = ?$

A) $2\sqrt{6}$ B) $\sqrt{6}$ C) $\frac{\sqrt{3}}{2}$ D) $-\frac{\sqrt{3}}{2}$ E) $-2\sqrt{6}$

4. $14x = \frac{\pi}{2} \Rightarrow \dfrac{\cos 12x + \cos 6x}{\sin 8x + \sin 2x} = ?$

A) 1 B) 0 C) -1 D) tan3x E) $\frac{1}{2}$

5. $x = \frac{\pi}{10} \Rightarrow \dfrac{\cos 13x + \cos 3x}{\sin 7x + \sin 3x} = ?$

A) cot3x B) 1 C) tan5x D) $-$tan5x E) 0

6. $\dfrac{\sin 10^\circ + \sin 30^\circ + \sin 50^\circ}{\cos 10^\circ + \cos 30^\circ + \cos 50^\circ} = ?$

A) $\frac{1}{2}$ B) $\frac{1}{\sqrt{3}}$ C) $\frac{1}{\sqrt{2}}$ D) 2 E) 1

7. $\dfrac{\cos 7x + \cos 5x + \cos x}{\sin 7x - \sin 5x + \sin x} = ?$

A) tanx B) cotx C) $-$cosx D) $-$cot5x E) cot7x

8. $2 \cdot \sin 50^\circ \cdot \cos 20^\circ - \sin 70^\circ = ?$

A) 2 B) $\frac{1}{2}$ C) $-\frac{1}{2}$ D) -2 E) 0

9. ABCD bir karedir.

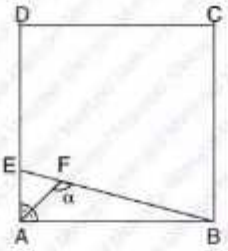
ABCD is a square.

$m(\widehat{EAF}) = m(\widehat{FAB})$,

$|DE| = 2\cdot|EA|$,

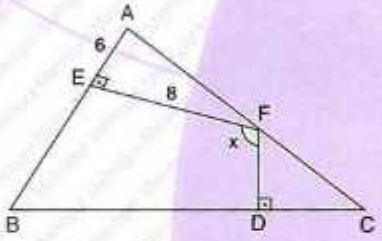
$m(\widehat{AFB}) = \alpha$

$\Rightarrow \tan\alpha = ?$



A) $-\sqrt{3}$ B) $-\sqrt{2}$ C) -1 D) -2 E) -3

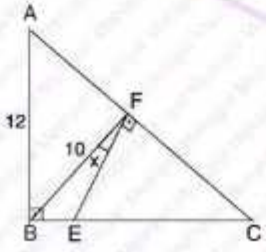
10.



$|AC| = |CB| \Rightarrow \tan x = ?$

A) $-\frac{5}{3}$ B) $-\frac{4}{3}$ C) -1 D) -2 E) -3

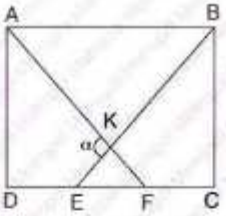
11.



$|AF| = |FC| \Rightarrow \cot x = ?$

A) $\frac{1}{7}$ B) $\frac{2}{7}$ C) $\frac{3}{7}$ D) $\frac{8}{7}$ E) $\frac{24}{7}$

12.



$|DC| = 3\cdot|AD|$, $|DE| = |EF| = |FC| \Rightarrow \tan\alpha = ?$

A) $\frac{4}{3}$ B) $\frac{8}{3}$ C) $\frac{16}{3}$ D) $\frac{20}{3}$ E) $\frac{24}{5}$

13. $\sin 4x \cdot \cot 2x = \dfrac{8\tan^2 x}{\tan^4 x + 2\tan^2 x + 1} \Rightarrow x = ?$

A) 22,5° B) 45° C) 67,5° D) 75° E) 90°

14. $x \in \left(0, \frac{\pi}{2}\right]$,

$$\frac{\sin 2x + 2\cos^2 x - 1}{\cos x - \sin x - \cos 3x + \sin 3x} = \frac{1}{\sec x} \Rightarrow x = ?$$

A) 15° B) 30° C) 45° D) 60° E) 90°

YANITLAR / ANSWERS

1	2	3	4	5	6	7
C	C	A	A	E	B	B
8	**9**	**10**	**11**	**12**	**13**	**14**
B	D	B	E	A	A	C

1. $\arctan 1 = ?$

A) $\frac{\pi}{12}$ B) $\frac{\pi}{8}$ C) $\frac{\pi}{6}$ D) $\frac{\pi}{4}$ E) 2π

2. $\arctan\sqrt{3} + \operatorname{arccot}\frac{1}{\sqrt{3}} = ?$

A) $\frac{5\pi}{6}$ B) $\frac{3\pi}{4}$ C) $\frac{2\pi}{3}$ D) $\frac{\pi}{2}$ E) $\frac{\pi}{3}$

3. $\arctan(-\sqrt{3}) = ?$

A) $\frac{\pi}{6}$ B) $\frac{\pi}{4}$ C) $\frac{\pi}{3}$ D) $-\frac{\pi}{3}$ E) $-\frac{\pi}{6}$

4. $\arcsin\left(\frac{\sqrt{3}}{2}\right) + \arccos\left(\frac{1}{2}\right) = ?$

A) $\frac{\pi}{3}$ B) $\frac{\pi}{2}$ C) $\frac{2\pi}{3}$ D) $\frac{3\pi}{4}$ E) $\frac{5\pi}{6}$

5. $\arcsin\left(-\frac{1}{2}\right) = ?$

A) $-\frac{\pi}{3}$ B) $-\frac{\pi}{6}$ C) $\frac{\pi}{6}$ D) $\frac{\pi}{3}$ E) $\frac{5\pi}{6}$

6. $\arcsin\frac{\sqrt{3}}{2} - 2 \cdot \arctan 1 = ?$

A) $-\frac{\pi}{6}$ B) $-\frac{\pi}{4}$ C) $-\frac{\pi}{3}$ D) $\frac{\pi}{3}$ E) $\frac{\pi}{6}$

7. $\sin\left(\arccos\frac{1}{2}\right) = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

8. $\sin(\arctan(-1)) = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{\sqrt{2}}{2}$ C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) $\frac{\sqrt{2}}{2}$

9. $\tan\left(\arcsin\frac{5}{13}\right) = ?$

A) $\frac{1}{2}$ B) $\frac{5}{12}$ C) $\frac{1}{4}$ D) $\frac{7}{12}$ E) $\frac{2}{3}$

10. $\cos\left(\arcsin\frac{\sqrt{3}}{2}\right) = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) $\frac{\sqrt{2}}{2}$ E) $\frac{\sqrt{3}}{2}$

11. $\cot\left(\arcsin\frac{3}{5}\right) = ?$

A) 2 B) $\frac{3}{2}$ C) $\frac{4}{3}$ D) $\frac{2}{3}$ E) $\frac{3}{4}$

12. $\tan\left(\arcsin\frac{1}{2}\right) = ?$

A) $\frac{\sqrt{2}}{3}$ B) $\frac{1}{\sqrt{3}}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{3}{2}$ E) $\frac{4}{3}$

13. $\cot\left(2\cdot\arcsin\frac{4}{5}\right) = ?$

A) $-\frac{7}{24}$ B) $\frac{7}{24}$ C) $\frac{23}{24}$ D) $\frac{4}{3}$ E) $\frac{24}{7}$

14. $\tan\left(2\cdot\arctan\frac{1}{3}\right) = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) 1 E) $\frac{4}{3}$

15. $\sin\left(\operatorname{arccot}\frac{1}{4}\right) = ?$

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{4}$ D) $\frac{1}{\sqrt{17}}$ E) $\frac{4}{\sqrt{17}}$

16. $\tan\left(\frac{\pi}{2} + \arcsin\frac{3}{5}\right) = ?$

A) -1 B) $-\frac{4}{3}$ C) $-\frac{3}{4}$ D) $-\frac{1}{3}$ E) $\frac{2}{3}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	C	D	C	B	A	E	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	C	C	B	A	C	E	B

1. $\tan\left(\arcsin\frac{1}{3}\right) = ?$

A) $2\sqrt{2}$ B) $\frac{\sqrt{2}}{2}$ C) $\frac{\sqrt{2}}{4}$ D) $\frac{2\sqrt{2}}{3}$ E) $\sqrt{2}$

2. $\sin\left(2 \cdot \operatorname{arccot}\frac{1}{2}\right) = ?$

A) $\frac{1}{6}$ B) $\frac{2}{5}$ C) $\frac{4}{5}$ D) $\frac{2}{3}$ E) $\frac{3}{4}$

3. $\sin\left(\frac{\pi}{2} - \arccos\frac{4}{5}\right) = ?$

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) $\frac{5}{4}$

4. $\cot\left(\arcsin\frac{3}{5} + \arccos\frac{3}{5}\right) = ?$

A) -1 B) 0 C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

5. $\arctan\frac{2}{3} + \arctan\frac{1}{5} = ?$

A) $\frac{\pi}{3}$ B) $\frac{\pi}{4}$ C) $\frac{\pi}{6}$ D) $\frac{\pi}{8}$ E) $\frac{\pi}{12}$

6. $\sin\left(\frac{\pi}{2} + 2 \cdot \arctan\frac{3}{4}\right) = ?$

A) $\frac{3}{5}$ B) $\frac{2}{5}$ C) $\frac{9}{25}$ D) $\frac{8}{25}$ E) $\frac{7}{25}$

7. $\tan\left(\frac{\pi}{2} + \arccos\frac{3}{5}\right) = ?$

A) $-\frac{4}{3}$ B) $-\frac{3}{4}$ C) $\frac{3}{4}$ D) $\frac{3}{5}$ E) $\frac{4}{3}$

8. $\cos\left(\arctan\frac{3}{4} + \arcsin\frac{12}{13}\right) = ?$

A) $-\frac{16}{65}$ B) $-\frac{12}{65}$ C) 0 D) $\frac{16}{65}$ E) $\frac{12}{65}$

9. $\tan\left(\arctan\frac{1}{4}+\arctan\frac{1}{3}\right)=?$

A) $\frac{7}{6}$ B) $\frac{7}{8}$ C) $\frac{7}{9}$ D) $\frac{7}{10}$ E) $\frac{7}{11}$

10. $\sin\left(\arcsin\frac{1}{2}+\arccos\frac{4}{5}\right)=?$

A) $\frac{2+\sqrt{3}}{10}$ B) $\frac{2+3\sqrt{3}}{10}$ C) $\frac{4+\sqrt{3}}{10}$ D) $\frac{4+3\sqrt{3}}{10}$ E) $\frac{4+2\sqrt{3}}{10}$

11. $\arctan x+\operatorname{arccot} x=?$

A) $\frac{\pi}{6}$ B) $\frac{\pi}{4}$ C) $\frac{\pi}{3}$ D) $\frac{\pi}{2}$ E) π

12. $\arctan 4x=\operatorname{arccot} x \Rightarrow x=?$

A) $\frac{1}{8}$ B) $\frac{1}{6}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

13. $\arcsin x=\arctan 2$
$\Rightarrow x=?$

A) $\frac{1}{\sqrt{5}}$ B) $\frac{2}{\sqrt{5}}$ C) $\frac{3}{\sqrt{5}}$ D) $\frac{4}{\sqrt{5}}$ E) $\frac{6}{\sqrt{5}}$

14. $\arctan\left(-\frac{\sqrt{3}}{3}\right)+\arccos\left(-\frac{\sqrt{3}}{2}\right)=?$

A) $\frac{\pi}{3}$ B) $\frac{\pi}{2}$ C) π D) $\frac{5\pi}{3}$ E) $\frac{2\pi}{3}$

15. $\cos\left(\arccos\frac{1}{4}\right)+\sin(\arccos 0)=?$

A) $\frac{4}{5}$ B) 1 C) $\frac{5}{4}$ D) $\frac{3}{2}$ E) $\frac{4}{5}$

16. $\cot\left(\arcsin\frac{1}{2}\right)+\tan(\arccos(-1))=?$

A) $-\frac{\sqrt{3}}{3}$ B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) $\sqrt{3}$ E) $\sqrt{3}+1$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	C	D	B	B	E	B	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	D	D	D	B	E	C	D

1. $\dfrac{\sin 20^\circ \cdot \cos 15^\circ + \cos 20^\circ \cdot \sin 15^\circ}{\cos 235^\circ} = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

2. $\dfrac{\cos 63^\circ}{\sin 9^\circ} - \dfrac{\sin 63^\circ}{\cos 9^\circ} = ?$

A) 2 B) 6 C) 8 D) 10 E) 12

3. $\dfrac{\sin 5\theta}{\sin\theta} - \dfrac{\cos 5\theta}{\cos\theta} = ?$

A) $\tan 2\theta$ B) $\cos 2\theta$ C) $4 \cdot \tan 2\theta$ D) $4 \cdot \cos 2\theta$ E) $4 \cdot \sec\theta$

4. $\dfrac{\sin 144^\circ}{\sin 168^\circ} + \dfrac{\cos 144^\circ}{\cos 168^\circ} = ?$

A) $\sin 24^\circ$ B) $\cos 24^\circ$ C) $4 \cdot \sin 24^\circ$ D) $4 \cdot \cos 24^\circ$ E) $\tan 66^\circ$

5. $\sin 20^\circ \cdot \cos 20^\circ \cdot \sin 180^\circ = ?$

A) 0 B) 1 C) 2 D) $\frac{1}{2}$ E) $-\frac{1}{2}$

6. $\cos 20^\circ \cdot \cos 40^\circ \cdot \cos 60^\circ \cdot \cos 80^\circ = ?$

A) $\frac{1}{2}$ B) $\frac{1}{8}$ C) $\frac{1}{16}$ D) -2 E) -8

7. $a = \dfrac{\pi}{2} \Rightarrow \dfrac{1}{\sin a} - \dfrac{1}{\sin 3a} = ?$

A) 9 B) 6 C) 3 D) 2 E) 1

8. $\dfrac{\sin 78^\circ + \cos 48^\circ}{\cos 42^\circ + \sin 12^\circ} = ?$

A) $\sqrt{3}$ B) $\sqrt{2}$ C) 0 D) $-\sqrt{2}$ E) $-\sqrt{3}$

9. $11x = \frac{\pi}{2} \Rightarrow \frac{4 \cdot \sin x \cdot \cos 4x}{\cos 14x + \cos 6x} = ?$

A) -1 B) 1 C) 2 D) $\frac{1}{2}$ E) $-\frac{1}{2}$

10. $\frac{\cos 20^\circ \cdot \sin 15^\circ + \sin 25^\circ \cdot \cos 20^\circ}{\cos 50^\circ} = ?$

A) $\sin 5^\circ$ B) $\sin 10^\circ$ C) $\tan 5^\circ$ D) $-\cos 5^\circ$ E) $\cos 5^\circ$

11. $0 \le x \le 360^\circ$,
$\arcsin\left(\frac{\sqrt{3}}{2}\right) = 3x \Rightarrow x = ?$

A) 20° B) 30° C) 45° D) $67{,}5^\circ$ E) 75°

12. $\arcsin 1 - \arcsin\left(\frac{1}{2}\right) = ?$

A) $\frac{\pi}{9}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{3}$ D) $\frac{\pi}{2}$ E) π

13. $\arcsin\left(\frac{\sqrt{3}}{2}\right) + \arccos\left(-\frac{1}{2}\right) = ?$

A) 60° B) 120° C) 150° D) 165° E) 180°

14. $\tan\left(\arcsin\left(\frac{\sqrt{3}}{2}\right) + \arccos\left(\frac{\sqrt{2}}{2}\right)\right) = ?$

A) $2+\sqrt{3}$ B) $2-\sqrt{3}$ C) $-2-\sqrt{3}$ D) $\sqrt{3}$ E) $-3\sqrt{3}$

15. $\arctan(4+3\sqrt{3}) - \arctan(6-3\sqrt{3}) = ?$

A) π B) $\frac{\pi}{2}$ C) $\frac{\pi}{3}$ D) $\frac{\pi}{4}$ E) $-\pi$

16. $\tan\left(\arctan\left(\frac{2}{3}\right) + \arctan\left(\frac{1}{3}\right)\right) = ?$

A) $\frac{7}{9}$ B) $\frac{9}{7}$ C) $\frac{7}{3}$ D) $\frac{3}{7}$ E) $\frac{7}{17}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	A	D	D	A	C	D	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	E	A	C	E	C	D	B

1. $0 < x < \frac{\pi}{2}$, $\sin x = \frac{1}{2} \Rightarrow$ **x = ?**

A) $\frac{\pi}{3}$ B) $\frac{\pi}{4}$ C) $\frac{\pi}{6}$ D) $\frac{\pi}{8}$ E) $\frac{\pi}{10}$

2. $0 < x < \frac{\pi}{2}$, $\tan x = \sqrt{3} \Rightarrow$ **x = ?**

A) $\frac{\pi}{3}$ B) $\frac{\pi}{4}$ C) $\frac{\pi}{6}$ D) $\frac{\pi}{12}$ E) $\frac{\pi}{24}$

3. $\tan x - 1 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{x : x = \frac{\pi}{6} + k\pi,\ k \in Z\right\}$

B) $\left\{x : x = \frac{\pi}{3} + k\pi,\ k \in Z\right\}$

C) $\left\{x : x = \frac{\pi}{4} + k\pi,\ k \in Z\right\}$

D) $\left\{x : x = \frac{2\pi}{3} + k\pi,\ k \in Z\right\}$

E) $\{x : x = k\pi,\ k \in Z\}$

4. $0 < x \leq 2\pi$, $\sin(x + 20°) = \frac{1}{2} \Rightarrow$ **ÇK(SS) = ?**

A) $\{10°\}$ B) $\{130°\}$ C) $\{30°\}$ D) $\{10°, 130°\}$ E) $\{30°, 150°\}$

5. $x \in (0, 2\pi]$,

$\sin(2x + 10°) = 1 \Rightarrow$ **ÇK(SS) = ?**

A) $\{40°\}$ B) $\{220°\}$ C) $\{90°\}$ D) $\{40°, 90°\}$ E) $\{40°, 220°\}$

6. $x \in [0, 2\pi]$,

$\cos x = \frac{\sqrt{2}}{2} \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{4}\right\}$ B) $\left\{\frac{\pi}{4}, \frac{3\pi}{4}\right\}$ C) $\left\{\frac{\pi}{4}, \frac{5\pi}{4}\right\}$ D) $\left\{\frac{\pi}{4}, \frac{7\pi}{4}\right\}$ E) $\left\{\frac{7\pi}{4}\right\}$

7. $x \in [0, 90°]$

$\tan(4x - 100°) = \sqrt{3} \Rightarrow \sum$ **x = ?**

A) 115° B) 120° C) 125° D) 130° E) 135°

8. $x \in (0, 270°)$,

$\cot(2x - 40°) = \frac{1}{\sqrt{3}} \Rightarrow$ **ÇK(SS) = ?**

A) $\{60°, 240°\}$ B) $\{60°, 210°\}$ C) $\{50°, 230°\}$ D) $\{50°, 140°\}$ E) $\{50°, 140°, 230°\}$

9. $x \in (0, \pi)$,
$\sin x \cdot \cos x = \frac{1}{4} \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{3}\right\}$ B) $\left\{\frac{\pi}{2}, \frac{2\pi}{3}\right\}$ C) $\left\{\frac{\pi}{12}, \frac{\pi}{3}\right\}$
D) $\left\{\frac{\pi}{12}\right\}$ E) $\left\{\frac{\pi}{12}, \frac{5\pi}{12}\right\}$

10. $0 < x < 90°$,
$\sin(x-25)° = \cos(x+37)° \Rightarrow$ **x = ?**

A) 38° B) 39° C) 40° D) 41° E) 42°

11. $x \in [0, 180°]$,
$\sin 2x = \cos\left(x - \frac{5\pi}{2}\right) \Rightarrow$ **ÇK(SS) = ?**

A) $\{0°, 60°\}$ B) $\{60°, 180°\}$ C) $\{0°, 180°\}$
D) $\{0°, 60°, 180°\}$ E) $\{180°\}$

12. $x \in [0, 2\pi]$,
$\tan\left(2x - \frac{\pi}{4}\right) = \cot\left(\frac{\pi}{6} - x\right) \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{5\pi}{12}\right\}$ B) $\left\{\frac{7\pi}{12}\right\}$ C) $\left\{\frac{13\pi}{12}\right\}$
D) $\left\{\frac{7\pi}{12}, \frac{11\pi}{12}\right\}$ E) $\left\{\frac{7\pi}{12}, \frac{19\pi}{12}\right\}$

13. $x \in [0, 180°]$,
$\cos\frac{5x}{2} = \cos\left(\frac{3x}{2} + 20°\right) \Rightarrow \sum x = ?$

A) 205° B) 280° C) 300° D) 320° E) 360°

14. $\frac{\pi}{2} < x < \pi$,
$\sin x + \frac{1}{\sqrt{3}} \cdot \cos x = 0 \Rightarrow$ **x = ?**

A) $\frac{3\pi}{4}$ B) $\frac{3\pi}{5}$ C) $\frac{2\pi}{3}$ D) $\frac{5\pi}{6}$ E) $\frac{7\pi}{9}$

15. $\frac{\pi}{2} < x < \pi$,
$\cos 5x = \cos x \Rightarrow$ **x = ?**

A) $\frac{3\pi}{4}$ B) $\frac{3\pi}{5}$ C) $\frac{2\pi}{3}$ D) $\frac{5\pi}{6}$ E) $\frac{7\pi}{9}$

16. $\alpha, \beta \in \left(0, \frac{\pi}{2}\right]$,
$\sin(\alpha - \beta) = \sin\alpha \cdot \cos\beta \Rightarrow$ **α = ?**

A) $\frac{\pi}{2}$ B) $\frac{\pi}{3}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{6}$ E) $\frac{\pi}{8}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	A	C	D	E	D	C	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	B	D	E	B	D	C	A

1. $\sin x = \frac{\cos x}{3} \Rightarrow \cos 2x = ?$

A) $\frac{1}{3}$ B) $\frac{3}{5}$ C) $\frac{4}{5}$ D) $\frac{5}{4}$ E) $-\frac{4}{5}$

2. $\frac{\tan 75° - \tan 15°}{1 + \tan 75° \cdot \tan 15°} = ?$

A) 1 B) $\sqrt{3}$ C) $\frac{\sqrt{3}}{3}$ D) $-\sqrt{3}$ E) -1

3. $\frac{2}{3} \cdot \arccos\left(\cos \frac{\pi}{12}\right) = ?$

A) $\frac{\pi}{12}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{18}$ D) $\frac{\pi}{9}$ E) $\frac{\pi}{3}$

4. $\cos 70° = k \Rightarrow \cos 40° = ?$

A) $2k^2$ B) $-2k^2$ C) $1 + k^2$ D) $2k^2 - 1$ E) $1 - 2k^2$

5. $\tan x - \cot x = 4$

$\Rightarrow \tan^3 x - \cot^3 x = ?$

A) 42 B) 52 C) 54 D) 64 E) 76

6. $\left.\begin{array}{l}\sin x = \frac{1}{3} \\ \sin y = \frac{1}{2}\end{array}\right\} \Rightarrow \sin(x + y) = ?$

A) $\sqrt{3} + \sqrt{2}$ B) $\frac{\sqrt{3} + \sqrt{2}}{2}$ C) $\frac{\sqrt{3} + \sqrt{8}}{2}$ D) $\frac{\sqrt{3} + \sqrt{8}}{6}$ E) $\frac{\sqrt{3} + \sqrt{8}}{8}$

7. $\frac{\cos x \cdot \cos y}{\cos(x + y) + \cos(x - y)} = ?$

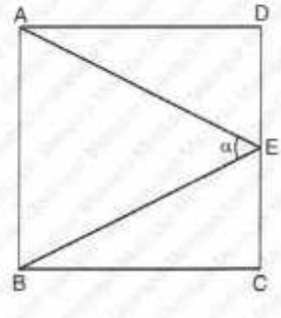
A) $\sin(x + y)$ B) $\tan(x - y)$ C) $\tan(x + y)$ D) 2 E) $\frac{1}{2}$

8. ABCD kare / square

$m(\widehat{AEB}) = \alpha$

$3 \cdot |EC| = |ED|$

$\Rightarrow \cot\alpha = ?$



A) $\frac{13}{16}$ B) $\frac{16}{13}$ C) $\frac{1}{13}$ D) $\frac{3}{16}$ E) $\frac{16}{3}$

9. $\sin\left(\frac{x}{2}\right)-\cos\left(\frac{x}{2}\right)=\frac{1}{4} \Rightarrow \sin x = ?$

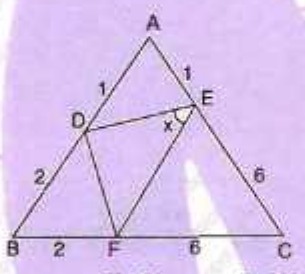
A) $\frac{1}{16}$ B) $\frac{3}{16}$ C) $\frac{3}{4}$ D) $\frac{15}{16}$ E) $\frac{7}{16}$

10. $\arctan a + \arctan b = x$

$\Rightarrow \tan x = ?$

A) $\frac{a-b}{1+ab}$ B) $\frac{1+ab}{a+b}$ C) $\frac{a+b}{1-ab}$ D) $\frac{1-ab}{a+b}$ E) $\frac{1+ab}{a-b}$

11. $x = ?$

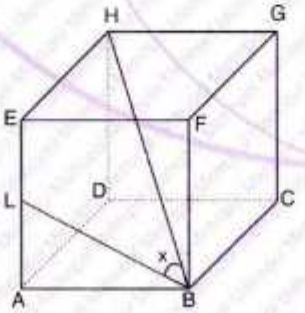


A) 120° B) 90° C) 60° D) 45° E) 30°

12. ABCDEFGH bir küptür.

ABCDEFGH is a cube.

$|EL| = |AL| \Rightarrow \tan x = ?$



A) $\sqrt{6}$ B) $\frac{\sqrt{6}}{2}$ C) $\frac{\sqrt{6}}{3}$ D) $\frac{\sqrt{6}}{4}$ E) $\frac{\sqrt{6}}{6}$

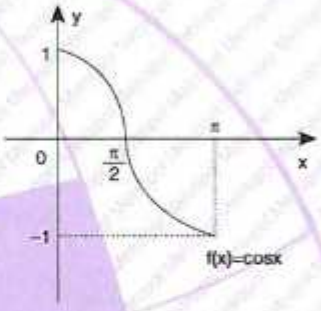
13. $f(x) = \arcsin\left(\frac{x}{3}+2\right) \Rightarrow f^{-1}(x) = ?$

A) $2 \cdot \sin(x) - 6$ B) $2 \cdot \sin(x) + 3$

C) $3 \cdot \sin(x) - 6$ D) $\sin(2x - 6)$

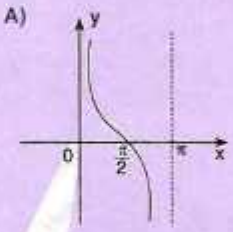
E) $\sin(2x) - 3$

14.

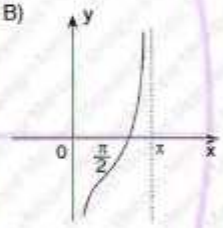


$\Rightarrow f(x) = \sec x = ?$

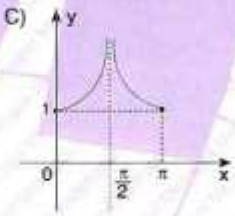
A)



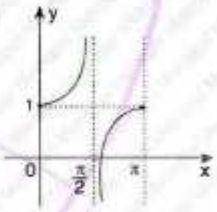
B)



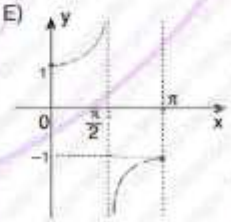
C)



D)



E)



YANITLAR / ANSWERS

1	2	3	4	5	6	7
C	B	C	E	E	D	E
8	**9**	**10**	**11**	**12**	**13**	**14**
A	D	C	C	C	C	E

1. $\cos x = \frac{\sin x}{4} \Rightarrow \sin 2x = ?$

A) $\frac{4}{7}$ B) $\frac{5}{12}$ C) $\frac{6}{11}$ D) $\frac{7}{15}$ E) $\frac{8}{17}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2. $0 < x < \frac{\pi}{2}$, $\tan x = \frac{5}{12}$

$\Rightarrow \frac{\sin^3 x - \cos^3 x}{1 + \frac{1}{2}\sin 2x} = ?$

A) $-\frac{17}{13}$ B) $-\frac{7}{13}$ C) 0 D) $\frac{7}{13}$ E) $\frac{17}{13}$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

3. $\frac{\arctan\left(\tan\frac{\pi}{3}\right)}{2} = ?$

A) $-\frac{2\pi}{3}$ B) $-\frac{\pi}{3}$ C) $\frac{\pi}{3}$ D) $\frac{\pi}{6}$ E) π

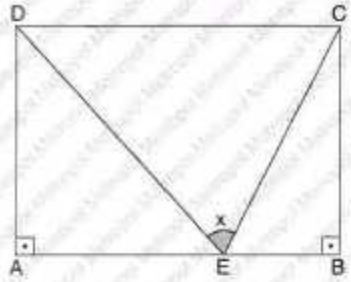
[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2019]

4. $\frac{\tan 40° + \tan 20°}{1 - \tan 40° \cdot \tan 20°} = ?$

A) 0 B) 1 C) $-\frac{\sqrt{3}}{2}$ D) $\sqrt{3}$ E) $-\sqrt{3}$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

5. AB // DC
AD // BC
|AD| = |AE| = 2|EB|
DA ⊥ AB
$m(\widehat{DEC}) = x$
$\Rightarrow \tan x = ?$



A) $\frac{1}{4}$ B) $\frac{2}{3}$ C) 1 D) $\frac{3}{2}$ E) 3

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

6. $0 < x < \pi$, $\cos 4x = \cos 2x$
$\Rightarrow x = ?$

A) $\frac{\pi}{8}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{3}$ E) $\frac{\pi}{2}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2018]

7. $28x = \pi \Rightarrow \frac{\sin 8x + \sin 6x}{\cos 8x + \cos 6x} = ?$

A) -1 B) 0 C) $\frac{1}{\sqrt{3}}$ D) 1 E) $\sqrt{3}$

[BALIKESİR ÜNİVERSİTESİ – YÖS 2017]

8. $\left(\frac{\sin 2x}{2} + \frac{\sin^2 x}{\frac{1}{\tan x} + \operatorname{cosec} x}\right) : \cos x = ?$

A) sinx B) cosx C) tanx D) cotx E) 1

[İSTANBUL ÜNİVERSİTESİ – YÖS 2016]

9. $\dfrac{\cos x + \cos 3x + \cos 5x}{\sin x + \sin 3x + \sin 5x} = ?$

A) cot3x B) tan3x C) cos3x D) sec3x E) sin3x

[EGE ÜNİVERSİTESİ – YÖS 2016]

10. $\sin x - \cos x = \dfrac{1}{\sqrt{3}} \rightarrow \sin 2x = ?$

A) $\dfrac{2}{3}$ B) $\dfrac{1}{5}$ C) $\dfrac{3}{5}$ D) $\dfrac{3}{4}$ E) $\dfrac{5}{3}$

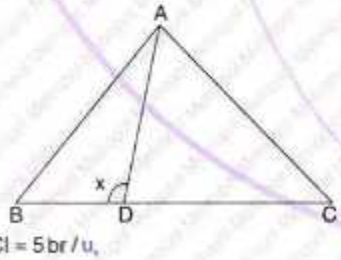
[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

11. $\dfrac{\sin 2x}{1 + \cos 2x} = ?$

A) sinx B) cosx C) 2sinx D) sinx·cosx E) tanx

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2015]

12.



$|AC| = |DC| = 5\,br/u$,

$|AD| = 6\,br/u \Rightarrow \sin x = ?$

A) $-\dfrac{4}{5}$ B) $-\dfrac{3}{5}$ C) $\dfrac{1}{5}$ D) $\dfrac{3}{5}$ E) $\dfrac{4}{5}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2014]

13. $\sin 80^\circ = a \rightarrow \sin 20^\circ = ?$

A) $2a\sqrt{1-a^2}$ B) $2a(1-a)$ C) $\sqrt{1+a^2}$ D) $a\sqrt{1-2a}$ E) $2\sqrt{1-a}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

14. $0 < x < \dfrac{\pi}{2}$,

$\sin x = \dfrac{2}{5} \Rightarrow \cos 2x = ?$

A) $\dfrac{23}{25}$ B) $\dfrac{21}{25}$ C) $\dfrac{19}{25}$ D) $\dfrac{17}{25}$ E) $\dfrac{3}{5}$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2014]

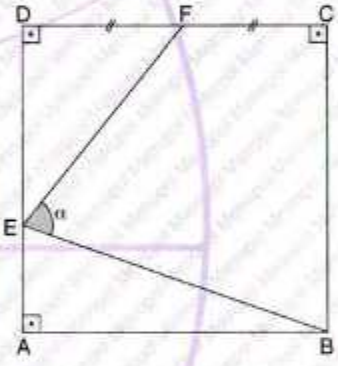
15. $m(\widehat{BEF}) = \alpha$

$|DF| = |FC|$,

$|AB| = |BC| = |CD| = |DA|$

$\dfrac{|DE|}{|EA|} = 2$

$\Rightarrow \tan\alpha = ?$



A) $-\dfrac{1}{3}$ B) $\dfrac{1}{3}$ C) $\dfrac{2}{3}$ D) 2 E) 3

[AKDENİZ ÜNİVERSİTESİ – YÖS 2013]

16. $\tan(x + 45^\circ) = 2 \Rightarrow \sin x = ?$

A) $\dfrac{1}{\sqrt{10}}$ B) $\dfrac{1}{3}$ C) $\dfrac{1}{2}$ D) $\dfrac{2}{\sqrt{10}}$ E) $\dfrac{3}{\sqrt{10}}$

[AKDENİZ ÜNİVERSİTESİ – YÖS 2013]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	B	D	D	E	D	D	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	A	E	E	A	D	E	A

BÖLÜM CHAPTER 7

TARİHSEL NOT / HISTORICAL NOTE

RENÉ DESCARTES [1596 - 1650]

Fransız filozof, matematikçi ve yazar. 1637'de René Descartes karesi negatif sayı olan karmaşık sayıların varlığına dikkati çekmiştir. Uzaydaki bir noktayı bir numaralar seti olarak işaretleyebilmeyi ve cebirsel denklemleri iki boyutlu koordinat sisteminde geometrik şekiller olarak göstermeyi (ve tam tersini) sağlayan Kartezyen koordinat sistemi, ismini Descartes'tan alır. Analitik geometrinin de temellerini Descartes atmıştır.

French philosopher, mathematician and writer. In 1637, René Descartes drew attention to the existence of complex numbers whose squares are negative numbers. The Cartesian coordinate system, which can mark a point in space as a set of numbers and display algebraic equations as geometric shapes in the two-dimensional coordinate system, takes its name from Descartes. Descartes also laid the foundations of analytical geometry.

KARMAŞIK SAYILAR
COMPLEX NUMBERS

Bu bölüm 64 alıştırma sorusu, 160 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 64 exercise questions, 160 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 7

KARMAŞIK SAYILAR / COMPLEX NUMBERS

BÖLÜM 07 CHAPTER

KARMAŞIK SAYILAR COMPLEX NUMBERS

1. $i^2 = -1 \Rightarrow \sqrt{-36} + \sqrt{-25} = ?$

Yanıt / The Answer is $11i$

2. $i^2 = -1 \Rightarrow \sqrt{-9}\ \sqrt{-4} = ?$

Yanıt / The Answer is -6

3. $i^2 = -1 \Rightarrow i^{36} + i^{13} = ?$

Yanıt / The Answer is $1 + i$

4. $i^2 = -1 \Rightarrow i^{-49} + i^{-30} = ?$

Yanıt / The Answer is $-i - 1$

5. $i^2 = -1,\ n \in Z \Rightarrow i^{4n+3} + i^{12n-1} = ?$

Yanıt / The Answer is $-2i$

6. $i^2 = -1,\ n \in Z \Rightarrow i^{-20n+1} + i^{24n+18} = ?$

Yanıt / The Answer is $i - 1$

7. $i^2 = -1 \Rightarrow i + i^2 + i^3 + \ldots + i^{37} = ?$

Yanıt / The Answer is i

8. $i^2 = -1 \Rightarrow i^{22} + i^{23} + i^{24} + \ldots + i^{91} = ?$

Yanıt / The Answer is $-1 - i$

9. $(1+i)^3 \cdot (1-i)^2 = ?$

Yanıt / The Answer is $4+4i$

10. $(1-i)^3 + (1+i)^2 = ?$

Yanıt / The Answer is -2

11. $(1+i)^2 \cdot (1-i)^2 = ?$

Yanıt / The Answer is 4

12. $z_1 = -2+3i,$
$z_2 = 6i,$
$2 \cdot z_1 - z_2 = a+bi \Rightarrow a \cdot b = ?$

Yanıt / The Answer is 0

13. $i^2 = -1,$

$$\begin{array}{r|l} x^6 + x^3 + x^2 + 1 & x+i \\ \hline - & \\ \hline k & \end{array} \Rightarrow k = ?$$

Yanıt / The Answer is $i-1$

14. $\dfrac{1}{1+i} + \dfrac{2}{i} = ?$

Yanıt / The Answer is $\dfrac{1-5i}{2}$

15. $\dfrac{(1+i)^8}{(1-i)^7} = ?$

Yanıt / The Answer is $1-i$

16. $(1-i)^4 + (1+i)^4 = ?$

Yanıt / The Answer is -8

17. $z = \frac{1}{1+i} - \frac{2i}{1-i}$
$\Rightarrow$ **Re(z) = ?**

Yanıt / The Answer is $\frac{3}{2}$

18. $z = \frac{1-i}{3+i} + \frac{1}{3-i}$
$\Rightarrow$ **Im(z) = ?**

Yanıt / The Answer is $-\frac{3}{10}$

19. $z = \frac{1}{3-4i} + \frac{1}{3+4i}$ $\Rightarrow$ **Re(z) + Im(z) = ?**

Yanıt / The Answer is $\frac{6}{25}$

20. $z = -3i \cdot (1-i) + 2(1+i)^3$
$\Rightarrow$ **$\bar{z}$ = ?**

Yanıt / The Answer is $-7 - i$

21. $2 \cdot z + 6 - i = 4i - \bar{z}$
$\Rightarrow$ **z = ?**

Yanıt / The Answer is $-2 + 5i$

22. $z = 3 - 2i$ ve/and $z^{-1} = a + bi$
$\Rightarrow$ **a + b = ?**

Yanıt / The Answer is $\frac{5}{13}$

23. $z = \frac{(1+2i)\cdot(1-i)}{(3-i)}$ $\Rightarrow$ **Re(z) = ?**

Yanıt / The Answer is $\frac{4}{5}$

24. $z_1 = 1 + i,$
$z_2 = 1 - i,$
$z = \frac{\overline{z_1 - z_2}}{z_1 + z_2}$ $\Rightarrow$ **Im(z) = ?**

Yanıt / The Answer is -1

25. $z=(1-i)\cdot(1-2i)\cdot(1-3i) \Rightarrow \mathrm{Re}(z)=?$

Yanıt / The Answer is -10

26. $\dfrac{10}{2-i}+\dfrac{10}{2+i}=?$

Yanıt / The Answer is 8

27. $\left(\dfrac{1+i}{1-i}\right)^3+\left(\dfrac{1-i}{1+i}\right)^3=?$

Yanıt / The Answer is 0

28. $z=1+\dfrac{1}{\dfrac{1}{1-i}-1} \Rightarrow z^{-1}=?$

Yanıt / The Answer is i

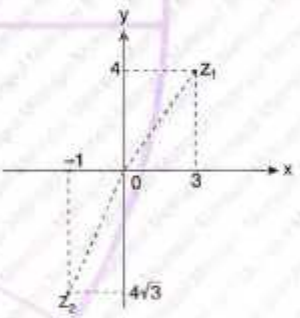
29. $\left|\dfrac{(3+4i)\cdot(5-12i)}{-6-8i}\right|=?$

Yanıt / The Answer is $\dfrac{13}{2}$

30. $(2-i)\cdot\bar{z}=z-4i$
$\Rightarrow |z|=?$

Yanıt / The Answer is $\sqrt{2}$

31. $|z_1|+|z_2|=?$



Yanıt / The Answer is 12

32. $|i^{99}+i^{98}+i^{97}+\ldots+i|=?$

Yanıt / The Answer is 1

33. $z_1 = -2 + i,\ z_2 = 3 - 11i$

$\Rightarrow |z_1 - z_2| = ?$

Yanıt / The Answer is 13

34. $z = 1 - i$

$\Rightarrow \dfrac{|z + i| \cdot |z - i|}{|z| \cdot \sqrt{2} \cdot |i|} = ?$

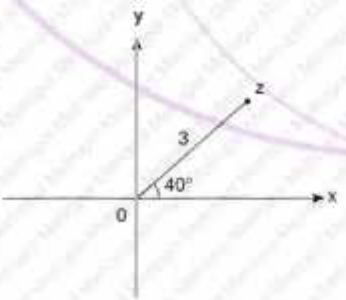
Yanıt / The Answer is $\dfrac{\sqrt{5}}{2}$

35. $z + |z| = 3 + i\sqrt{3}$

$\Rightarrow z = ?$

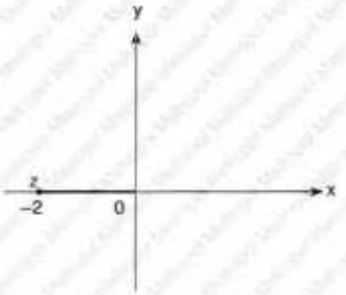
Yanıt / The Answer is $1 + \sqrt{3} \cdot i$

36. $z = r \cdot \text{cis}\alpha = ?$



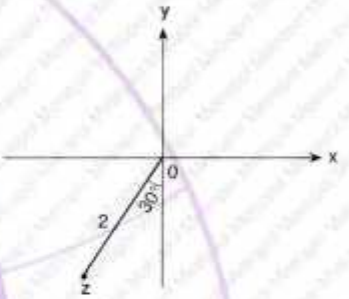
Yanıt / The Answer is $3 \cdot \text{cis}\,40°$

37. $z = r \cdot \text{cis}\alpha = ?$



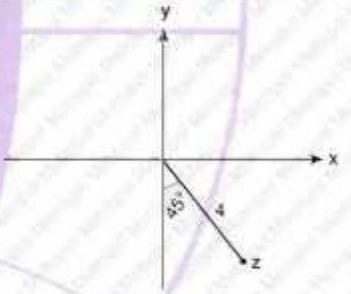
Yanıt / The Answer is $2 \cdot \text{cis}\,180°$

38. $z = r \cdot \text{cis}\alpha = ?$



Yanıt / The Answer is $2 \cdot \text{cis}\,240°$

39. $z = r \cdot \text{cis}\alpha = ?$



Yanıt / The Answer is $4 \cdot \text{cis}\,315°$

40. $z = -2i,\ z = r \cdot \text{cis}\,\alpha \Rightarrow z = ?$

Yanıt / The Answer is $2 \cdot \text{cis}\,\dfrac{3\pi}{2}$

41. $z = -4,\ z = r \cdot \text{cis}\,\alpha \Rightarrow \mathbf{z = ?}$

Yanıt / The Answer is $4 \cdot \text{cis}\,(180°)$

42. $z = 3 + 3i,\ z = r \cdot \text{cis}\,\alpha \Rightarrow \mathbf{z = ?}$

Yanıt / The Answer is $3\sqrt{2} \cdot \text{cis}\,\frac{\pi}{4}$

43. $z = -3 - 3\sqrt{3}i,\ z = r\,\text{cis}\,\alpha \Rightarrow \mathbf{z = ?}$

Yanıt / The Answer is $6 \cdot \text{cis}\,240°$

44. $z = -1 - i \Rightarrow \mathbf{Arg(z) = ?}$

Yanıt / The Answer is $\frac{5\pi}{4}$

45. $z = 1 - \sqrt{3}i \Rightarrow \mathbf{z^2 = ?}$

Yanıt / The Answer is $4 \cdot \text{cis}\,240°$

46. $z = 1 + i \Rightarrow \mathbf{z^6 = ?}$

Yanıt / The Answer is $-8i$

47. $z = 4\ (\cos 36° + i \cdot \sin 36°) \Rightarrow \mathbf{z^5 = ?}$

Yanıt / The Answer is -2^{10}

48. $z_1 = 4 \cdot \text{cis}\,30°,$

$z_2 = 8 \cdot \text{cis}\,60° \Rightarrow \mathbf{z_1 \cdot z_2 = ?}$

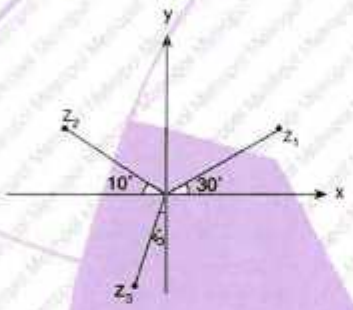
Yanıt / The Answer is $32i$

49. $z_1 = 6 \cdot \text{cis}10°$,

$z_2 = 9 \cdot \text{cis}40° \Rightarrow \text{Arg}\left(\dfrac{z_1^{\,4}}{z_2^{\,3}}\right) = ?$

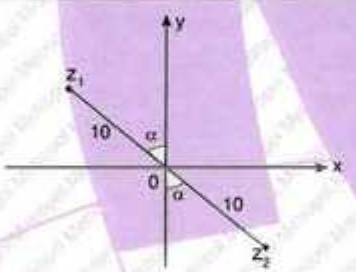
Yanıt / The Answer is 280°

50. $\text{Arg}(z_1 \cdot z_2 \cdot z_3) = ?$



Yanıt / The Answer is 105°

51. $\dfrac{z_1}{z_2} = ?$



Yanıt / The Answer is −1

52. $(1+\sqrt{3}i)^8 \cdot (-\sqrt{2}+\sqrt{2}i)^4 = ?$

Yanıt / The Answer is $2^{11}(1-\sqrt{3}i)$

53. $z_1 = 8(\cos 38° + i\sin 38°)$,

$z_2 = 2(\cos 8° + i\sin 8°)$

$\Rightarrow \dfrac{z_1}{z_2} = ?$

Yanıt / The Answer is $2\sqrt{3}+2i$

54. $z_1 = 3\sqrt{2} \cdot \text{cis}\dfrac{3\pi}{4}$,

$z_2 = 2 \cdot \text{cis}\dfrac{\pi}{3}$

$\Rightarrow \dfrac{z_1^{\,2}}{z_2^{\,3}} = ?$

Yanıt / The Answer is $\dfrac{9}{4}i$

55. $a, b \in \mathbb{R}^+$, $z = 3+4i$

$\sqrt{z} = a+bi \Rightarrow a+b = ?$

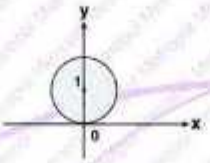
Yanıt / The Answer is 3

56. $z = \dfrac{2}{1-i} \Rightarrow \text{Arg}(z) = ?$

Yanıt / The Answer is 45°

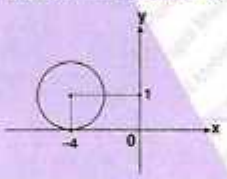
57. $|z - i| \leq 1 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is



58. $|z + 4 - i| = 1 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is

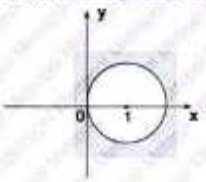


59. $|z| < 4 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is

60. $|z - 1| \geq 1 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is



61. $|z| \leq 2 \Rightarrow \min(|z - 3 + 4i|) = ?$

Yanıt / The Answer is 3

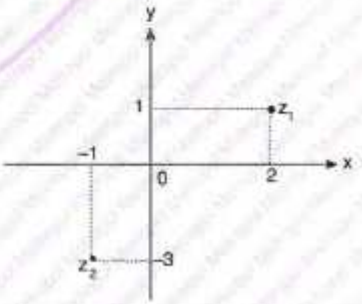
62. $|z| \leq 2 \Rightarrow \max(|z - 3 + 4i|) = ?$

Yanıt / The Answer is 7

63. $|z| \leq 4 \Rightarrow \max|z - 4 + 3i| = ?$

Yanıt / The Answer is 9

64. $|z_1 - z_2| = ?$



Yanıt / The Answer is $5\sqrt{2}$

1. $\sqrt{-1}\cdot\sqrt{-9}\ \sqrt{-16} = ?$

A) -6 B) 6 C) $12i$ D) $-12i$ E) $-6i$

2. $\sqrt{-36}\cdot\sqrt{-9}-\sqrt{-16}\cdot\sqrt{-25} = ?$

A) 2 B) $2i$ C) 4 D) $4i$ E) $2+2i$

3. $\sqrt{-7}\cdot\sqrt{-14}\cdot\sqrt{-5}\cdot\sqrt{-15} = ?$

A) $35\sqrt{6}$ B) $-35\sqrt{6}$ C) $35\sqrt{6}\cdot i$ D) $-35\sqrt{6}\cdot i$ E) $-\sqrt{6}\cdot i$

4. $\dfrac{\sqrt{-2}\cdot\sqrt{-5}\cdot\sqrt{-10}}{\sqrt{-50}} = ?$

A) $-2\sqrt{2}i$ B) $-\sqrt{2}i$ C) $-\sqrt{2}$ D) $\sqrt{2}$ E) $\sqrt{2}i$

5. $\sqrt{-9}\cdot\sqrt{-25}\cdot\sqrt{-3}\cdot\sqrt{12} = ?$

A) $-90i$ B) -90 C) 90 D) $90i$ E) $120i$

6. $z=\sqrt{-16}-\sqrt{(-3)^2} \Rightarrow \mathbf{Re(z) - Im(z) = ?}$

A) -7 B) -5 C) 3 D) 5 E) 7

7. $i=\sqrt{-1}$,

$x^2+4=0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-2i\}$ B) $\{2i\}$ C) $\{2-i\}$ D) $\{2+i\}$ E) $\{-2i, 2i\}$

8. $i^2=-1$,

$x^2-2x+4=0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{1+2\sqrt{3}i\}$ B) $\{1-2\sqrt{3}i\}$ C) $\{1\pm\sqrt{3}i\}$ D) $\{2\pm\sqrt{3}i\}$ E) $\{2\pm2\sqrt{3}i\}$

9. $z_1 = 4a - 1 + 3i$,
$z_2 = b + (a + 5)i$,
$z_1 = z_2 \Rightarrow$ **$a - b = ?$**

A) 2 B) 3 C) 5 D) 7 E) 9

10. $z_1 = 7 - m + i$,
$z_2 = 2ni - 5i - 4$,
$z_1 = z_2 \Rightarrow$ **$m + n = ?$**

A) 11 B) 12 C) 14 D) 16 E) 18

11. $\left.\begin{array}{l} z_1 = 3 - 4i \\ z_2 = 8 + 6i \\ z_3 = a + bi \\ z_3 = z_1 - z_2 \end{array}\right\} \Rightarrow$ **$\sqrt{a^2 + b^2} = ?$**

A) 10 B) $5\sqrt{5}$ C) $3\sqrt{5}$ D) 5 E) $\sqrt{5}$

12. $i^2 = -1$,
$z_1 = \sqrt{9} \cdot i + xi + \sqrt[3]{-8} + y$
$z_2 = 2y + \sqrt[5]{-32} + \sqrt{-16} \cdot x$
$z_1 = z_2 \Rightarrow$ **$x \cdot y = ?$**

A) 8 B) 4 C) 0 D) −4 E) −8

13. $f(x) = x^2 + bx + c$
$f(x_1) = f(x_2) = 0$
$x_1 = 3 + i \Rightarrow$ **$b \cdot c = ?$**

A) 60 B) −60 C) 30 D) 15 E) −30

14. $P(x) = x^2 + bx + c$
$P(x_1) = P(x_2) = 0$
$x_1 = 3 - 2i \Rightarrow$ **$P(-1) = ?$**

A) 5 B) 10 C) 20 D) 25 E) 30

15. $x^2 + mx - 4 = 0$, ÇK(SS) $= \{x_1, x_2\}$,
$x_1 = 2 + i \Rightarrow$ **$m = ?$**

A) 4 B) $\frac{-2-9i}{5}$ C) $\frac{-2+9i}{5}$ D) −4 E) $\frac{2+9i}{5}$

16. $x^2 + 4ax - 6 \cdot b - 5i = 0$
$x_1 = 1 + i \Rightarrow$ **$x_2 = ?$**

A) $-i$ B) $4 + i$ C) $4 - i$ D) $-4 + i$ E) $-4 - i$

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1	2	3	4	5	6	7	8
D	A	A	C	A	A	E	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	C	B	C	B	C	B	E

1. $i^{67} = ?$

A) $2i$ B) i C) 0 D) 1 E) $-i$

2. $i^{143} + i^{172} = ?$

A) $1+i$ B) $2+i$ C) $1-i$ D) $2-i$ E) $-i$

3. $i^2 = -1$

$(1+i^7)\cdot(1+i^{33})\cdot(1+i^{19})\cdot(1+i^{13})\cdot(1+i^{23})\cdot(1+i^{17}) = ?$

A) 2 B) 4 C) 8 D) 16 E) 32

4. $\left(i^{17} + \frac{2}{i^{13}}\right)^4 = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

5. $(1+i)^9 \cdot i^{43} = ?$

A) 4 B) $8\cdot(1-i)$ C) $8\cdot(1+i)$ D) $16\cdot(1-i)$ E) $16\cdot(1+i)$

6. $(1+i)^{13} = ?$

A) -2^6 B) $2^6\, i$ C) $-2^6\cdot(1+i)$ D) $2^6\cdot(1+i)$ E) $1+i$

7. $(1+i)^{11} - (1-i)^{11} = ?$

A) -64 B) 64 C) 0 D) $-64i$ E) $64i$

8. $(1+i)^{16} - (1-i)^{16} = ?$

A) 0 B) $4i$ C) $-4i$ D) -16 E) 16^2

9. $(1+i)^{13}+(1-i)^{9}=z \Rightarrow \mathbf{Re(z)=?}$

A) 24 B) −24 C) 48 D) −48 E) 0

10. $\dfrac{(1+i)^9}{(1-i)^5}(3+2i)=?$

A) $8-12i$ B) $8+12i$ C) $-8-12i$ D) $-8+12i$ E) $-3-2i$

11. $\left(\dfrac{1+i^{49}}{1+i^{51}}\right)^{18}=?$

A) $-3i$ B) $-2i$ C) 2 D) −1 E) 0

12. $z=(8-4\sqrt{3}i)\cdot(2+i) \Rightarrow \mathbf{Im(z)=?}$

A) $8(1-\sqrt{3})$ B) $16(1-\sqrt{3})$ C) $32(1-\sqrt{3})$ D) $64(1-\sqrt{3})$ E) $8(1+\sqrt{3})$

13. $\dfrac{2+i}{1+i}+\dfrac{6}{2-i}=z \Rightarrow \mathbf{Im(z)=?}$

A) $\dfrac{1}{10}$ B) $\dfrac{3}{10}$ C) $\dfrac{7}{10}$ D) $\dfrac{9}{10}$ E) $\dfrac{10}{9}$

14. $z=1+i+\dfrac{2}{1-i} \Rightarrow \mathbf{z^{-1}=?}$

A) $1-i$ B) $1+i$ C) $\dfrac{1-i}{4}$ D) $\dfrac{1+i}{4}$ E) $\dfrac{-1-i}{4}$

15. $(3-4i)\cdot(4+2i)=x+2-3i+yi$

$\Rightarrow \mathbf{x+y=?}$

A) 12 B) 11 C) 10 D) 9 E) 8

16. $6a+12i=4b+ai+16 \Rightarrow \mathbf{z=a+bi=?}$

A) $14+12i$ B) $14-12i$ C) $16+12i$ D) $16-12i$ E) $12+14i$

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1	2	3	4	5	6	7	8
E	C	C	D	D	C	E	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	A	D	A	C	C	B	E

1. $i^{67} + i^{93} + i^{106} = ?$

A) -1 B) 1 C) i D) $-i$ E) $i + 1$

2. $i^{905} - i^{2012} - i^{1905} = ?$

A) -1 B) 0 C) 1 D) 2 E) 3

3. $\dfrac{i^{2014} + i^{2013}}{i^{2012} + i^{2011}} = ?$

A) -1 B) $-i$ C) 0 D) 1 E) i

4. $i^2 = -1$, $n \in \mathbb{N}$,

$i^{4n+23} + i^{-12n+25} - i^{26-16n} = ?$

A) 1 B) $-i$ C) 0 D) i E) $2i$

5. $i + i^2 + i^3 + \ldots + i^{208} = ?$

A) $-i$ B) -1 C) 0 D) $2i$ E) 1

6. $i^2 = -1$,

$i^{86} + i^{-86} + i^{43} + i^{-43} + i^{50} = ?$

A) i B) $-i$ C) -3 D) $3i$ E) $3+i$

7. $n \in \mathbb{Z} \Rightarrow \dfrac{i^{8n-1} + i^{4n}}{i^{4n-1}} = ?$

A) $1-i$ B) $1+i$ C) $-1-i$ D) 1 E) 2

8. $i^2 = -1$,

$(1+i)^5 + (1-i)^5 = ?$

A) -8 B) -5 C) 0 D) 5 E) 8

9. $i^2 = -1$

$\left(\frac{1+i}{1-i}\right)^{20} = ?$

A) $-2i$ B) $-i$ C) -1 D) 1 E) $2i$

10. $\left(\frac{1+i}{1-i}\right)^{1917} = ?$

A) 1 B) i C) 0 D) -1 E) $-i$

11. $\frac{(1+i)^{87}}{(1-i)^{86}} = ?$

A) $-1-i$ B) $-5i$ C) -5 D) -2 E) $-2i$

12. $\frac{(3+i^3)\cdot(3+i^5)}{(i^9-2)\cdot(i^{13}+2)} = ?$

A) $5i$ B) $-5i$ C) -5 D) -2 E) $-2i$

13. $(2-i)\cdot(2-i^3)\cdot(2-i^{12})\cdot(2-i^{15})\cdot(2-i^{17}) = ?$

A) 50 B) $50i$ C) 25 D) $25i$ E) -25

14. $P(x) = x^{35} + 2x^{33} + 5x^{31}$

$\Rightarrow P(i) = ?$

A) $4i$ B) $-4i$ C) $2i$ D) $-2i$ E) $-2i+4$

15. $f(x) = -x^{15} + 3x^{11} - 2x^7 - 3x^5 + 2$

$\Rightarrow f(-i) = ?$

A) $2-3i$ B) $2-2i$ C) $2-i$ D) $2+2i$ E) $2+3i$

16. $i^2 = -1$

$i^2 + 2i^5 + 3i^8 + \ldots + k\cdot i^{3k-1} + \ldots + 64\cdot i^{191} = ?$

A) $16-16i$ B) $16+16i$ C) $32-32i$ D) $32+32i$ E) $64-64i$

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1	2	3	4	5	6	7	8
A	A	A	A	C	C	B	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	B	A	D	C	B	E	C

1. $\dfrac{\sqrt{(-2)^2}+\sqrt{-1}+\sqrt{(-3)^2}-\sqrt{-9}}{1+i}=?$

A) $\frac{1}{2}+\frac{3}{2}i$ B) $\frac{1}{2}-\frac{3}{2}i$ C) $\frac{3}{2}-\frac{5}{2}i$ D) $\frac{3}{2}-\frac{7}{2}i$ E) $\frac{3}{2}+\frac{7}{2}i$

2. $\dfrac{i^{21}+2i^{43}-i^{124}}{2+i}=?$

A) $-3-i$ B) $-3+i$ C) $\frac{3+i}{5}$ D) $\frac{-3-i}{5}$ E) $-3-i$

3. $z=(1+i)^5\cdot(1-i)^6 \Rightarrow \mathbf{Re(z)}=?$

A) 4 B) 8 C) -8 D) 32 E) -32

4. $z=\dfrac{(1+i)^{43}}{(1-i)^{41}}=?$

A) -6 B) -5 C) -3 D) -2 E) 0

5. $\dfrac{(1+i)^6-(1-i)^6}{(1-i)^3\cdot(1+i)^3}=?$

A) -2^4 B) $-2^3\cdot i$ C) $-2^2\cdot i$ D) $-2i$ E) -2

6. $(1-i)^6+(1+i)^8=a+bi \Rightarrow \mathbf{a-b}=?$

A) -8 B) 8 C) 0 D) 16 E) -16

7. $(1-i)^{28}+(1+i)^{28}=?$

A) 2^{28} B) $-2^{28}\cdot i$ C) $2^{15}\cdot i$ D) -2^{15} E) 2^{15}

8. $z=\dfrac{i^{15}\cdot(1+i)^5}{(1-i)\cdot(1+i^{17})-1}=?$

A) $4i$ B) $-4i$ C) $-4+4i$ D) $-4-4i$ E) $-16i$

9. $\dfrac{5}{(1-i)\cdot(2-i)\cdot(3-i)} = ?$

A) $-\dfrac{1}{2}$ B) $-\dfrac{i}{2}$ C) $\dfrac{3i}{2}$ D) $-\dfrac{3i}{2}$ E) $\dfrac{i}{2}$

10. $z = 2-3i \Rightarrow \dfrac{1}{z} = ?$

A) $\dfrac{2}{13}+\dfrac{3}{13}i$ B) $\dfrac{2}{13}-\dfrac{3}{13}i$ C) $-\dfrac{2}{13}-\dfrac{3}{13}i$ D) $-\dfrac{2}{13}+\dfrac{3}{13}i$ E) $\dfrac{4}{13}+\dfrac{9}{13}i$

11. $z = \dfrac{4}{1-2i}+\dfrac{1}{2-i} \Rightarrow \mathrm{Im}(z) = ?$

A) $-\dfrac{5}{9}$ B) $\dfrac{5}{9}$ C) -9 D) $-\dfrac{9}{5}$ E) $\dfrac{9}{5}$

12. $a+bi = \dfrac{i}{2-i}-\dfrac{1-2i}{1+i} \Rightarrow a+b = ?$

A) $\dfrac{11}{5}$ B) 2 C) $\dfrac{9}{5}$ D) $\dfrac{8}{5}$ E) $\dfrac{7}{5}$

13. $z \in \mathbb{C}$,
$\dfrac{z-2}{2-i} = \dfrac{4}{1+i} \Rightarrow \mathrm{Im}(z) = ?$

A) -12 B) -6 C) 0 D) 6 E) 12

14. $i\cdot z-\dfrac{5}{4-3i} = 0 \Rightarrow z = ?$

A) $3-4i$ B) $3+4i$ C) $\dfrac{3-4i}{5}$ D) $\dfrac{3+4i}{5}$ E) $\dfrac{-3-4i}{5}$

15. $z\cdot\bar{z}+i\cdot z = 6+2i \Rightarrow \sum z = ?$

A) $-i$ B) i C) $4i$ D) $-4i$ E) $4+i$

16. $z+\bar{z} = 14$,
$z\cdot\bar{z} = 625 \Rightarrow z = ?$

A) $-7+24i$ B) $7+24i$ C) $8+15i$ D) $8-15i$ E) $-7-24i$

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1	2	3	4	5	6	7	8
D	D	D	D	D	B	D	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	A	E	A	B	C	E	B

1. $\dfrac{(1-i^2)\cdot(1-i^6)\cdot(1-i^{10})}{(1-i)\cdot(1-i^3)\cdot(1-i^5)} = ?$

A) $1+2i$ B) $2-2i$ C) $1-2i$ D) $2+2i$ E) $-2i$

2. $(1+i)^4\cdot\left(2-\dfrac{2}{i}\right)^2 = ?$

A) $4i$ B) $32i$ C) $-32i$ D) $-4i$ E) 16

3. $\left.\begin{array}{l} z_1 = 3+i \\ z_2 = 3-i \end{array}\right| \Rightarrow \mathrm{Re}\left(\dfrac{z_1+z_2}{z_1}\right) = ?$

A) $\frac{9}{5}$ B) $\frac{3}{5}$ C) 0 D) $-\frac{3}{5}$ E) $-\frac{9}{5}$

4. $z = \dfrac{1}{1+i} + \dfrac{1}{1-i} \Rightarrow \mathrm{Im}(z) = ?$

A) 4 B) 3 C) 2 D) 1 E) 0

5. $z = \dfrac{4-3i}{1+i} \Rightarrow \mathrm{Re}(z) = ?$

A) $-\frac{1}{7}$ B) $-\frac{1}{4}$ C) $\frac{1}{2}$ D) $\frac{1}{4}$ E) $\frac{2}{7}$

6. $z\cdot(1-i) = 5-i \Rightarrow z = ?$

A) $5i$ B) $3-2i$ C) $3+2i$ D) $-5i$ E) $-3-2i$

7. $(z+1)\cdot(2+i) = 3-2i \Rightarrow \mathrm{Re}(z) + \mathrm{Im}(z) = ?$

A) $-\frac{8}{5}$ B) $-\frac{3}{5}$ C) $\frac{1}{5}$ D) $\frac{3}{5}$ E) $\frac{8}{5}$

8. $a+bi+\dfrac{1}{1+i} = 1-i \Rightarrow a+b = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

9. $i^2 = -1$,

$z = \frac{i}{(1-i)\cdot(2+i)} \Rightarrow \mathbf{Im(z) = ?}$

A) $-\frac{1}{10}$ B) $-\frac{3}{10}$ C) $\frac{1}{10}$ D) $\frac{3}{10}$ E) $-\frac{1}{2}$

10. $z = -3+4i \Rightarrow \mathbf{Re(z^{-1}) = ?}$

A) $-\frac{3}{4}$ B) $-\frac{4}{25}$ C) $-\frac{3}{25}$ D) $\frac{4}{25}$ E) $\frac{\sqrt{3}}{5}$

11. $(2-i)\cdot z = 1-\bar{z} \Rightarrow \mathbf{Re(z) = ?}$

A) 1 B) $\frac{1}{2}$ C) $\frac{1}{4}$ D) $-\frac{1}{2}$ E) $-\frac{1}{4}$

12. $(2-3i)\cdot z + \bar{z} = 12 \Rightarrow \mathbf{Im(z) = ?}$

A) -3 B) -2 C) -1 D) 2 E) 3

13. $z = \frac{1}{4-3i} \Rightarrow \mathbf{Im(\bar{z}) = ?}$

A) $3i$ B) $\frac{3}{25}$ C) $-3i$ D) $\frac{-3}{25}$ E) -3

14. $4z - 3\bar{z} = \frac{1-18i}{2-i} \Rightarrow \mathbf{z = ?}$

A) $-4+i$ B) $-4-i$ C) $-2+i$ D) $3-2i$ E) $4-i$

15. $z_1 = 2+2\sqrt{3}i$,

$z_2 = 1-\sqrt{3}i$

$\Rightarrow \mathbf{(z_1+\bar{z}_2)\cdot(z_2+\bar{z}_1) = ?}$

A) 9 B) 18 C) 27 D) 36 E) 81

16. $f, g: \mathbb{C} \to \mathbb{C}$, $z \in \mathbb{C}$,

$\left.\begin{array}{l} f(z) = \bar{z} - z \\ g(z) = z\cdot z \end{array}\right\} \Rightarrow \mathbf{(gof)(3-i) = ?}$

A) -4 B) 4 C) $4i$ D) $-4i$ E) -1

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1	2	3	4	5	6	7	8
D	C	A	E	C	C	A	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	C	C	E	D	E	D	B

1. $z = \frac{4}{1+\sqrt{3}\cdot i} + \frac{\sqrt{3}+i}{\sqrt{3}-i} \Rightarrow \mathbf{Re(z) = ?}$

A) 2 B) 1 C) $\frac{1}{2}$ D) $\frac{3}{2}$ E) $\frac{5}{2}$

2. $z = \frac{10}{2+i} + \frac{4}{1-i} + \frac{3}{i}$

$\Rightarrow \mathbf{z = ?}$

A) $17-i$ B) $17+i$ C) $-3i$ D) $6+3i$ E) $6-3i$

3. $-2+\bar{z} = (2-i)\cdot z + 2 \Rightarrow \mathbf{z = ?}$

A) $-1-i$ B) $-1+i$ C) $1+i$ D) $-3-i$ E) $3+i$

4. $2z + \bar{z}\cdot i = 4+5i \Rightarrow \mathbf{z = ?}$

A) $1-2i$ B) $1+2i$ C) $2-2i$ D) $2+2i$ E) $-2i+5$

5. $\left|\frac{(3-\sqrt{5}\cdot i)\cdot(\sqrt{3}+i)^2}{\sqrt{13}+i}\right| = ?$

A) 13 B) 9 C) 5 D) 4 E) 1

6. $z = \frac{(-\sqrt{3}+i)\cdot(2-2i)^2}{2\sqrt{3}-2i} \Rightarrow \mathbf{|z| = ?}$

A) 16 B) 4 C) 1 D) $\frac{1}{4}$ E) $\frac{1}{16}$

7. $z = \frac{(3+4i)\cdot 3i}{2-i} \Rightarrow \mathbf{|z| = ?}$

A) $12\sqrt{5}$ B) $9\sqrt{5}$ C) $3\sqrt{5}$ D) $-9\sqrt{5}$ E) $-12\sqrt{5}$

8. $\left.\begin{array}{l} z_1 = 2\sqrt{3}-2i \\ z_2 = 1+\sqrt{3}i \end{array}\right\} \Rightarrow \left|\frac{z_1}{z_2}\right| = ?$

A) 0 B) 1 C) 2 D) 4 E) 16

9. $z = \frac{2-3i}{1+i} \Rightarrow |\bar{z}| = ?$

A) $\sqrt{13}$ B) $\sqrt{26}$ C) $\frac{\sqrt{13}}{2}$ D) $\frac{\sqrt{26}}{2}$ E) $\frac{\sqrt{26}}{4}$

10. $z + |z| = 9 - 3i \Rightarrow Re(z) = ?$

A) 1 B) 4 C) 7 D) 10 E) 13

11. $z - 1 = |z| - 2i \Rightarrow Im(z) = ?$

A) -5 B) -2 C) 0 D) 2 E) 7

12. $|z| + i \cdot \bar{z} = 2 + 4i \Rightarrow z = ?$

A) $4-3i$ B) $4+3i$ C) $-4-3i$ D) $-3i$ E) $4i$

13. $3z - 4i = (2-i)\ \bar{z} \Rightarrow |\bar{z}| = ?$

A) $\sqrt{5}$ B) $\sqrt{3}$ C) $\sqrt{2}$ D) 1 E) 0

14. $(2-i) \cdot z = (3-2i) \cdot \bar{z} + 16i \Rightarrow |z| = ?$

A) $4\sqrt{10}$ B) $2\sqrt{10}$ C) $\sqrt{10}$ D) $\sqrt{5}$ E) $\frac{\sqrt{5}}{2}$

15. $z = a + bi,$

$4 \cdot z - 7 = 5 - 4\sqrt{3} \cdot i \Rightarrow |z| = ?$

A) $2\sqrt{3}$ B) $4\sqrt{3}$ C) $8\sqrt{3}$ D) $16\sqrt{3}$ E) $32\sqrt{3}$

16. $z = 1 + 2i \Rightarrow z^3 = ?$

A) $-11+2i$ B) $-11-2i$ C) $11+2i$ D) $11-2i$ E) $1-2i$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	E	D	B	D	B	C	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	B	B	A	C	B	A	B

1. $i \cdot z + 1 = 2 \cdot (1 - \bar{z}) \Rightarrow \mathbf{Re(z) = ?}$

A) 3 B) 2 C) 1 D) $\frac{2}{3}$ E) $\frac{3}{2}$

2. $z = x + yi,$
$(1-2i) \cdot z = -4 - 6i + \bar{z} \Rightarrow \mathbf{Re(z) = ?}$

A) -2 B) -1 C) 0 D) 1 E) 2

3. $z + 3 - 2i = (1+i) \cdot \bar{z}$
$\Rightarrow \mathbf{|z| = ?}$

A) 5 B) 6 C) 8 D) 10 E) 25

4. $|z| + z = 3 - 2i \Rightarrow \mathbf{Re(z) = ?}$

A) 5 B) $\frac{5}{6}$ C) $\frac{6}{5}$ D) -5 E) 10

5. $z = \frac{1+3i}{1-3i} \Rightarrow \mathbf{|z| = ?}$

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 3

6. $z = \frac{(1+3i) \cdot (2-i)}{(1+2i)} \Rightarrow \mathbf{|z| = ?}$

A) $\frac{\sqrt{5}}{2}$ B) $\frac{\sqrt{10}}{2}$ C) $\sqrt{2}$ D) $\sqrt{5}$ E) $\sqrt{10}$

7. $z = \frac{(\sqrt{5}-2i) \cdot (4-2i)}{2+i} \Rightarrow \mathbf{|z| = ?}$

A) 2 B) 3 C) 4 D) 5 E) 6

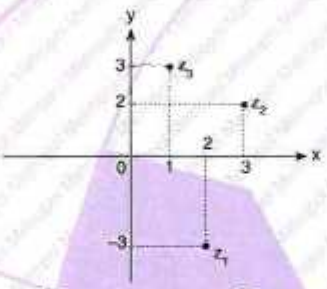
8. $z = 2 - 3i \Rightarrow \mathbf{|z^{-1}| = ?}$

A) $\frac{\sqrt{13}}{13}$ B) $\frac{\sqrt{13}}{11}$ C) $\sqrt{13}$ D) 13 E) 26

9. $\left.\begin{array}{l} z_1 = 3+4i \\ z_2 = 5-12i \end{array}\right\} \Rightarrow |\overline{z_1} \cdot \overline{z_2}| = ?$

A) 45 B) 50 C) 55 D) 60 E) 65

10. $\dfrac{|z_1 \cdot z_3|}{|z_2|} = ?$



A) $\dfrac{\sqrt{3}}{5}$ B) $\dfrac{3\sqrt{3}}{5}$ C) $\dfrac{\sqrt{5}}{3}$ D) $\dfrac{3\sqrt{10}}{5}$ E) $\sqrt{10}$

11. $\left.\begin{array}{l} z_1 = -1+3i \\ z_2 = 1+2i \end{array}\right\} \Rightarrow |z_1 - z_2| = ?$

A) $\sqrt{5}$ B) $2\sqrt{5}$ C) $3\sqrt{5}$ D) $4\sqrt{5}$ E) $5\sqrt{5}$

12. $\left.\begin{array}{l} z_1 = 8-6i \\ z_2 = 1+i \end{array}\right\} \Rightarrow |z_1 - 2 \cdot z_2| = ?$

A) $\sqrt{2}$ B) $5\sqrt{2}$ C) $5\sqrt{5}$ D) $\sqrt{10}$ E) 10

13. $b \in \mathbb{R}^-$,

$z = a + bi$,

$z \cdot \overline{z} - 4ai = 5 + 8i \Rightarrow \mathbf{Re(z) + Im(z) = ?}$

A) -4 B) -3 C) -2 D) 2 E) 3

14. $z \in \mathbb{C}$, $z = x + iy$,

$z \cdot \overline{z} - \sqrt{z \cdot \overline{z}} = 42$

$\Rightarrow \mathbf{x^2 + y^2 = ?}$

A) 16 B) 25 C) 36 D) 49 E) 64

15. $z = a + bi$,

$3i \cdot z + 2 = \dfrac{\overline{z}}{i} + 4i \Rightarrow \mathbf{z = ?}$

A) $1+i$ B) $1-i$ C) $-1-i$ D) $2i$ E) $-2i$

16. $\left.\begin{array}{l} z_1 = 2-2\sqrt{3}i \\ z_2 = 1+i \end{array}\right\} \Rightarrow |z_1^5 \cdot z_2^{-8}| = ?$

A) 128 B) 64 C) 32 D) 16 E) 8

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	D	A	B	C	E	E	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	E	A	E	B	D	A	B

1. $x \neq 0,\ z = x + yi,$

$z + 4 = |z| - 2i \Rightarrow \mathbf{x + y = ?}$

A) $-\frac{9}{2}$ B) $-\frac{7}{2}$ C) 0 D) -1 E) 2

2. $z = |z - 2| - 2i \Rightarrow \mathbf{z = ?}$

A) $2 + 3i$ B) $3 - 2i$ C) $2 + 2i$ D) $2 - 2i$ E) $3 + i$

3. $z = \frac{1 + ix}{1 - ix} \Rightarrow \mathbf{|z| = ?}$

A) 4 B) 2 C) 1 D) $\frac{2}{3}$ E) $\frac{1}{3}$

4. $z = \frac{(-1 + 2i)^3 \cdot \sqrt{4 - 3i}}{(2 - i)^4} \Rightarrow \mathbf{|\bar{z}| = ?}$

A) $\frac{\sqrt{5}}{5}$ B) $\frac{1}{2}$ C) 1 D) 2 E) $\sqrt{5}$

5. $z_1 = 3 - 4i$, $z_2 = \sqrt{7} - \sqrt{2}i$, $z_3 = -6 + 8i$ $\Rightarrow \mathbf{\left|\frac{z_1^2 \cdot z_2}{z_3}\right| = ?}$

A) $\frac{15}{2}$ B) $\frac{13}{2}$ C) 13 D) 15 E) 18

6. $z = \frac{(3 - i) \cdot (-3 + 4i)}{(1 - i)} \Rightarrow \mathbf{|(\bar{z})^2| = ?}$

A) 10 B) 25 C) 75 D) 100 E) 125

7. $z_1 = 1 - \sqrt{5}i$, $z_2 = \sqrt{13}i + \sqrt{14}$, $z_3 = 4 - \sqrt{2} \cdot i$ $\Rightarrow \mathbf{\left|\frac{z_1 \cdot z_2}{z_3}\right| = ?}$

A) 1 B) 2 C) 3 D) 4 E) 6

8. $z_1 = 4 + 5i,$

$z_2 = 7 + i \Rightarrow \mathbf{|z_1 - z_2| = ?}$

A) 5 B) 6 C) 7 D) 8 E) 9

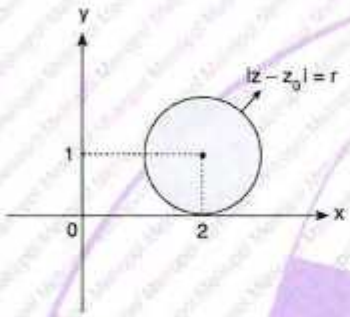
9. $a \in \mathbb{R}^+$,

$z_1 = 3 - ia,\ z_2 = a + 2i,$

$|z_1 - z_2| = \sqrt{17} \Rightarrow \mathbf{a = ?}$

A) 1 B) 2 C) 3 D) 4 E) 5

10.



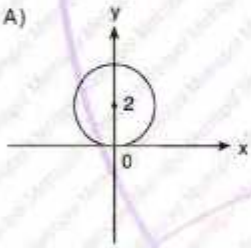
A) $|z - 1 - 2i| \le 1$ B) $|z + 1 + 2i| \le 1$

C) $|z - 2 - i| \le 1$ D) $|z + 2 + i| \le 2$

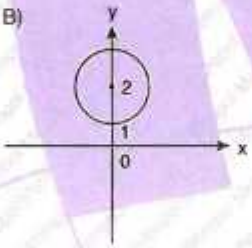
E) $|z - 2 - i| \le 2$

11. $|z - 2i| = 1 \Rightarrow$ **ÇK(SS) = ?**

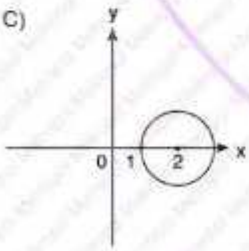
A)



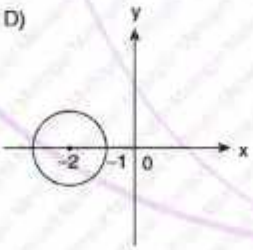
B)



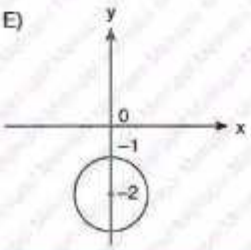
C)



D)



E)



12. $|z| \le 1,$

$A = |z - 3 + 4i| \Rightarrow \mathbf{max(A) = ?}$

A) 4 B) 5 C) 6 D) 7 E) 8

13. $|z| \le 3 \Rightarrow \mathbf{min(|z + 4i|) = ?}$

A) -1 B) 0 C) 1 D) 2 E) 3

14. $z \cdot |Re(z)| = -4 + 3i \Rightarrow \mathbf{|z| = ?}$

A) $\frac{5}{2}$ B) 7 C) 6 D) 3 E) 1

15. $a > 0,$

$z = a + (a + 2)i,$

$|\bar{z} + i - 1| = 10 \Rightarrow \mathbf{a = ?}$

A) 6 B) 8 C) 7 D) 9 E) 3

16. $\left.\begin{array}{l} z_1 = 3 \cdot cis13^\circ \\ z_2 = 4 \cdot cis103^\circ \end{array}\right\} \Rightarrow \mathbf{|z_1 - z_2| = ?}$

A) 20 B) 15 C) 10 D) 5 E) 1

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	D	C	C	A	E	C	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	C	B	C	C	A	C	D

1. $z = 2 + \sqrt{3}i \Rightarrow \mathbf{Im(z^2) = ?}$

A) $4\sqrt{3}$ B) $2\sqrt{3}$ C) 1 D) $-\sqrt{3}$ E) $-4\sqrt{3}$

2. $i^2 = -1,$

$z = \dfrac{i^3 + i^{11}}{1 - i} \Rightarrow \mathbf{z^{14} = ?}$

A) 2^7 B) -2^7 C) $-2^7 i$ D) $-2^6 i$ E) $2^7 i$

3. $\left(\dfrac{4-3i}{3+4i}\right)^{49} + \left(\dfrac{2+7i}{7-2i}\right)^{63} = ?$

A) $2i$ B) i C) 0 D) $-i$ E) $-2i$

4. $z = i + \sqrt{3} \Rightarrow \mathbf{z = r \cdot cis\theta = ?}$

A) $\sqrt{2} \cdot cis\frac{\pi}{6}$ B) $\sqrt{2} \cdot cis\frac{\pi}{3}$ C) $\sqrt{2} \cdot cis\frac{\pi}{4}$ D) $2 \cdot cis\frac{\pi}{6}$ E) $2 \cdot cis\frac{\pi}{8}$

5. $z = -3 + 3i \Rightarrow \mathbf{z = ?}$

A) $3 \cdot cis\frac{\pi}{4}$ B) $\sqrt{2} \cdot cis\frac{3\pi}{4}$ C) $3\sqrt{2} \cdot cis\frac{3\pi}{4}$ D) $3\sqrt{2} \cdot cis\frac{\pi}{4}$ E) $3\sqrt{2} \cdot cis\frac{\pi}{2}$

6. $z = 1 + i\sqrt{3} \Rightarrow \mathbf{z = r \cdot cis\theta = ?}$

A) $2 \cdot cis\frac{\pi}{6}$ B) $2 \cdot cis\frac{\pi}{3}$ C) $4 \cdot cis\frac{\pi}{6}$ D) $4 \cdot cis\frac{\pi}{3}$ E) $2 \cdot cis\frac{\pi}{2}$

7. $z = 2 - 2i,\ z = r \cdot cis\theta \Rightarrow \mathbf{z = ?}$

A) $2\sqrt{2} \cdot cis\frac{\pi}{4}$ B) $2\sqrt{2} \cdot cis\frac{3\pi}{4}$ C) $2\sqrt{2} \cdot cis\frac{5\pi}{4}$ D) $2\sqrt{2} \cdot cis\frac{7\pi}{4}$ E) $\sqrt{2} \cdot cis\frac{5\pi}{2}$

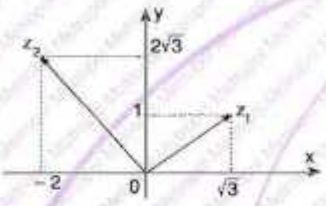
8. $z = -3 + i\sqrt{3},\ z = r \cdot cis\theta \Rightarrow \mathbf{z = ?}$

A) $2\sqrt{3} \cdot cis30°$ B) $2\sqrt{3} \cdot cis120°$ C) $2\sqrt{3} \cdot cis150°$ D) $2\sqrt{3} \cdot cis210°$ E) $2\sqrt{3} \cdot cis240°$

9. $\frac{1}{z} = \cos\frac{\pi}{4} + i \cdot \sin\frac{\pi}{4} \Rightarrow z = ?$

A) $\sqrt{2}\,(1+i)$ B) $\sqrt{2}\cdot(1-i)$ C) $\frac{\sqrt{2}}{2}\,(1+i)$ D) $\frac{\sqrt{2}}{2}\,(1-i)$ E) $\frac{1+i}{2}$

10.



$\Rightarrow z_1 \cdot z_2 = ?$

A) $2^2\cdot(-\sqrt{3}+i)$ B) $2^3\cdot(-\sqrt{3}+i)$ C) $2^2\cdot(-\sqrt{3}-i)$ D) $2^3\cdot(-\sqrt{3}-i)$ E) $2^4\cdot i$

11. $\left.\begin{array}{l} z_1 = \text{cis}\,160^\circ \\ z_2 = \text{cis}\,100^\circ \\ z_3 = \text{cis}\,200^\circ \end{array}\right\} \Rightarrow \frac{z_1 \cdot z_2}{z_3} = ?$

A) $\frac{1}{2} + \frac{\sqrt{3}}{2}i$ B) $\frac{1}{2} - \frac{\sqrt{3}}{2}i$ C) $\frac{\sqrt{3}}{2} - \frac{1}{2}i$ D) $\frac{\sqrt{3}}{2} - \frac{1}{2}i$ E) $1+i$

12. $z_1 = \cos 40^\circ - i \cdot \sin 40^\circ$

$z_2 = \cos 160^\circ + i \cdot \sin 160^\circ$

$\Rightarrow \arg\left(z_1^2 \cdot z_2\right) = ?$

A) 20° B) 40° C) 60° D) 80° E) 100°

13. $z = 2\cdot\text{cis}\frac{\pi}{3} \Rightarrow z^6 = ?$

A) -64 B) $64i$ C) $-2+2i$ D) $2+2i$ E) 64

14. $z = \sqrt{3} + i \Rightarrow z^{10} = ?$

A) $2^9\,(1-\sqrt{3}i)$ B) $2^{10}\,(1-\sqrt{3}i)$ C) $2^8\,(1-\sqrt{3}i)$ D) $2^{10}\,(-1+\sqrt{3}i)$ E) $2^{10}\,(\sqrt{3}-i)$

15. $\left.\begin{array}{l} z_1 = 2\cdot\text{cis}23^\circ \\ z_2 = 4\cdot\text{cis}16^\circ \end{array}\right\} \Rightarrow \frac{z_1^4}{z_2^2} = ?$

A) $\frac{1}{2} + \frac{\sqrt{3}}{2}\cdot i$ B) $\frac{1}{2} - \frac{\sqrt{3}}{2}\cdot i$ C) $-\frac{1}{2} - \frac{\sqrt{3}}{2}\cdot i$ D) $1+\sqrt{3}i$ E) $1-\sqrt{3}i$

16. $\left.\begin{array}{l} z_1 = 3\cdot\text{cis}15^\circ \\ z_2 = 5\cdot\text{cis}85^\circ \end{array}\right\} \Rightarrow \arg\left(\frac{z_2^2}{z_1^5}\right) = ?$

A) 75° B) 80° C) 85° D) 95° E) 100°

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	E	E	D	C	B	D	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	A	A	D	E	A	A	D

1. $i^2 = -1$

$$\left|\frac{(6-8i)^2\cdot(12i-5)}{7+24i}\right| = ?$$

A) 26 B) 39 C) 52 D) 65 E) 78

2. $z = \dfrac{(1-i)^{16}}{1+i} \Rightarrow \mathbf{Re(z) = ?}$

A) 2^8 B) 2^7 C) 2^6 D) -2^7 E) -2^8

3. $z = \left(\dfrac{1+i}{1-i}\right)^{19} \Rightarrow \mathbf{Im(z) = ?}$

A) 0 B) −1 C) 1 D) 2 E) −2

4. $i^2 = -1,\ z = x + yi$

$(4-3i)\cdot z = \bar{z} + 1$

$\Rightarrow \mathbf{Re(z) + Im(z) = ?}$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{5}{24}$ D) $\frac{1}{8}$ E) $\frac{1}{4}$

5. $i^2 = -1$

$P(x) = x^2 - x + 25,\ P(x_1) = P(x_2) = 0$

$\Rightarrow \sqrt{x_1} - \sqrt{x_2} \in \mathbb{R}^+ = ?$

A) i B) 2i C) 3i D) 4i E) 5i

6. $z \in \mathbb{C},$

$f(z) = \prod_{k=1}^{12} z^{k-1} \Rightarrow \mathbf{f(-i) = ?}$

A) −1 B) 1 C) −i D) i E) 2i

7. $z = 3\cdot\left(\cos\frac{\pi}{4} - i\cdot\sin\frac{\pi}{4}\right) \Rightarrow \mathbf{z^2 = ?}$

A) 27i B) −27i C) −9i D) 9i E) 27

8. $z_1, z_2 \in \mathbb{C},$

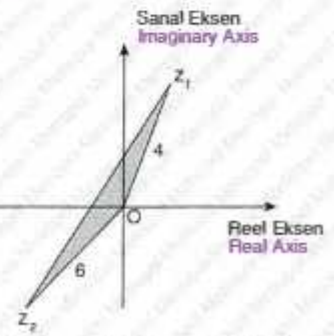
$|z_1| = 4$

$|z_2| = 6$

$\arg(z_1) = 70°$

$\arg(z_2) = 220°$

$\Rightarrow$ **Alan / Area($\widehat{z_1Oz_2}$) = ?**



A) 4 B) 5 C) 6 D) 15 E) 20

9. $z_1 = -2+2i$

$z_2 = 1+i \Rightarrow \arg\left(\frac{z_1}{z_2}\right) = ?$

A) $\frac{\pi}{6}$ B) $\frac{\pi}{3}$ C) $\frac{\pi}{2}$ D) $\frac{3\pi}{4}$ E) π

10. $\sqrt{-1} = i$,

$f(z) = (z-1)^2 + \bar{z}$

$g(z) = z^3 - z^2 + 4\bar{z}$

$\Rightarrow (gof)(1-i) = ?$

A) $1+5i$ B) $1-5i$ C) $5+i$ D) $5-i$ E) $4i$

11. $z \in \mathbb{C}$,

$f(z) = \sum_{k=0}^{101} z^k \Rightarrow f(i) = ?$

A) $1+i$ B) $1-i$ C) i D) $-i$ E) 1

12. $z \in \mathbb{C}$, $z \neq -6i$,

$z^2 + 36 = z + 6i$

$\Rightarrow \mathrm{Re}(z) + \mathrm{Im}(z) = ?$

A) 3 B) 5 C) 7 D) 9 E) 11

13. $i = \sqrt{-1}$,

$x < y < 0$ ve / and $\sqrt{x-y} = 2i$

$\Rightarrow x - y = ?$

A) 4 B) 2 C) 1 D) -2 E) -4

14. $i = \sqrt{-1}$

$f\left(\frac{x}{i^5}\right) = x^{101} + \frac{1}{x^{29}} + x^{43}$

$\Rightarrow f(1) = ?$

A) $1-i$ B) $1+i$ C) i D) $-i$ E) 0

15. $z \in \mathbb{C}$,

$\mathrm{Re}(i \cdot \bar{z}) = 3$ ve / and $\mathrm{Re}(z+2) = 6$

$\Rightarrow \mathrm{Re}(z) \cdot \mathrm{Im}(z) = ?$

A) 18 B) 15 C) 12 D) 10 E) 6

16. $z \in \mathbb{C}$,

$\frac{z^2+25}{z+5i} = \frac{z^4-16}{(z-2i)\cdot(z-2)} - z^2$

$\Rightarrow \mathrm{Re}(\bar{z}) = ?$

A) $-\frac{5}{9}$ B) $-\frac{9}{5}$ C) $-\frac{18}{5}$ D) $\frac{5}{9}$ E) $\frac{18}{5}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	B	B	B	C	A	C	C
9	10	11	12	13	14	15	16
C	B	A	C	E	D	C	C

1. $i^2 = -1$, $\frac{13+i}{x+iy} = 3+i \rightarrow x \cdot y = ?$

A) 4 B) −4 C) −2 D) 2 E) 8

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2. $i^2 = -1 \Rightarrow \left|\frac{(3+4i)^2 \cdot (1+i)^4}{(i-1)^2}\right| = ?$

A) 10 B) 25 C) 50 D) 100 E) 250

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

3. $i^2 = -1$

$z = x + yi$

$(2+3i) \cdot z = \bar{z} - 2 \rightarrow z = ?$

A) $\frac{-1+i}{2}$ B) $\frac{-3+3i}{2}$ C) $1+i$ D) $\frac{5-2i}{2}$ E) $\frac{2-i}{2}$

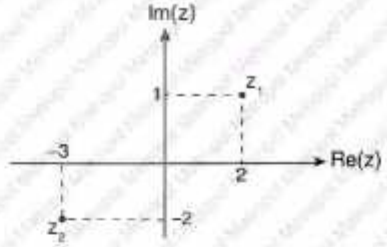
[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2019]

4. $\left(\frac{1-i}{1+i}\right)^{20} = ?$

A) −i B) 1 C) i D) −1 E) 1 − i

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

5.



Yukarıdaki şekil z_1 ve z_2'yi göstermektedir.

The figure above shows z_1 and z_2.

$i^2 = -1$ ve / and $z = x + yi$ ise / therefore $\mathbf{Re}\left(\frac{z_1 \cdot z_2}{z_1 + z_2}\right) = ?$

A) 4 B) $\frac{11}{2}$ C) 5 D) $\frac{9}{2}$ E) 6

[ULUDAĞ ÜNİVERSİTESİ – YÖS 2018]

6. $i^2 = -1$ ve $z = x + yi$ olmak üzere

$(1-i)z = 2i + \bar{z}$ ise **z'nin gerçek kısmı (Re(z)) nedir?**

Provided that $i^2 = -1$ and $z = x + yi$, if $(1-i)z = 2i + \bar{z}$, what is the real part of z (Re(z))?

A) 2 B) −2 C) −1 D) 0 E) 1

[ULUDAĞ ÜNİVERSİTESİ – YÖS 2018]

7. $z = \frac{3-i}{11+13i} \Rightarrow \frac{1}{z} = ?$

A) 3 + 5i B) 3 − 5i C) 2 − 5i D) 2 + 5i E) 3 + 2i

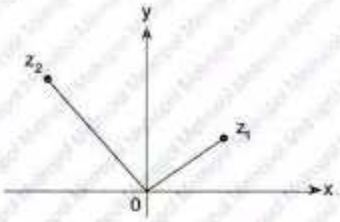
[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

8. $i^2 = -1$, $\frac{(1+i)^2}{1-i} = ?$

A) i − 1 B) 1 C) −i D) i E) 1 − i

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

9.



$|z_1| = 3,\ |z_2| = 5$

$\arg z_1 = 80°$

$\arg z_2 = 150° \Rightarrow |z_1 + z_2| = ?$

A) $\sqrt{15}$ B) 4 C) $\sqrt{19}$ D) $\sqrt{21}$ E) $2\sqrt{6}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2018]

10. $x, y \in \mathbb{R}$,

$(2-i)\cdot(y-xi)+(1+i)\cdot(x-yi) = 3-9i$

$\Rightarrow \sqrt{x^2+y^2} = ?$

A) $5\sqrt{2}$ B) $4\sqrt{6}$ C) $2\sqrt{10}$ D) $4\sqrt{2}$ E) 3

[İSTANBUL ÜNİVERSİTESİ – YÖS 2017]

11. $x + iy = \dfrac{(1+i)^{52}}{(1-i)^{48}}$

$\Rightarrow x + y = ?$

A) -4 B) -2 C) 0 D) 2 E) 4

[ERCİYES ÜNİVERSİTESİ – YÖS 2017]

12. $i^2 = -1$,

$f(x) = x^2 - 2x + 4$

$f(x_1) = f(x_2) = 0 \Rightarrow \sqrt{x_1} - \sqrt{x_2} = ?$

A) $2i$ B) $-2i$ C) $\sqrt{2}\cdot i$ D) $2+i$ E) $-2+i$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2017]

13. $\dfrac{i^{59}+i^{102}}{i^{985}+i^{348}} = ?$

A) $1+i$ B) -1 C) i D) $-i$ E) 1

[ANADOLU ÜNİVERSİTESİ – YÖS 2017]

14. $(5+2i)\cdot(2-5i) - (2+5i)\cdot(5-2i) = ?$

A) $-42i$ B) $-50i$ C) $-58i$ D) -40 E) 40

[İSTANBUL ÜNİVERSİTESİ – YÖS 2015]

15. $z = 4\cdot\left(\cos\frac{\pi}{4} + i\cdot\sin\frac{\pi}{4}\right) \Rightarrow z^4 = ?$

A) -16 B) $16i$ C) -256 D) 256 E) 4

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

16. $z \in \mathbb{C}$,

$f(z) = \sum_{k=1}^{101} z^{k-1} \Rightarrow f(i) = ?$

A) 1 B) i C) $-i$ D) -1 E) $i+1$

[ONSEKİZ MART ÜNİVERSİTESİ – YÖS 2014]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	C	A	B	B	B	D	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	A	C	B	A	C	A

BÖLÜM CHAPTER 8

TARİHSEL NOT / HISTORICAL NOTE

JOHN NAPİER [1550 - 1617]

Merchiston Baronu ve İskoçyalı bir matematikçi olan Napier, logaritmanın bulucusu olarak bilinir. 1, 2, 3, ... şeklindeki aritmetik dizi ile, buna karşılık gelen 10, 100, 1000, ... biçimindeki geometrik dizi arasındaki ilişkiyi gördü. 1614 yılında yazdığı "Logaritma Kuralarının Tanımı" adlı eserinde, aritmetik dizi ile geometrik dizinin karşılaştırılmasından, matematiğe logaritma kavramını getirdi. Günümüzdekilerden farklı olarak kurulan bu diziler, logaritmayı, sayısının azalan bir fonksiyonu olarak tanımlıyordu. Buradaki aritmetik dizi, geometrik dizinin logaritmasıdır.

The Baron of Merchiston and a Scottish mathematician. He is known as the finder of the logarithm. He saw the relationship between the arithmetic sequence 1, 2, 3, ... and the corresponding geometric sequence 10, 100, 1000, ... In his work titled "Definition of the Logarithm Rules" published in 1614, he introduced the concept of mathematical logarithm derived from the comparison of the arithmetic sequence with the geometric sequence. These sequences, which were established differently then, defined the logarithm as a decreasing function of the numbers. The arithmetic sequence here is the logarithm of the geometric sequence.

LOGARİTMA
LOGARITHM

Bu bölüm 64 alıştırma sorusu, 170 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 64 exercise questions, 170 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 8

LOGARİTMA / LOGARITHM

1. $2^x = 10 \Rightarrow x = ?$

Yanıt / The Answer is $\log_2 10$

2. $7^x = 20 \Rightarrow x = ?$

Yanıt / The Answer is $\log_7 20$

3. $\log_3 x = 4 \Rightarrow x = ?$

Yanıt / The Answer is 81

4. $\log_2 x = 7 \Rightarrow x = ?$

Yanıt / The Answer is 2^7

5. $\log_3 27 = ?$

Yanıt / The Answer is 3

6. $\log_2 \frac{1}{64} = ?$

Yanıt / The Answer is -6

7. $\log_9 243 = ?$

Yanıt / The Answer is $\frac{5}{2}$

8. $2^{x-1} = 3 \Rightarrow x = ?$

Yanıt / The Answer is $\log_2 6$

9. $3^{x+3} = 4 \Rightarrow x = ?$

Yanıt / The Answer is $\log_3 4 - 3$

10. $1 + \log_2 x = 3 \Rightarrow x = ?$

Yanıt / The Answer is 4

11. $\log_3(4 - x) = 2 \Rightarrow x = ?$

Yanıt / The Answer is -5

12. $e^{2x} = 4 \Rightarrow x = ?$

Yanıt / The Answer is $\ln 2$

13. $e^{x-1} = 3 \Rightarrow x = ?$

Yanıt / The Answer is $\ln 3 + 1$

14. $\log_3 27 = x \Rightarrow 2^{x-1} = ?$

Yanıt / The Answer is 4

15. $\log_{\sqrt{2}} x = 16 \Rightarrow 3^{x-1} = ?$

Yanıt / The Answer is 27

16. $\log_3(\log_3 x) = 1 \Rightarrow x = ?$

Yanıt / The Answer is 27

17. $\log_2(1+\log_3(x-2))=2 \Rightarrow x=?$

Yanıt / The Answer is 29

18. $\log_{\frac{1}{3}}(\log_4(2x+1))=0 \Rightarrow x=?$

Yanıt / The Answer is $\frac{3}{2}$

19. $\log(5+\log_2(2x+2))=1 \Rightarrow x=?$

Yanıt / The Answer is 15

20. $\ln(e^3+\log_2(x+1))=3 \Rightarrow x=?$

Yanıt / The Answer is 0

21. $\log_3(28+\log_2 x)=3 \Rightarrow x=?$

Yanıt / The Answer is $\frac{1}{2}$

22. $\log 10+\ln 1=?$

Yanıt / The Answer is 1

23. $\dfrac{3\cdot\ln e^2+\log_3 1}{\log_{\sqrt{3}}3+2\cdot\log 10}=?$

Yanıt / The Answer is $\frac{3}{2}$

24. $\log_{\frac{1}{2}}8-\log_{\frac{1}{5}}27+\log_{\sqrt{5}}25=?$

Yanıt / The Answer is $\frac{5}{2}$

25. $\ln(\sqrt[8]{e}) + \ln(\sqrt[4]{e}) = ?$

Yanıt / The Answer is $\frac{7}{12}$

26. $\log(0{,}0001) + \log\frac{1}{1000} = ?$

Yanıt / The Answer is -7

27. $\log_2 3 = x \Rightarrow \log_9 4 = ?$

Yanıt / The Answer is $\frac{1}{x}$

28. $\log_a b = 16 \Rightarrow \log_{a^2}\sqrt{b} = ?$

Yanıt / The Answer is 4

29. $x^3 = y^2 \Rightarrow \log_y x^2 = ?$

Yanıt / The Answer is $\frac{4}{3}$

30. $\log_{182} 2 + \log_{182} 7 + \log_{182} 13 = ?$

Yanıt / The Answer is 1

31. $\ln 2 + \ln 4 + \ln 8 = ?$

Yanıt / The Answer is $6 \cdot \ln 2$

32. $\dfrac{\log_2 48 - \log_2 3}{\log_3 36 - \log_3 4} = ?$

Yanıt / The Answer is 2

33. $\left.\begin{array}{l}\log 2 = x \\ \log 3 = y\end{array}\right\} \Rightarrow \log 36 = ?$

Yanıt / The Answer is $2\cdot(x+y)$

34. $\left.\begin{array}{l}\log_x 3 = 4 \\ \log_y 3 = 2\end{array}\right\} \Rightarrow \log_3(x\cdot y) = ?$

Yanıt / The Answer is $\frac{3}{4}$

35. $\frac{1}{\log_5 15} + \frac{1}{\log_3 15} = ?$

Yanıt / The Answer is 1

36. $\log_{25} 9 \cdot \log_{27} 16 \cdot \log_4 5 = ?$

Yanıt / The Answer is $\frac{2}{3}$

37. $\frac{1}{2}\cdot\log x - 2\cdot\log y + \frac{1}{3}\cdot\log z = ?$

Yanıt / The Answer is $\log\frac{\sqrt[6]{x^3z^2}}{y^2}$

38. $f(x) = \log_5 x \Rightarrow f^{-1}(x) = ?$

Yanıt / The Answer is 5^x

39. $f(x) = 1 + \log_3(x-2) \Rightarrow f^{-1}(x) = ?$

Yanıt / The Answer is $3^{x-1}+2$

40. $f(x) = \ln(x-2) \Rightarrow f^{-1}(x) = ?$

Yanıt / The Answer is e^x+2

41. $f(x) = \ln\left(\frac{x-5}{3}\right) \Rightarrow f^{-1}(x) = ?$

Yanıt / The Answer is $3 \cdot e^x + 5$

42. $\log a + 3 \cdot \log b - 2 \cdot \log c = ?$

Yanıt / The Answer is $\log\left(\frac{a \cdot b^3}{c^2}\right)$

43. $x = \log_2 12$

$y = \log_5 20$

$z = \log_3 15$

$\Rightarrow ? < ? < ?$

Yanıt / The Answer is $y < z < x$

44. $a = \log_{\frac{1}{4}} 40$

$b = \log_{\frac{1}{3}} 30$

$c = \log_{\frac{1}{2}} 20$

$\Rightarrow ? < ? < ?$

Yanıt / The Answer is $c < b < a$

45. $3^{\log_9 3} = ?$

Yanıt / The Answer is $\sqrt{3}$

46. $4^{\frac{1}{\log_3 4}} = ?$

Yanıt / The Answer is 3

47. $2^{\log_2 7} + e^{\ln 7} = ?$

Yanıt / The Answer is 14

48. $x^{\log_5 3} = 3^{\log_5 4} \Rightarrow x = ?$

Yanıt / The Answer is 4

49. $(\sqrt[3]{2})^{\log_2 27} = ?$

Yanıt / The Answer is 3

50. $3^{2x} + 3^{x+1} - 28 = 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{\log_3 4\}$

51. $(\log x)^2 - \log x^5 + 4 = 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{10, 10^4\}$

52. $e^x - 10 \cdot e^{-x} - 3 = 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{\ln 5\}$

53. $2e^x - 3 \cdot e^{-x} - 5 = 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{\ln 3\}$

54. $\log_5(5x+1) - \log_5(3x+51) = 0 \Rightarrow \log_5 x = ?$

Yanıt / The Answer is 2

55. $\log_3(x+1) = 3 + \log_3 x \Rightarrow x = ?$

Yanıt / The Answer is $\frac{1}{26}$

56. $16^{\log_2 \sqrt{x+1}} = x^3 + x^2 + 2x - 7 \Rightarrow x^3 = ?$

Yanıt / The Answer is 8

57. $f(x) = 8^{\log_2(x-1)} \Rightarrow f(\sqrt[3]{5}+1) = ?$

Yanıt / The Answer is 5

58. $f(x) = \log_3(8x+a)$, $f^{-1}(3) = 5 \Rightarrow a = ?$

Yanıt / The Answer is -13

59. $\log_3(3x-1) + \log_3 2 \geq 3 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left[\frac{29}{6}, \infty\right)$

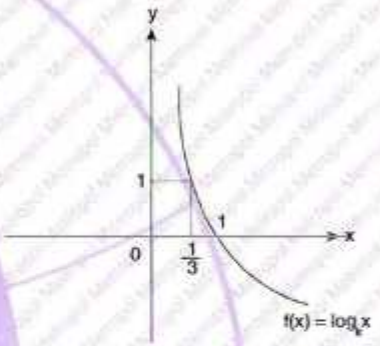
60. $\log_5(2x-4) < 1 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left(2, \frac{9}{2}\right)$

61. $\log 2 = x$,
$\log 3 = y$
$\Rightarrow \log 72 = ?$

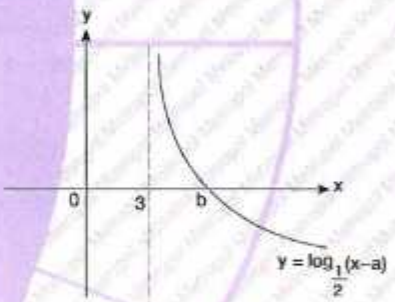
Yanıt / The Answer is $3x + 2y$

62. $f(9) + f^{-1}(-3) = ?$



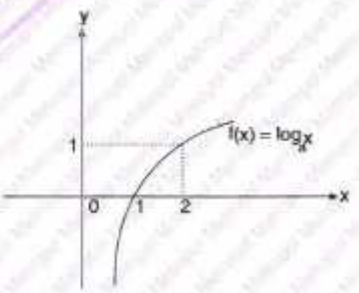
Yanıt / The Answer is 25

63. $a + b = ?$



Yanıt / The Answer is 7

64. $f(16) = ?$



Yanıt / The Answer is 4

1. $\log_2(x-1)=3 \Rightarrow \mathbf{x=?}$

A) 6 B) 7 C) 9 D) 10 E) 12

2. $\log_{\sqrt{2}}32=x \Rightarrow \mathbf{x=?}$

A) 5 B) 6 C) 8 D) 9 E) 10

3. $\log_4 128=a+2 \Rightarrow \mathbf{a=?}$

A) $\frac{1}{2}$ B) $\frac{2}{5}$ C) 1 D) $\frac{3}{2}$ E) 2

4. $\mathbf{\log_2 8+\log_{\sqrt{3}}9=?}$

A) 5 B) 6 C) 7 D) 8 E) 9

5. $\log_{\frac{1}{5}}\left(\frac{x-3}{4}\right)=-2 \Rightarrow \mathbf{x=?}$

A) 96 B) 97 C) 103 D) 106 E) 113

6. $\log_2(\log_2(x+1))=2 \Rightarrow \mathbf{x=?}$

A) 3 B) 7 C) 15 D) 31 E) 63

7. $\log_5(x-2)=2 \Rightarrow \mathbf{\log_3 x=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $\ln(e^{3x-2})=13 \Rightarrow \mathbf{x=?}$

A) 3 B) 4 C) 5 D) 6 E) 8

9. $a = \log_3 25,\ b = \log_2 17,\ c = \log_5 20$

$\Rightarrow\ ? < ? < ?$

A) $a < b < c$ B) $c < a < b$

C) $b < c < a$ D) $a < c < b$

E) $c < b < a$

10. $x = \log_{\frac{1}{2}} 14,\ y = \log_{\frac{1}{4}} 26,\ z = \log_{\frac{1}{16}} 30$

$\Rightarrow\ ? > ? > ?$

A) $z > x > y$ B) $x > y > z$

C) $x > z > y$ D) $z > y > x$

E) $y > z > x$

11. $\dfrac{\log_5 \sqrt{5}}{\log_{\sqrt{7}} 7} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 4

12. $\log_3 81 + \log_5 625 - \log_{10} 0{,}001 = ?$

A) 3 B) 5 C) 8 D) 11 E) 14

13. $\log_2[1 + \log_3(x-2)] = 1 \Rightarrow x = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

14. $\log_3\left[2 - \log_4\left[5 + \log_2\left(3x - \frac{5}{2}\right)\right]\right] = 0 \Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $\log_2\left[4 \cdot \log_5(5 \cdot \log_4(x+7))\right] = 2 \Rightarrow x = ?$

A) 2 B) 1 C) -2 D) -3 E) -4

16. $\log_2\left[\log_3\left(\log_3(x-2)\right)\right] = 0 \Rightarrow x = ?$

A) 25 B) 23 C) 27 D) 29 E) 21

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	E	D	C	C	C	C	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	D	A	D	C	A	D	D

1. $2^x = 7 \Rightarrow \mathbf{x = ?}$

A) $\log_7 2$ B) $\log_2 7$ C) $\log_2 14$ D) $\log_2 49$ E) $\log_7 4$

2. $f(x) = \log_3(2x-7) \Rightarrow \mathbf{f^{-1}(2) = ?}$

A) 3 B) 4 C) 6 D) 8 E) 12

3. $f(x) = \log_5(x-3) \Rightarrow \mathbf{f^{-1}(x) = ?}$

A) -3^x+5 B) -5^x+3 C) 5^x+3 D) 5^{x+3} E) 3^x+5

4. $f(x) = \log_3(5x-1) \Rightarrow \mathbf{f^{-1}(x) = ?}$

A) $\frac{3^x-1}{5}$ B) $\frac{3^x+1}{5}$ C) 3^x D) $\log_5(5x+1)$ E) $\frac{x^5+1}{5}$

5. $f(x) = \log_2(3x-1) \Rightarrow \mathbf{f^{-1}(x) = ?}$

A) 2^x-1 B) $\frac{2^x-1}{3}$ C) $\frac{2^x+1}{3}$ D) $\frac{3^x-1}{2}$ E) $\frac{3^x+1}{2}$

6. $f(x) = 5^{x+1} \Rightarrow \mathbf{f^{-1}(x) = ?}$

A) $\frac{x-1}{5}$ B) $\log_5 x$ C) $1-\log_5 x$ D) $\log_5 x - 1$ E) $5\cdot\log_5 x - 1$

7. $f(x) = 3^{x+2}-2 \Rightarrow \mathbf{f^{-1}(x) = ?}$

A) $-2+\log_3(x+2)$ B) $2-\log_3(x+2)$ C) $\frac{1}{9}\cdot\log_3(x+2)$ D) $\frac{1}{9}\cdot\log_3(x-2)$ E) $2+\log_3(x-2)$

8. $f(x) = 2^{x-3}+1 \Rightarrow \mathbf{f^{-1}(x) = ?}$

A) $-3+\log_2(x-1)$ B) $-3+\log_2(x+1)$ C) $3-\log_2(x-1)$ D) $3-\log(x+1)$ E) $3+\log_2(x-1)$

9. $f(x) = 3^{\ln x} \Rightarrow f^{-1}(x) = ?$

A) $3^{\ln x}$ B) $e^{\log_3 x}$ C) $10^{\log_3 x}$ D) $\ln x + 3$ E) $e^{\log_3 x+1}$

10. $f(x) = \ln(2x+3) - 4 \Rightarrow f^{-1}(x) = ?$

A) $\frac{e^{x-4}-3}{2}$ B) $\frac{e^{x+4}-3}{2}$ C) $\frac{e^{x-4}+3}{2}$ D) $\frac{e^{x+4}-2}{3}$ E) $\frac{e^{x-4}+2}{3}$

11. $\left.\begin{array}{l} f(x) = \log_3 x \\ (fog)(x) = 2x-1 \end{array}\right\} \Rightarrow g(x) = ?$

A) 3^x B) 3^{x-1} C) 3^{2x-1} D) $3^x - 1$ E) $2\cdot 3^x + 1$

12. $f(x) = \log_2 x,$

$(gof)(x) = 2^x + 3 \Rightarrow g(2) = ?$

A) 8 B) 10 C) 12 D) 16 E) 19

13. $f(x) = 3 + \log_3(x+4)$

$\Rightarrow$ ÇK(SS) = ?

A) $(-\infty, -4)$ B) $(-4, 0)$ C) $(-4, \infty)$ D) $(4, \infty)$ E) $R - \{-4\}$

14. $\log_x(6x-8) = 2 \Rightarrow \sum x = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

15. $x \in Z,$

$f(x) = \log_x(25 - x^2) \Rightarrow \sum x = ?$

A) 10 B) 9 C) 8 D) 7 E) 6

16. $f(x) = \ln 4 + \ln e^{2x-1}$

$\Rightarrow f^{-1}(1) = ?$

A) $-\ln 2$ B) $1+\ln 2$ C) $1-\ln 2$ D) $2+\ln 2$ E) $2-\ln 2$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	D	C	B	C	D	A	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	B	C	E	C	C	B	C

1. $x \in Z$,

$f(x) = \log_3\left(\frac{x-5}{x-2}\right) \Rightarrow \sum x = ?$

A) −19 B) −14 C) −8 D) 8 E) 14

2. $x \in Z$,

$f(x) = \log_{(x-2)}(8-x) \Rightarrow \sum x = ?$

A) 21 B) 22 C) 23 D) 24 E) 25

3. $\log_{(x-3)}\left(\frac{x+1}{x-1}\right) \in R \Rightarrow$ **ÇK(SS) = ?**

A) $(1, \infty)$ B) $(1, \infty) - \{4\}$

C) $(3, \infty)$ D) $(3, \infty) - \{4\}$

E) $(1, 3)$

4. $\log\left(\frac{5x-7}{4x+8}\right) = 0 \Rightarrow x = ?$

A) $\frac{7}{5}$ B) $\frac{5}{7}$ C) 5 D) 10 E) 15

5. $\log 2 = x \Rightarrow \log 5 = ?$

A) $1-x$ B) $x-1$ C) x

D) $\frac{x-1}{2}$ E) $2x-1$

6. $\log 125 = x \Rightarrow \log 2 = ?$

A) $3-x$ B) $x-3$ C) $3+x$

D) $\frac{x-3}{3}$ E) $\frac{3-x}{3}$

7. $x \in Z$,

$\log_2(x-5) < 3 \Rightarrow \sum x = ?$

A) 63 B) 65 C) 68 D) 72 E) 78

8. $x \in Z$,

$\log_4 9 + \log_2(x-3) < 5 \Rightarrow \sum x = ?$

A) 60 B) 72 C) 81 D) 85 E) 90

9. $\log_{\frac{1}{3}}(x-4) \geq 2 \Rightarrow$ **ÇK(SS) = ?**

A) $3 < x < 4$ B) $3 < x \leq \frac{35}{9}$ C) $4 < x < \frac{37}{9}$ D) $4 < x \leq \frac{37}{9}$ E) $4 < x \leq \frac{41}{9}$

10. $x \in Z$,

$\log_{\frac{1}{2}}(x+3) \geq -2 \Rightarrow \sum x = ?$

A) -4 B) -2 C) 2 D) 4 E) 6

11. $2 \leq \log_2(x+5) \leq 4 \Rightarrow$ **ÇK(SS) = ?**

A) $(-1, 11)$ B) $(1, 11)$ C) $[-1, 11)$ D) $[-1, 11]$ E) $[-11, 1]$

12. $x \in Z$,

$\log_2(\log_3(x+3)) < 1 \Rightarrow \sum x = ?$

A) 10 B) 12 C) 14 D) 16 E) 18

13. $\log_{0,8}\left(\frac{x-1}{7-x}\right) \leq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(1, 4]$ B) $[1, 7)$ C) $(7, \infty)$ D) $[4, 7)$ E) $(-\infty, 7)$

14. $\log_5(2x-3) - \log_5(-x+6) = 0 \Rightarrow$ **x = ?**

A) 6 B) 5 C) 4 D) 3 E) 2

15. $\log_2(x+4) - \log_2(x+1) = 2 \Rightarrow$ **x = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

16. $\log_3(\log(8x)) - \log_3(\log(10x-1)) = 0 \Rightarrow$ **x = ?**

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	B	D	E	A	E	A	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	B	D	C	D	D	A	A

1. $\log_{81} 729 = ?$

A) 3 B) 3^2 C) $\frac{3}{2}$ D) $\frac{9}{4}$ E) $\frac{27}{8}$

2. $\log_2 (5 \cdot \log_5 \sqrt[5]{25}) = ?$

A) 1 B) 5 C) 10 D) 25 E) 50

3. $\log_5 \frac{1}{125} + \log_{\frac{1}{2}} 32 \cdot \log_9 81 = ?$

A) −26 B) 26 C) 0 D) 13 E) −13

4. $\log_3 \sqrt{27} - \log_4 8 + \log_5 1 = ?$

A) 0 B) 1 C) 3 D) 9 E) 12

5. $\log_a a^{\sqrt[3]{a}} = 3 \Rightarrow a = ?$

A) 3 B) 3^2 C) 3^3 D) 3^4 E) 3^5

6. $a = \log_5 \frac{1}{x}$, $x = 5^2 \Rightarrow \log_2 (14 - a) = ?$

A) 4 B) 8 C) 12 D) 16 E) 20

7. $\log_2 [\log_3 (\log_5 x)] = 2 \Rightarrow \log_{125} x = ?$

A) 27 B) 25 C) 18 D) 36 E) 16

8. $\log_3 x = 0,7\overline{9} \Rightarrow \sqrt{x^5} = ?$

A) 3 B) 9 C) 27 D) 81 E) 117

9. $\log_3 x = \log_{\frac{1}{9}} y \Rightarrow \log_3(x^4 \cdot y^2) = ?$

A) 3 B) 2 C) 1 D) 0 E) −2

10. $a \in R^+$,

$5^a = b$,

$\log_b 625 = a \Rightarrow \log_b 5 = ?$

A) $\frac{1}{12}$ B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) $\frac{1}{2}$ E) 1

11. $y = \log_{125} x$,

$x = \frac{1}{5} \Rightarrow y = ?$

A) $-\frac{1}{18}$ B) $-\frac{1}{9}$ C) $-\frac{1}{3}$ D) −1 E) −2

12. $a^9 = b \Rightarrow \log_b a^{27} = ?$

A) −3 B) 3 C) −6 D) 6 E) 12

13. $\log_6 4 + \log_6 27 + \log_6 2 = ?$

A) 12 B) 9 C) 6 D) 3 E) $\frac{1}{3}$

14. $\log_3 648 - \log_3 8 = a \Rightarrow \log_a 2 = ?$

A) $\frac{1}{16}$ B) $\frac{1}{8}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) $\frac{1}{3}$

15. $\frac{1}{\log_3 60} + \frac{1}{\log_4 60} + \frac{1}{\log_5 60} = ?$

A) 1 B) 3 C) 4 D) 5 E) 6

16. $\log_3 6 - \log_3(x-1) = 2 \Rightarrow x = ?$

A) $\frac{5}{3}$ B) $\frac{5}{2}$ C) $\frac{3}{2}$ D) $\frac{1}{6}$ E) $\frac{3}{4}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	A	E	A	C	A	A	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	D	C	B	D	D	A	A

1. $x = \log_2\left(\frac{3}{2}\right)$, $y = \log_2\left(\frac{32}{3}\right) \Rightarrow$ **x + y = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

2. $\log_5(x-2) + \log_5(x+2) = 1 \Rightarrow$ **ÇK(SS) = ?**

A) {3} B) {4,5} C) {4} D) {5} E) {2,5}

3. $\log_2(5x-2) - \log_2(x+3) = \log_4 16 \Rightarrow$ **x = ?**

A) 8 B) 12 C) 14 D) 16 E) 18

4. $\log(3x-7) - \log(x+1) = 0 \Rightarrow$ **x = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

5. $\frac{1}{\log_2 x} + \frac{1}{\log_4 x} + \frac{1}{\log_8 x} + \dots + \frac{1}{\log_{256} x} = 72$
$\Rightarrow$ **x = ?**

A) $\sqrt{2}$ B) 2 C) $2\sqrt{2}$ D) 4 E) $4\sqrt{2}$

6. $\log_3 x = \log_3 54 + \log_3 12 - \log_3 8 \Rightarrow$ **x = ?**

A) 2 B) 3 C) 9 D) 27 E) 81

7. $\frac{6}{\log_3 90} + \frac{3}{\log_2 90} + \frac{1}{\log_{125} 90} = ?$

A) 1 B) $\frac{3}{2}$ C) 2 D) 3 E) 4

8. $\frac{3}{\log_2 x} - \frac{2}{\log_3 x} + \log_x 9 = 3 \Rightarrow$ **x = ?**

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) 2 D) 3 E) 4

9. $\left.\begin{array}{l}\log_2(x\cdot y)=4\\ \log_2\left(\frac{x}{y}\right)=2\end{array}\right\} \Rightarrow y=?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 8

10. $\left.\begin{array}{l}\log\left(\frac{x}{y}\right)=2\\ \log(x\cdot y)=8\end{array}\right\} \Rightarrow y=?$

A) 10^{-3} B) 10^{-2} C) 10 D) 10^{2} E) 10^{3}

11. $\log_3 4\cdot\log_{16} e^2\cdot\ln 27=?$

A) 1 B) 2 C) 3 D) 4 E) 5

12. $\log_{\sqrt{2}} 9\cdot\log_{125} 16\cdot\log_{\sqrt{3}}\sqrt{5}=?$

A) 24 B) 18 C) 12 D) 6 E) 3

13. $\log_9 2\cdot\log_4 25\cdot\log_5(x+1)=2 \Rightarrow x=?$

A) 63 B) 65 C) 78 D) 80 E) 82

14. $\log_2 5\cdot\log_5 7\cdot\log_7 8=\log_x(5x^2+6x) \Rightarrow x=?$

A) 2 B) 3 C) 4 D) 5 E) 6

15. $\log_3 5=x,\ \log_3 7=y \Rightarrow \log_7 5=?$

A) $\frac{y}{x}$ B) $x\cdot y$ C) $x+y$ D) $x-y$ E) $\frac{x}{y}$

16. $a\in\mathbb{R}^+$,

$\left.\begin{array}{l}\ln(x\cdot y)=a\\ \ln\left(\frac{x}{y}\right)=b\end{array}\right\} \Rightarrow x=?$

A) e B) e^{a+b} C) $2\cdot e^{a+b}$ D) $e^{\frac{a+b}{2}}$ E) $4\cdot e^{a+b}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	A	C	D	A	E	D	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	E	C	C	D	E	E	D

1. $\log 2 = a \Rightarrow \log 25 = ?$

A) $3a + 3$ B) $3a$ C) $3a - 3$ D) $2 - 2a$ E) $2a - 2$

2. $\log 4 = x \Rightarrow \log 25 = ?$

A) $1 - x$ B) $1 + x$ C) $2 - x$ D) $2 + x$ E) $1 + 2x$

3. $\log 4 = a \Rightarrow \log \frac{1}{125} = ?$

A) $3(a - 2)$ B) $\frac{3(a-2)}{2}$ C) $3a - 4$ D) $a - 4$ E) $\frac{a-1}{a+2}$

4. $\log_2 5 = x \Rightarrow \log_{\sqrt{2}} 25 = ?$

A) $\frac{x}{4}$ B) $\frac{x}{2}$ C) x D) $2x$ E) $4x$

5. $\log_6 2 = x \Rightarrow \log_6 3 = ?$

A) $2x$ B) $-1 - x$ C) $1 - x$ D) $x - 1$ E) $1 + x$

6. $\log_3 15 = a \Rightarrow \log_5 75 = ?$

A) $\frac{2a-1}{a-1}$ B) $\frac{2a-3}{a-1}$ C) $\frac{2a-1}{a+1}$ D) $\frac{2a-3}{a+1}$ E) $\frac{2a}{a-1}$

7. $\log_2 3 = a \Rightarrow \log_9 48 = ?$

A) $\frac{4-a}{a}$ B) $\frac{4-a}{2a}$ C) $\frac{4+a}{a}$ D) $\frac{4+a}{2a}$ E) $\frac{6+a}{2a}$

8. $\left.\begin{array}{l}\log_2 3 = a \\ \log_2 5 = b\end{array}\right\} \Rightarrow \log_2 675 = ?$

A) $3a + 2b$ B) $3a + b$ C) $3a - 2b$ D) $3a - b$ E) $2a + 2b$

9. $\left.\begin{array}{l}\log_3 5 = a\\ \log_{25} 8 = b\end{array}\right\} \Rightarrow \log_2 3 = ?$

A) $\frac{2}{3\cdot a\cdot b}$ B) $\frac{3\cdot a\cdot b}{2}$ C) $\frac{3}{2\cdot a\cdot b}$ D) $\frac{2\cdot a\cdot b}{3}$ E) $a\cdot b$

10. $\log_{71} 2 = a \rightarrow \log_2 8! = ?$

A) $\frac{3a+1}{a}$ B) $\frac{2a+1}{a}$ C) $a+3$ D) $3a$ E) $3a+1$

11. $\log 35 = a,\ \log 5 = b \rightarrow \log 7 = ?$

A) $b-a$ B) $a-b$ C) $a+b$ D) $a\cdot b$ E) $\frac{a}{b}$

12. $\left.\begin{array}{l}\log 2 = a\\ \log 11 = b\end{array}\right\} \rightarrow \log_5 484 = ?$

A) $\frac{2(a+b)}{1-a}$ B) $\frac{a+b}{1-b}$ C) $\frac{2b}{a+b}$ D) $\frac{a}{a-b}$ E) $\frac{2a-b}{1+a}$

13. $\log_{12} 36 = a \rightarrow \log_3 2 = ?$

A) $\frac{2+a}{2a+2}$ B) $\frac{2-a}{2a+2}$ C) $\frac{2-a}{2a-2}$ D) $\frac{2+a}{2a}$ E) $\frac{2-a}{2a-1}$

14. $x^{\log 2} + 4\cdot 2^{\log x} = 10$

$\Rightarrow x = ?$

A) 1000 B) 100 C) 10 D) 1 E) $\frac{1}{10}$

15. $\log_5 3 = a,$

$\log_5 2 = b \rightarrow \log_{45} 100 = ?$

A) $\frac{2-2b}{2a}$ B) $\frac{2+2b}{2a}$ C) $\frac{2+2b}{2a+1}$ D) $2-2b$ E) $2+2b$

16. $\log_3 5 = m \Rightarrow \log_9 125 + \log_5 27 = ?$

A) $\frac{m^2+6}{2m}$ B) $\frac{m^2-6}{2m}$ C) $\frac{3m^2-6}{2m}$ D) $\frac{3m^2+6}{2m}$ E) $\frac{m^2+6}{4m}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	C	B	E	C	A	D	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	B	A	C	C	C	D

1. $3 \cdot \log 5 + 2 \cdot \log 2 - 2 \cdot \log\sqrt{5} = ?$

A) 5 B) 2 C) 1 D) −2 E) −5

2. $\log x = 3{,}6 \Rightarrow \sqrt[9]{x^5} = ?$

A) 10 B) 10^3 C) 10^2 D) 10^4 E) 1

3. $\log_5 (625)^{x-2} = 12 \Rightarrow x = ?$

A) −6 B) 6 C) 10 D) −5 E) 5

4. $9^{\log_3 2} = \log_2 (x+9) \Rightarrow x = ?$

A) 3 B) 5 C) 7 D) 9 E) 11

5. $\log_7 125 = a \Rightarrow \log_{49} 625 = ?$

A) $\frac{a}{2}$ B) $\frac{3a}{2}$ C) $\frac{a}{3}$ D) $\frac{2a}{3}$ E) 2a

6. $\log_3 25 \cdot \log_5 e \cdot \ln\sqrt{3} = ?$

A) $\frac{1}{2}$ B) 2 C) 1 D) 3 E) 4

7. $A = \log_4 125 \cdot \log_5 256 - \log_7 27 \cdot \log_3 7$
$\Rightarrow A = ?$

A) 9 B) 18 C) 27 D) 54 E) 81

8. $7^{2 \cdot \log_7 x + \log_7 x} = 125 \Rightarrow x = ?$

A) 14 B) 7 C) −7 D) 5 E) 10

9. $2^{\log_x 3} + 3^{\log_x 2} = 4 \Rightarrow$ **x = ?**

A) $\sqrt{3}$ B) 3 C) −3 D) 9 E) − 9

10. $\log_7 6 = a$

$\Rightarrow$ $\log_7 42 + \log_6 42 - \log_5 625 = ?$

A) $(a-1)^2$ B) $a \cdot (a-1)^2$ C) $\frac{a}{(a-1)^2}$ D) $\frac{(a-1)^2}{a}$ E) a^3

11. $\log \frac{x}{a \cdot b} + \log b - \log x = ?$

A) $-\log x$ B) $-\log b$ C) $-\log(a \cdot b)$ D) $-\log a$ E) $-\log\left(\frac{b}{a}\right)$

12. $\log_5 2 = x \Rightarrow$ **log20 = ?**

A) 2x B) 2x + 1 C) $\frac{x+1}{2x+1}$ D) $\frac{2x-1}{x+1}$ E) $\frac{2x+1}{x+1}$

13. $\log a + 6 \cdot \log \frac{1}{a} = \log 256 - \frac{3}{2} \log a^4 \Rightarrow$ $\log_4 a = ?$

A) 16 B) 32 C) 64 D) 8 E) 4

14. $x \in Z$,

$\log_3 x = 6 \cdot \log_x 3 + 1 \Rightarrow$ **x = ?**

A) 18 B) 3^3 C) −18 D) -3^3 E) 36

15. $\left.\begin{array}{l}\log_3 a = x - 2y \\ \log_3 b = y + 2x\end{array}\right\} \Rightarrow \log_{81} \frac{a}{b} = ?$

A) $-x - 3y$ B) $\frac{-x-3y}{2}$ C) $\frac{-x-3y}{3}$ D) $\frac{-x-3y}{4}$ E) $\frac{-x-3y}{5}$

16. $\log_3(x + y) = \log_3 x - \log_3 y \Rightarrow$ **x = ?**

A) $\frac{-y}{1+y}$ B) $\frac{-y}{1-y}$ C) $\frac{y^2}{1+y}$ D) $\frac{y^2}{1-y}$ E) $\frac{-y^2}{1-y}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	C	E	C	D	C	A	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	D	D	E	E	B	D	D

1. $5^{\log_5 x} + 3^{\log_3 5} = \log_2 256 \Rightarrow \mathbf{x = ?}$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $5^{\log_5(x-2)} + e^{\ln(2x-7)} = x + 7 \Rightarrow \mathbf{x = ?}$

A) 6 B) 7 C) 8 D) 9 E) 10

3. $e^{\log_x 4} + 4^{\log_x e} = 32 \Rightarrow \mathbf{x = ?}$

A) $\sqrt[3]{e}$ B) $\sqrt{e}$ C) e D) e^2 E) e^3

4. $\left.\begin{array}{l}\log_5 4 = a\\ \log_4 9 = b\\ \log_{25} 3 = c\end{array}\right\} \Rightarrow \mathbf{\frac{a \cdot b}{c} = ?}$

A) 1 B) 3 C) 4 D) 6 E) 8

5. $\left.\begin{array}{l}\log(a \cdot b \cdot c^2) = 2\\ \log\left(\frac{a^2 \cdot b}{c}\right) = 3\\ \log\left(\frac{b}{c}\right) = 4\end{array}\right\} \Rightarrow \mathbf{a \cdot b = ?}$

A) 10^2 B) 10^3 C) 10^6 D) 10^7 E) 10^{12}

6. $\left.\begin{array}{l}\log(x \cdot y) = 2\\ \log(y \cdot z) = 1\\ \log(x \cdot z) = 0\end{array}\right\} \Rightarrow \mathbf{\log(x^2 \cdot y^2 \cdot z^2)^4 = ?}$

A) 4 B) 8 C) 12 D) 16 E) 18

7. $\left.\begin{array}{l}e^x = 12\\ e^y = 4\end{array}\right\} \Rightarrow \mathbf{x + y = ?}$

A) ln4 B) ln12 C) ln24 D) ln36 E) ln48

8. $\ln^2 x - \ln x - 2 = 0 \Rightarrow \prod \mathbf{x = ?}$

A) e^3 B) e^2 C) e D) $\frac{1}{e}$ E) 1

9. $e^{2x} - e^{x} - 6 = 0 \Rightarrow$ **ÇK(SS) = ?**

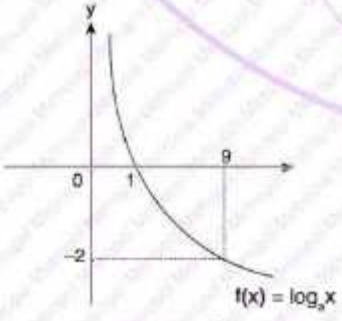
A) {ln2} B) {ln3} C) {ln2, ln3} D) {ln6} E) ∅

10. $x^{\log_2 x} = 32x^4$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow x_1 \cdot x_2 = ?$

A) 4 B) 8 C) 16 D) 32 E) 64

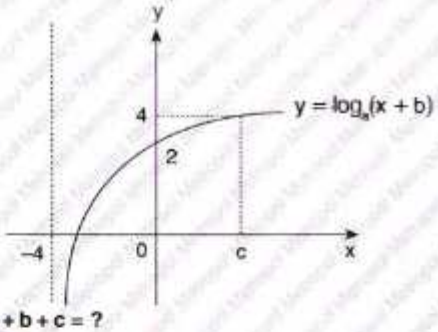
11.



$\Rightarrow a = ?$

A) 9 B) 3 C) $\frac{1}{3}$ D) $\frac{1}{\sqrt{3}}$ E) $\frac{1}{9}$

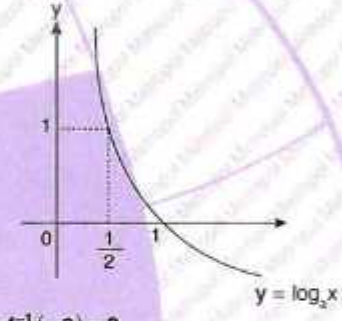
12.



$\Rightarrow a + b + c = ?$

A) 18 B) 16 C) 14 D) 12 E) 10

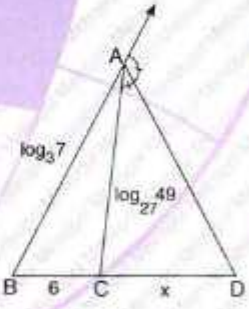
13.



$\Rightarrow f(2) + f^{-1}(-2) = ?$

A) 3 B) 4 C) 5 D) −3 E) −4

14.



$\Rightarrow x = ?$ br/u

A) 9 B) 12 C) 15 D) 18 E) 21

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1	2	3	4	5	6	7
C	C	B	C	B	B	E
8	**9**	**10**	**11**	**12**	**13**	**14**
C	B	C	C	A	A	B

1. $\log_2 x + \log_2 (x-1) = 1 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-1, 2\}$ B) $\{-1\}$ C) $\{2\}$ D) $\varnothing$ E) R

2. $e^x - 12 \cdot e^{-x} + 1 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-3, 4\}$ B) $\{-4, 3\}$ C) $\{\ln 4\}$ D) $\{\ln 3\}$ E) $\{\ln 3, \ln 4\}$

3. $e^{-2\ln x} - e^{-\ln x} - 2 = 0 \Rightarrow \sum x = ?$

A) $\frac{3}{2}$ B) $\frac{3}{4}$ C) $\frac{1}{2}$ D) 0 E) $-\frac{1}{2}$

4. $(\ln x)^2 - 2\ln x - 15 = 0 \Rightarrow \prod x = ?$

A) e^{-3} B) e^{-2} C) 1 D) e^2 E) e^3

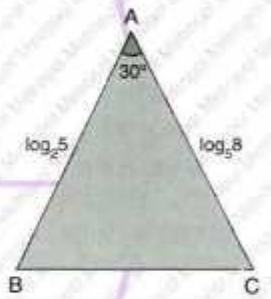
5. $x^{\log_3 x} - 9^2 = 0 \Rightarrow \prod x = ?$

A) 9 B) 1 C) $\frac{1}{3}$ D) $\frac{1}{9}$ E) $\frac{1}{81}$

6. $x^{\ln x} = e^{\ln x + 2} \Rightarrow$ **ÇK(SS) = ?**

A) $\{e^{-1}, e^2\}$ B) $\{e^{-2}, e^2\}$ C) $\{e^2\}$ D) $\{e^{-2}, e^{-1}\}$ E) $\{e^{-1}\}$

7. $A(\widehat{ABC}) = ?$



A) $\frac{1}{2}$

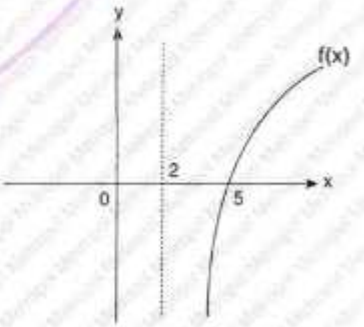
B) 1

C) $\frac{3}{2}$

D) $\frac{1}{4}$

E) $\frac{3}{4}$

8. **f(x) = ?**



A) $-1 + \log_3(x-2)$ B) $-1 + \log_2(x-2)$

C) $1 + \log_2(x-2)$ D) $1 + \log_3(x-2)$

E) $1 + \log_3(x+2)$

9. $f(x) = \log_a(x + b)$

$\Rightarrow$ **a = ?**

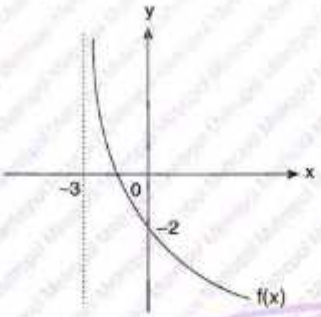
A) $\frac{1}{\sqrt{3}}$

B) $\frac{1}{\sqrt{2}}$

C) $\frac{1}{2}$

D) $\frac{1}{3}$

E) $\frac{1}{4}$



10. **y = f(x) = ?**

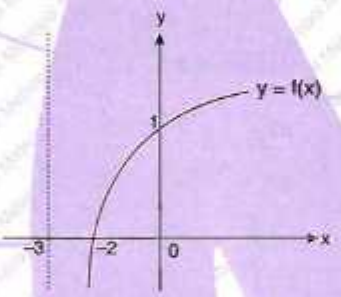
A) $\log_3 (x + 3)$

B) $\log_6 (x + 2)$

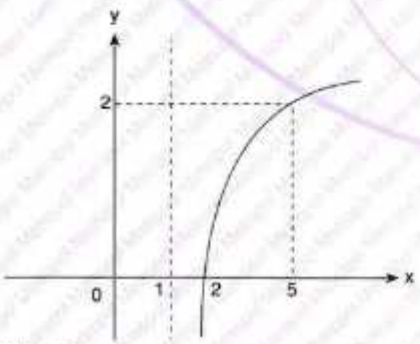
C) $\log_6 (x + 3)$

D) $\log_2 (x + 3)$

E) $\log_2 (x + 2)$



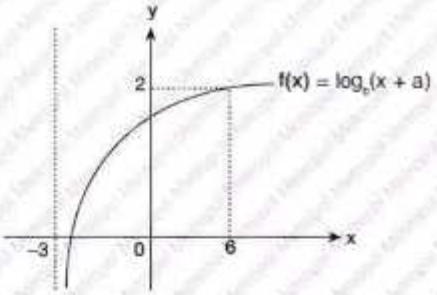
11.



$\Rightarrow$ **f (17) = ?**

A) 3 B) 4 C) 5 D) 6 E) 7

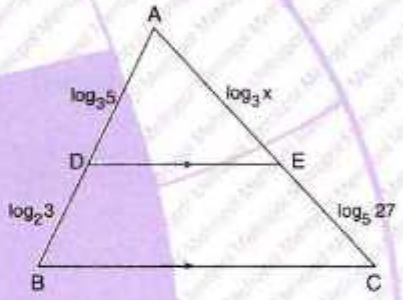
12.



$\Rightarrow$ **f(24) = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

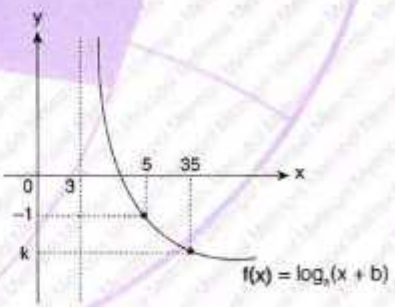
13.



$[DE] \parallel [BC] \Rightarrow$ **x = ?**

A) 12 B) 10 C) 8 D) 6 E) 4

14.



$\Rightarrow$ **k = ?**

A) –3 B) –4 C) –5 D) –6 E) –7

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1	2	3	4	5	6	7
C	D	C	D	B	A	E
8	**9**	**10**	**11**	**12**	**13**	**14**
A	A	A	B	C	C	C

1. $\log_2(\log x + \log y) = 1 \Rightarrow \mathbf{x \cdot y = ?}$

A) 10^2 B) 10^{-2} C) 10 D) 10^{-1} E) 10^3

2. $\log_3(x^2 - x) - \log_3 x = 1 \Rightarrow \mathbf{x = ?}$

A) 4 B) 5 C) 6 D) 36 E) 64

3. $\left.\begin{array}{l} a = \log_3 5 \\ b = \log_9 7 \\ c = \log_3 3 \end{array}\right\} \Rightarrow \mathbf{? < ? < ?}$

A) $a < b < c$ B) $a < c < b$
C) $b < c < a$ D) $c < b < a$
E) $c < a < b$

4. $2 \cdot \log_3 x + 3 \cdot \log_3 x^2 + 4 \cdot \log_3 x^3 = 60 \Rightarrow \mathbf{\log_9 x^3 = ?}$

A) $-\frac{9}{2}$ B) $\frac{9}{2}$ C) 9 D) $\frac{3}{2}$ E) 6

5. $\log_6 3 = a \Rightarrow \mathbf{\log_3 24 = ?}$

A) $3 + 2a$ B) $3 - 2a$
C) $a \cdot (2a + 3)$ D) $\frac{2a+3}{a}$
E) $\frac{3-2a}{a}$

6. $\left.\begin{array}{l} a = \log 156 \\ b = \log 2 \\ c = \log 3 \end{array}\right\} \Rightarrow \mathbf{\log 13 = ?}$

A) $a + 2b + c$ B) $a - 2b + c$
C) $a + 2b - c$ D) $a - 2b - c$
E) $-a - 2b - c$

7. $\log_4(x^2 - x - 6) - \log_4(x - 3) = 2 \Rightarrow \mathbf{x = ?}$

A) 7 B) 14 C) 21 D) 28 E) 35

8. $\log_2(x + 3) + \log_2(x + 11) = 7 \Rightarrow \mathbf{ÇK(SS) = ?}$

A) $\{7\}$ B) $\{5\}$ C) $\{3\}$ D) $\{2\}$ E) $\{0\}$

9. $\ln x - 2\sqrt{\ln x} - 15 = 0 \Rightarrow x = ?$

A) e B) e^5 C) e^{10} D) e^{15} E) e^{25}

10. $(\log x)^2 - \log x - 2 = 0$

$\Rightarrow \sum x = ?$

A) 95 B) 95,1 C) 100 D) 100,1 E) 101

11. $\ln x^2 + \log_x e^3 = 5$, ÇK(SS) $= \{x_1, x_2\}$

$\Rightarrow x_1 \cdot x_2 = ?$

A) e B) e^2 C) $e^{\frac{5}{2}}$ D) e^3 E) $e^{\frac{7}{2}}$

12. $(\log_5 x)^2 - 2\log_5 x - 3 = 0$, ÇK(SS) $= \{x_1, x_2\}$

$\Rightarrow x_1 \cdot x_2 = ?$

A) 100 B) 75 C) 50 D) 25 E) 1

13. $e^{2x} - 12e^x + 27 = 0$

$\Rightarrow x_1 + x_2 = ?$

A) ln27 B) ln9 C) ln3 D) 0 E) −ln27

14. $x \in Z$,

$\log_{\frac{1}{3}}(x-2) - \log_{\frac{1}{3}} 2 \geq -2 \Rightarrow \sum x = ?$

A) 197 B) 203 C) 207 D) 211 E) 217

15. $\log_{\frac{1}{3}}(\log_3(x-1)) > -1$,

$x \in Z \Rightarrow \sum x = ?$

A) 378 B) 377 C) 376 D) 375 E) 374

16. $|3 - \log_5(x-1)| = 2$

$\Rightarrow \sum x = ?$

A) 3101 B) 3130 C) 3132 D) 3135 E) 3138

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	A	C	B	E	D	B	B
9	10	11	12	13	14	15	16
E	D	C	D	A	C	D	C

1. $f(x) = \log_{(x-2)}(5 - |x-3|)$

$\Rightarrow \sum x = ?$

A) 22 B) 24 C) 26 D) 28 E) 30

2. $f(x) = \sqrt{3^{\arcsin x}}$

$\Rightarrow f^{-1}(x) = ?$

A) $\log_3(2\sin x)$ B) $\sin(\log_3 x)$ C) $\sin(2\cdot\log_3 x)$ D) $\sin^2(\log_3 x)$ E) $\sin(\log_3 2x)$

3. $\log(a^2 + 3b^2) = \log b + \frac{1}{2}\cdot\log 12 + \log a$

$\Rightarrow b = ?$

A) $\frac{a}{2}$ B) $2a$ C) $3a$ D) $\frac{a}{\sqrt{3}}$ E) $\sqrt{3}\cdot a$

4. $10^{x-2} = 5^{x-1} \Rightarrow 20^{\frac{x+2}{x}} = ?$

A) 20 B) 40 C) 60 D) 80 E) 160

5. $3\cdot\log_{(5-2\sqrt{3})}\frac{(5+2\sqrt{3})}{13} + 2\cdot\log_{(6+2\sqrt{7})}\frac{(6-2\sqrt{7})}{8} = ?$

A) -5 B) -3 C) 2 D) 1 E) 5

6. $x \in [0, 2\pi]$,

$f(x) = x + \log_x(\cos x) \Rightarrow$ ÇK(SS) = ?

A) $\left(0, \frac{\pi}{2}\right)$ B) $\left(0, \frac{\pi}{2}\right) - \{1\}$ C) $\left(0, \frac{\pi}{2}\right) \cup \left(\frac{3\pi}{2}, 2\pi\right)$ D) $\left[\left(0, \frac{\pi}{2}\right) - \{1\}\right] \cup \left(\frac{3\pi}{2}, 2\pi\right]$ E) $\left(\frac{3\pi}{2}, 2\pi\right)$

7. $\log_{a+b}(a-b) - \log_{a-b}(a+b) = 0$

$\Rightarrow a^2 - b^2 = ?$

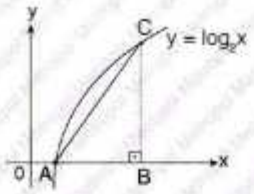
A) 0 B) 1 C) -1 D) $a+b$ E) $a-b$

8. $\log_4(\sin^2 x) - \log_4(\cos^2 x) = \frac{1}{2}$

$\Rightarrow \frac{\sec x\cdot\tan x}{\cot x} = ?$

A) -2 B) $-2\sqrt{3}$ C) $-\sqrt{3}$ D) $\sqrt{3}$ E) $2\sqrt{3}$

9.



$A(\widehat{ABC}) = 30\ br^2/u^2$

$\Rightarrow C(x_0, y_0) = ?$

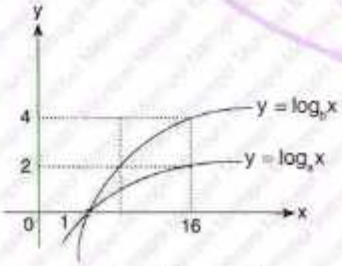
A) (15,3) B) (16,4) C) (18,6) D) (25,5) E) (64,8)

10. $\log_3 x = a,\ \log_3 y = b,\ \log_3 z = c$

$\Rightarrow \log_3\left(\dfrac{x^3\sqrt{y}}{z^2}\right) = ?$

A) $3a + b - 3c$ B) $a + \frac{b}{2} - 2c$ C) $3a + \frac{b}{2} - 2c$ D) $3a + \frac{b}{2} + 2c$ E) $3a - \frac{b}{2} - 2c$

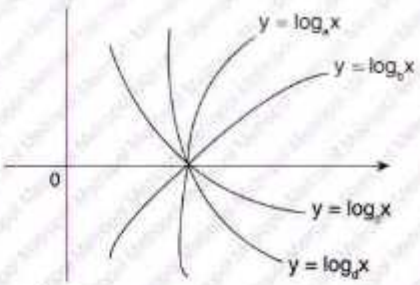
11.



$\Rightarrow a + b = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

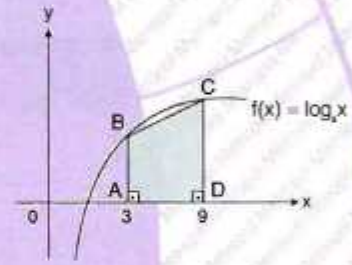
12.



$\Rightarrow ? > ? > ? > ?$

A) $a > b > d > c$ B) $b > a > c > d$ C) $a > b > c > d$ D) $b > c > d > a$ E) $b > a > d > c$

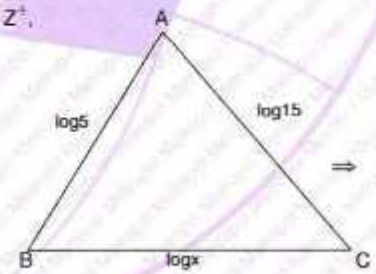
13.



$A(ABCD) = 9\ br^2/u^2 \Rightarrow f(a^2 + 6a) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $x \in Z^+$,



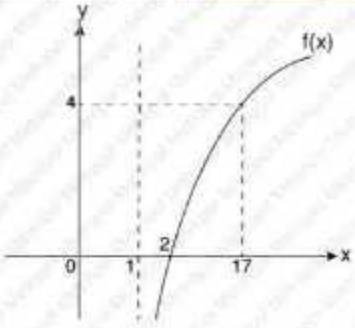
$\Rightarrow \prod x = ?$

A) 74! B) $\frac{74!}{2!}$ C) $\frac{74!}{3!}$ D) 75! E) $\frac{75!}{3!}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
A	C	D	D	A	D	B
8	**9**	**10**	**11**	**12**	**13**	**14**
E	B	C	C	E	C	C

1.



Şekilde $f(x) = \log_a(x + b)$ fonksiyonunun grafiği verilmiştir.

Buna göre $f\left(\frac{3}{2}\right) = ?$

The graph of function $f(x) = \log_a(x + b)$ is given in the figure.

Accordingly, $f\left(\frac{3}{2}\right) = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

2. $\log_{10}x = 0{,}64$

$\Rightarrow \sqrt[8]{x^{25}} = ?$

A) 64 B) 96 C) 100 D) 112 E) 128

[İSTANBUL ÜNİVERSİTESİ – YÖS 2019]

3. $\log_{ab}a = \frac{1}{3} \Rightarrow \log_{\frac{a}{b}}b = ?$

A) 1 B) 2 C) 3 D) −3 E) −2

[AKDENİZ ÜNİVERSİTESİ – YÖS 2019]

4. $x > 1$

$x = \log_{x^{\frac{1}{17}}}x^{-19}$

$y = \log_{x^{-17}}x^{19}$

$z = \log_{x^{19}}x^{-17}$

Aşağıdaki sıralamalardan hangisi doğrudur?

Which of the following orders is correct?

A) $y > z > x$ B) $x > z > y$ C) $x > y > z$ D) $z > y > x$ E) $z > x > y$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

5. $\log_x(1 + \log_x 8) = 2 \Rightarrow x = ?$

A) 4 B) 3 C) 2 D) −2 E) −3

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

6. $\frac{\log 8 + 3}{\log 20} = ?$

A) 3 B) 2 C) 1 D) −1 E) −2

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2019]

7. $\log_2 a + \log_8 8a = \frac{11}{3}$

$\Rightarrow a = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

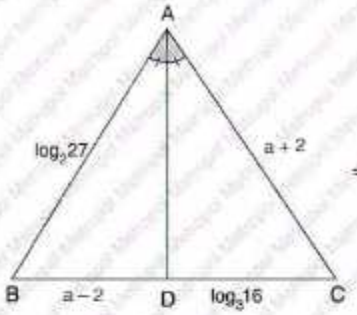
[ANKARA ÜNİVERSİTESİ – YÖS 2018]

8. $\log 5 = x \Rightarrow \frac{\log_3 10}{\log_3 2} = ?$

A) $1 - x$ B) $\frac{1}{1-x}$ C) $x - 1$ D) $\frac{3}{1-x}$ E) $\frac{3}{x-1}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2018]

9.



$\Rightarrow$ **a = ?**

A) 3 B) 4 C) 5 D) 6 E) 7

[İSTANBUL ÜNİVERSİTESİ – YÖS 2018]

10. $\log_2 7 = x \Rightarrow \log_7 14 = ?$

A) $x+1$ B) $\frac{x-1}{x}$ C) $\frac{1}{x+1}$ D) $\frac{x}{x+1}$ E) $\frac{x+1}{x}$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

11. $f(x) = \log_5 e^{\frac{3}{x}} \Rightarrow f^{-1}(-3) = ?$

A) $\frac{1}{\ln 5}$ B) $\frac{3}{\ln 5}$ C) 1 D) $-\frac{1}{\ln 5}$ E) $-\frac{3}{\ln 5}$

[FIRAT ÜNİVERSİTESİ – YÖS 2018]

12. $\ln a + \ln b = 4$

$\ln a - \ln b = 2 \Rightarrow \log_a b = ?$

A) $\frac{1}{2}$ B) 2 C) 1 D) $\frac{1}{3}$ E) $\frac{3}{2}$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

13. $a, b \in R^+$,

$\log_4 a + \log_2 b = \frac{5}{2}$,

$\log_4 b - \log_2 a = \frac{1}{2}$

$\Rightarrow a^3 \cdot b = ?$

A) 2 B) 8 C) 6 D) 16 E) 3

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

14. $\log_2 x = 5,\ \log_{\sqrt{3}} y = 4 \Rightarrow x + 2y = ?$

A) 50 B) 41 C) 22 D) 78 E) 113

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2018]

15. $\left.\begin{array}{l}\log_a b = 2\\ \log_b c = 3\\ \log_c d = 4\end{array}\right\} \Rightarrow \log_a(a \cdot b \cdot c \cdot d) = ?$

A) 26 B) 27 C) 29 D) 30 E) 33

[EGE ÜNİVERSİTESİ – YÖS 2016]

16. $\frac{\log_x 8}{\log_y 3} \cdot \frac{\log_y\left(\frac{1}{9}\right)}{\log_x\left(\frac{1}{2}\right)} = ?$

A) $\frac{\log_x 4}{\log_y 3}$ B) 3 C) -4 D) 6 E) $(\log_x 2)\cdot(\log_y 4)$

[YIDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2015]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	C	E	B	C	A	C	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	E	D	D	D	A	E	D

BÖLÜM CHAPTER 9

TARİHSEL NOT / HISTORICAL NOTE

BLAİSE PASCAL [1623 - 1662]

Fransız matematikçi, fizikçi ve düşünürdür. Pascal hayatı boyunca matematiği etkilemeye devam etmiştir. Pascal'ın 1653 yılındaki Traité du triangle arithmétique diye geçen Aritmetik üçgen üzerinde incelemesi, binom çarpanlarını uygun bir tablo halinde tanıtmıştır (Pascal üçgeni).

French mathematician, physicist and thinker. Pascal continued to influence mathematics throughout his life. Pascal's study of the Arithmetic triangle, called "Traité du triangle arithmétique" in 1653, introduced binomial factors as an appropriate table (Pascal's triangle).

TÜMEVARIM, DİZİLER VE SERİLER
INDUCTION, SEQUENCES and SERIES

Bu bölüm 80 alıştırma sorusu, 188 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 80 exercise questions, 188 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 9

TÜMEVARIM, DİZİLER VE SERİLER / INDUCTION, SEQUENCES and SERIES

1. $\sum_{k=1}^{5} 2 = ?$

Yanıt / The Answer is 10

2. $\sum_{k=1}^{10} m = 200 \Rightarrow m = ?$

Yanıt / The Answer is 20

3. $\sum_{k=1}^{6} k = ?$

Yanıt / The Answer is 21

4. $\sum_{k=-4}^{6} 5 = ?$

Yanıt / The Answer is 55

5. $\sum_{k=-2}^{3} k = ?$

Yanıt / The Answer is 3

6. $\sum_{k=-5}^{6} 2k = ?$

Yanıt / The Answer is 12

7. $\sum_{n=1}^{10} (n^2 - 3n - 4) = ?$

Yanıt / The Answer is 180

8. $\sum_{i=1}^{6} (xi + 2) = 75 \Rightarrow x = ?$

Yanıt / The Answer is 3

9. $\sum_{k=-2}^{6} (7k-1) = ?$

Yanıt / The Answer is 117

10. $\sum_{k=-2}^{4} (5-xk) = 49 \Rightarrow x = ?$

Yanıt / The Answer is -2

11. $\sum_{k=1}^{10} k \cdot (k+1) = ?$

Yanıt / The Answer is 440

12. $\sum_{k=0}^{8} (k+1)^2 = ?$

Yanıt / The Answer is 285

13. $\sum_{k=4}^{123} \log_5\left(\frac{k+2}{k+1}\right) = ?$

Yanıt / The Answer is 2

14. $13 + 15 + 17 + ... + 91 = ?$

Yanıt / The Answer is $\sum_{k=7}^{45} (2k-1)$

15. $(-28) + (-26) + ... + 0 + ... + 26 + 28 = ?$

Yanıt / The Answer is $\sum_{k=-14}^{14} 2k$

16. $\sum_{m=-2}^{5} (3m+k) = 124 \Rightarrow k = ?$

Yanıt / The Answer is 11

17. $x_1 = 2,\ x_2 = -3$

$\Rightarrow \sum_{k=1}^{2} x_k = ?$

Yanıt / The Answer is **−1**

18. $f(x) = 5x + 6 \Rightarrow \sum_{k=1}^{3} f(k) = ?$

Yanıt / The Answer is **48**

19. $\sum_{k=1}^{3} \sum_{n=1}^{4} (3n - 2k) = ?$

Yanıt / The Answer is **42**

20. $\sum_{k=1}^{4} \sum_{p=1}^{3} \sum_{t=1}^{2} (k \cdot p \cdot t) = ?$

Yanıt / The Answer is **180**

21. $f(x) = x^2 - 5x + 6,\ f(x_1) = f(x_2) = 0$

$\Rightarrow \sum_{k=1}^{2} (x_k + 1)\ (x_k + 2) = ?$

Yanıt / The Answer is **32**

22. $\sum_{k=1}^{5} \left(\frac{1}{k} - \frac{1}{k+1}\right) = ?$

Yanıt / The Answer is $\frac{5}{6}$

23. $\sum_{k=1}^{5} (-1)^k \cdot (k+1) = ?$

Yanıt / The Answer is **−4**

24. $\sum_{k=0}^{250} k! = A,\quad \begin{array}{r|l} A & 30 \\ \hline - & \\ \hline m & \end{array} \Rightarrow m = ?$

Yanıt / The Answer is **4**

25. $f(x)=\sum_{k=1}^{x} k!,\ g(x)=\sum_{k=1}^{x}(k+1)$

$\Rightarrow (gof)(2)=?$

Yanıt / The Answer is 9

26. $\sum_{p=0}^{7}\binom{7}{p}=?$

Yanıt / The Answer is 2^7

27. $\prod_{k=1}^{6} 2=?$

Yanıt / The Answer is 2^6

28. $\prod_{k=0}^{12} 4=?$

Yanıt / The Answer is 2^{26}

29. $\prod_{k=1}^{10} k=?$

Yanıt / The Answer is 10!

30. $\prod_{k=10}^{25} k=?$

Yanıt / The Answer is $\frac{25!}{9!}$

31. $\prod_{k=1}^{8}(k^2+k)=?$

Yanıt / The Answer is 8! · 9!

32. $\prod_{k=1}^{17}\frac{k}{k+1}=?$

Yanıt / The Answer is $\frac{1}{18}$

33. $\prod_{k=1}^{6}(k^2-k-6)=?$

Yanıt / The Answer is 0

34. $\prod_{k=1}^{11}(2k^2-7k-4)=?$

Yanıt / The Answer is 0

35. $\prod_{k=2}^{5}2^{k-2}=?$

Yanıt / The Answer is 64

36. $\prod_{m=-1}^{5}2^{m+1}=?$

Yanıt / The Answer is 2^{21}

37. $\prod_{k=1}^{30}\log_{(k+1)}(k+2)=?$

Yanıt / The Answer is 5

38. $\prod_{k=5}^{12}\left(1+\frac{1}{k}\right)=?$

Yanıt / The Answer is $\frac{13}{5}$

39. $\prod_{k=1}^{n}5^{\frac{k}{3}}=5^5 \Rightarrow n=?$

Yanıt / The Answer is 5

40. $\prod_{k=1}^{5}2^{2k-1}=2^x \Rightarrow x=?$

Yanıt / The Answer is 25

41. $\prod_{n=1}^{2} \sum_{m=1}^{4} (m+n) = ?$

Yanıt / The Answer is 252

42. $\sum_{k=1}^{5} \prod_{m=1}^{2} (m+k) = ?$

Yanıt / The Answer is 110

43. $\prod_{k=1}^{10} \left(1+\frac{1}{k+2}\right) = ?$

Yanıt / The Answer is $\frac{13}{3}$

44. $\prod_{k=1}^{20} \left(1+\frac{1}{k+1}\right)^2 = ?$

Yanıt / The Answer is 121

45. $\prod_{k=1}^{15} \left(1+\frac{2k+1}{k^2}\right) = ?$

Yanıt / The Answer is 256

46. $\prod_{k=1}^{20} \left(1+\frac{2}{k}+\frac{1}{k^2}\right) = ?$

Yanıt / The Answer is 441

47. $\prod_{k=1}^{4} (3k+1) \equiv x \pmod{91} \Rightarrow x = ?$

Yanıt / The Answer is 0

48. $f: N^+ \to N^+$,

$f(x) = \prod_{n=1}^{x} 2^n \Rightarrow (fof)(2) = ?$

Yanıt / The Answer is 2^{36}

49. $(a_n) = (4n+5) \Rightarrow a_2 + a_4 = ?$

Yanıt / The Answer is 34

50. $(a_n) = (n^2 + 8n + 16) \Rightarrow a_9 = ?$

Yanıt / The Answer is 169

51. $(a_n) = \left(\sum_{k=1}^{n} (2k-1)\right) \Rightarrow a_8 = ?$

Yanıt / The Answer is 64

52. $(a_n) = \left(\frac{2^n}{n!}\right) \Rightarrow \frac{a_6}{a_4} = ?$

Yanıt / The Answer is $\frac{2}{15}$

53. $(a_n) = \left(\frac{1}{n} + \frac{3}{n} + \frac{5}{n} + \ldots + \frac{2n-1}{n}\right)$
$\Rightarrow a_{10} = ?$

Yanıt / The Answer is 10

54. $(a_n) = (3n-1),\ a_k = 20 \Rightarrow k = ?$

Yanıt / The Answer is 7

55. $(a_n) = \left(\frac{5n+4}{2n-5}\right),\ a_k = 8 \Rightarrow k = ?$

Yanıt / The Answer is 4

56. $(a_n) = \begin{cases} n-1, & n \equiv 0 \pmod 2 \\ -n^2, & n \equiv 1 \pmod 2 \end{cases} \Rightarrow a_6 + a_7 = ?$

Yanıt / The Answer is −44

57. $(a_n)=\begin{cases} n^2-1, & n\equiv 0 \pmod 3 \\ \dfrac{2n-1}{2}, & n\equiv 1 \pmod 3 \\ -n, & n\equiv 2 \pmod 3 \end{cases} \Rightarrow a_3+a_7+a_{11}=?$

Yanıt / The Answer is $\frac{7}{2}$

58. $(a_n)=\begin{cases} 2n+1, & n\equiv 0 \pmod 3 \\ 2, & n\equiv 1 \pmod 3 \\ 3n, & n\equiv 2 \pmod 3 \end{cases} \Rightarrow a_7+a_8+a_9=?$

Yanıt / The Answer is 45

59. $(a_n)=\left(\sum_{k=1}^{n} 2k\right) \Rightarrow a_4=?$

Yanıt / The Answer is 20

60. $(a_n)=\left(\sum_{k=1}^{n} k^2\right) \Rightarrow a_5=?$

Yanıt / The Answer is 91

61. $(a_n)=(3n+7) \Rightarrow (a_{n+1})=?$

Yanıt / The Answer is $(3n+10)$

62. $(a_{n+1})=(5n-2) \Rightarrow (a_n)=?$

Yanıt / The Answer is $(5n-7)$

63. $(a_n)=\left(\frac{2n-1}{n+3}\right) \Rightarrow (a_{2n-1})=?$

Yanıt / The Answer is $\left(\frac{4n-3}{2n+2}\right)$

64. $(a_{2n+1})=(4n^2+4n+1) \Rightarrow (a_n)=?$

Yanıt / The Answer is (n^2)

65. $\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^{n-1} = ?$

Yanıt / The Answer is 2

66. $\sum_{n=0}^{\infty}\left(\frac{5}{2}\right)^{-n} = ?$

Yanıt / The Answer is $\frac{5}{3}$

67. $\sum_{n=1}^{\infty}3^{-n+1} = ?$

Yanıt / The Answer is $\frac{3}{2}$

68. $\sum_{n=2}^{\infty}\left(\frac{4}{3}\right)^{-n+1} = ?$

Yanıt / The Answer is 3

69. $\sum_{n=1}^{\infty}\left(\frac{3}{7}\right)^{n-1} = ?$

Yanıt / The Answer is $\frac{7}{4}$

70. $\sum_{k=1}^{\infty}5^{-k} = ?$

Yanıt / The Answer is $\frac{1}{4}$

71. $\sum_{n=0}^{\infty}3^{-2n} = ?$

Yanıt / The Answer is $\frac{9}{8}$

72. $\sum_{n=1}^{\infty}\frac{2^{n+1}}{5^{n}} = ?$

Yanıt / The Answer is $\frac{4}{3}$

73. $\sum_{n=0}^{\infty}(2^{-n}+4^{-n})=?$

Yanıt / The Answer is $\frac{10}{3}$

74. $\sum_{n=2}^{\infty}(1,25)^{-n}=?$

Yanıt / The Answer is $\frac{16}{5}$

75. $\prod_{n=1}^{\infty}3^{\left(\frac{1}{3}\right)^n}=?$

Yanıt / The Answer is $\sqrt{3}$

76. $0,3+0,03+0,003+...=?$

Yanıt / The Answer is $\frac{1}{3}$

77. $0,36+0,0036+0,000036+...=?$

Yanıt / The Answer is $\frac{4}{11}$

78. $\sum_{n=1}^{\infty}\frac{1-3^n}{5^n}=?$

Yanıt / The Answer is $-\frac{5}{4}$

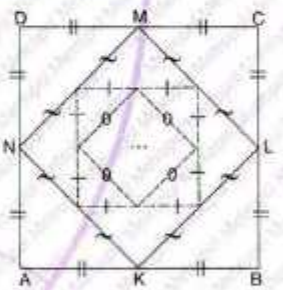
79. ABCD bir karedir.

ABCD is a square.

|AB| = 10 cm

⇒ **Toplam alan /**

The total area = ? br² / u²



Yanıt / The Answer is 200

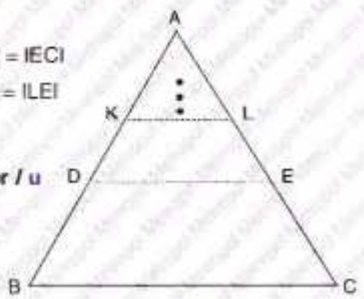
80. |AB| = |AC| = |BC| = 6

|AD| = |DB| ve / and |AE| = |EC|

|AK| = |KD| ve / and |AL| = |LE|

⇒ **Toplam çevre /**

The total perimeter = ? br / u



Yanıt / The Answer is 36

1. $\sum_{k=1}^{20} k = ?$

A) 150 B) 170 C) 190 D) 210 E) 230

2. $\sum_{k=1}^{n} (-k) = -28 \Rightarrow n = ?$

A) 7 B) 6 C) 5 D) 4 E) 3

3. $\sum_{k=1}^{16} (2k+3) = ?$

A) 306 B) 312 C) 314 D) 318 E) 320

4. $\sum_{k=1}^{15} (2-k) = ?$

A) −120 B) −90 C) −68 D) −60 E) −44

5. $\sum_{k=5}^{17} (7k-5) = ?$

A) 930 B) 936 C) 946 D) 954 E) 962

6. $\sum_{k=2}^{12} (2k+1) = ?$

A) 165 B) 160 C) 145 D) 140 E) 115

7. $\sum_{n=1}^{20} (n+2) = ?$

A) 250 B) 332 C) 420 D) 432 E) 440

8. $\sum_{n=1}^{20} (2+na) = 70 \Rightarrow a = ?$

A) $\frac{1}{5}$ B) $\frac{1}{6}$ C) $\frac{1}{7}$ D) $\frac{1}{8}$ E) $\frac{1}{9}$

9. $\sum_{k=7}^{n}(k+3)=46 \Rightarrow n=?$

A) 7 B) 9 C) 10 D) 12 E) 14

10. $\sum_{k=0}^{5}(2ak-5)=60 \Rightarrow a=?$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $\sum_{k=1}^{3}3\cdot(-k^2)=?$

A) −12 B) −22 C) −32 D) −42 E) −52

12. $\sum_{k=0}^{8}(k^2-1)=?$

A) 194 B) 195 C) 204 D) 210 E) 215

13. $\sum_{k=1}^{10}(k^2+3k+1)=?$

A) 550 B) 555 C) 560 D) 565 E) 570

14. $\sum_{k=1}^{12}k^3=?$

A) 3042 B) 6084 C) 4042 D) 6082 E) 6086

15. $\sum_{k=-9}^{10}(k^3-k)=?$

A) 1010 B) 990 C) 910 D) 900 E) 890

16. $1+4+7+10+...+130=?$

A) $\sum_{k=1}^{15}k^2$ B) $\sum_{k=0}^{30}(3k+1)$ C) $\sum_{k=1}^{10}k^3$ D) $\sum_{k=0}^{43}(3k+1)$ E) $\sum_{k=0}^{15}(3k-1)$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	A	E	B	B	A	A	C
9	10	11	12	13	14	15	16
C	C	D	B	C	B	B	D

1. $\sum_{k=1}^{30} 3k = ?$

A) 1195 B) 1295 C) 1395 D) 1495 E) 1595

2. $\sum_{k=3}^{12} 2k = ?$

A) 150 B) 100 C) 50 D) 25 E) 5

3. $\sum_{k=1}^{12} (2k-1) = ?$

A) 48 B) 60 C) 72 D) 84 E) 144

4. $\sum_{n=4}^{8} (3n+m) = 5! \Rightarrow m = ?$

A) 2 B) 5 C) 6 D) 8 E) 9

5. $\sum_{k=1}^{x} (10-k) = -21 \Rightarrow x = ?$

A) −3 B) −7 C) −14 D) 21 E) −21

6. $\sum_{k=p}^{n} (k-p) = 15 \Rightarrow n-p = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

7. $\sum_{i=1}^{12} i^2 = ?$

A) 300 B) 350 C) 400 D) 450 E) 650

8. $\sum_{k=1}^{a} (k^2 - a \cdot k) = -4 \Rightarrow a = ?$

A) 3 B) 6 C) 9 D) 12 E) 15

9. $\sum_{k=1}^{5}(k^2+2k-3)=?$

A) 50 B) 55 C) 60 D) 65 E) 70

10. $\sum_{n=2}^{9}(n^2-2n+1)=?$

A) 144 B) 148 C) 154 D) 204 E) 248

11. $\sum_{n=2}^{11}(n-3)^2=?$

A) 205 B) 203 C) 201 D) 199 E) 197

12. $f(x)=\sum_{k=1}^{x}(k^2+m\cdot k),\ f(1)=4 \Rightarrow f(2)=?$

A) 28 B) 14 C) 7 D) 1 E) −14

13. $\sum_{n=1}^{20}\frac{1}{(n+1)(n+2)}=?$

A) $\frac{5}{11}$ B) $\frac{4}{11}$ C) $\frac{3}{11}$ D) $\frac{2}{11}$ E) $\frac{1}{11}$

14. $\sum_{k=1}^{4}k\cdot(k+1)^2=?$

A) 130 B) 140 C) 150 D) 160 E) 170

15. $\sum_{k=1}^{30}(-1)^k\cdot(2k+3)=?$

A) 10 B) 20 C) 30 D) 40 E) 50

16. $\sum_{n=1}^{21}(-1)^n\cdot(3n+1)=?$

A) −17 B) −34 C) −51 D) −68 E) −85

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	A	E	C	D	A	E	A
9	10	11	12	13	14	15	16
E	D	A	B	A	E	C	B

1. $\sum_{k=2}^{6}(k-2)\cdot(k-3)\cdot(k-4)=?$

A) 25 B) 28 C) 30 D) 56 E) 60

2. $\sum_{k=-8}^{3}(k^2+18k)=?$

A) −97 B) −124 C) −137 D) −284 E) −322

3. $\sum_{k=-5}^{5}k\cdot(k^2+5)=?$

A) −5 B) −3 C) 0 D) 3 E) 5

4. $\sum_{k=-10}^{10}(k^3-2k+1)=?$

A) 17 B) 18 C) 19 D) 20 E) 21

5. $\sum_{k=-4}^{4}(k+2)\cdot(k^2-2k+4)=?$

A) 45 B) 60 C) 72 D) 76 E) 84

6. $\sum_{k=0}^{18}\frac{1}{(k+1)(k+2)}=?$

A) $\frac{16}{19}$ B) $\frac{17}{19}$ C) $\frac{18}{19}$ D) $\frac{17}{20}$ E) $\frac{19}{20}$

7. $\sum_{k=3}^{27}\frac{1}{k^2+5k+6}=?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{5}$ D) $\frac{1}{6}$ E) $\frac{1}{12}$

8. $\sum_{k=0}^{8}2^k=?$

A) 240 B) 256 C) 358 D) 480 E) 511

9. $i^2 = -1 \Rightarrow \sum_{k=2}^{100} i^k = ?$

A) $-i$ B) -1 C) 0 D) 1 E) i

10. $\sum_{n=0}^{100} 3^n \equiv x \pmod 5 \Rightarrow x = ?$

A) 5 B) 3 C) 1 D) 0 E) 2

11. $\sum_{k=1}^{10} k \cdot k! = ?$

A) $10!$ B) $10! - 1$ C) $11!$ D) $11! - 1$ E) $12!$

12. $\sum_{k=1}^{20} k \cdot k! = ?$

A) $20!$ B) $21!$ C) $20! - 1$ D) $21! + 1$ E) $21! - 1$

13. $\sum_{k=5}^{124} \log_5\left(1 - \frac{1}{k+1}\right) = ?$

A) -2 B) -1 C) 1 D) 2 E) 3

14. $\sum_{x=1}^{2} \sum_{y=1}^{3} (x^2 + y^2) = ?$

A) 41 B) 43 C) 47 D) 53 E) 57

15. $\sum_{n=2}^{6} \sum_{k=3}^{6} (k + n - 2) = ?$

A) 120 B) 128 C) 130 D) 132 E) 140

16. $\sum_{n=1}^{4} \sum_{m=2}^{3} [m^2 n - 6n] = ?$

A) 30 B) 20 C) 10 D) -10 E) -20

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	E	C	E	C	E	D	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	C	D	E	A	B	C	C

1. $\sum_{k=3}^{5} k + \sum_{k=6}^{9} k + \sum_{k=10}^{13} k = ?$

A) 84 B) 88 C) 92 D) 96 E) 100

2. $\sum_{k=1}^{n+3} (2k-3) = an^2 + bn + c \Rightarrow a + b + c = ?$

A) 4 B) 8 C) 12 D) 16 E) 20

3. $\sum_{k=1}^{n+8} (8k-18) = an^2 + 2 \cdot b \cdot n + 144 \Rightarrow a + b = ?$

A) 29 B) 27 C) 25 D) 23 E) 21

4. $\sum_{k=1}^{n} k^2 + \sum_{k=1}^{n} k = 112 \Rightarrow n = ?$

A) 6 B) 3 C) 1 D) 2 E) 5

5. $\sum_{k=-2}^{8} \frac{1}{(k+3)\cdot(k+4)} = ?$

A) $\frac{5}{12}$ B) $\frac{7}{12}$ C) $\frac{9}{12}$ D) $\frac{11}{12}$ E) $\frac{13}{12}$

6. $f(x) = x + 2 \Rightarrow \sum_{n=1}^{8} (f(n))^2 = ?$

A) 300 B) 340 C) 380 D) 350 E) 400

7. $f(x) = 3x - 2;\ x_1 = 2,\ x_2 = 3$

$\Rightarrow \sum_{k=1}^{2} ((x_k + 4)\cdot f(x_k)) = ?$

A) 70 B) 73 C) 76 D) 79 E) 82

8. $f(x) = 3x - 1$ ve / and $x_1 = 3,\ x_2 = 5,\ x_3 = 7$

$\Rightarrow \sum_{i=1}^{3} ((x_i - 2)\cdot f(x_i)) = ?$

A) 100 B) 150 C) 90 D) 180 E) 160

9. $\sum_{x=1}^{18} (\tan x \cdot \cot x) = ?$

A) 36 B) 18 C) 1 D) −18 E) − 36

10. $\sum_{k=1}^{89} (\tan k^\circ - \cot k^\circ) = ?$

A) − 89 B) − 1 C) 0 D) 1 E) 89

11. $3^3 + 4^3 + 5^3 + ... + x^3 = 2016$

$\Rightarrow x = ?$

A) 27 B)18 C) 9 D) 1 E) − 9

12. $\sum_{k=-5}^{6} k^3 = ?$

A) 8 B) 64 C) 27 D) 125 E) 216

13. $\left(\sum_{k=1}^{4} k^3\right) + \left(\sum_{k=6}^{10} k^3\right) - 4 = ?$

A) 2900 B) 2896 C) 2892 D) 2884 E) 2880

14. $\sum_{n=1}^{5} \left(\frac{1}{2}\right)^n = ?$

A) $\frac{31}{32}$ B) $\frac{32}{31}$ C) $\frac{5}{32}$ D) $\frac{32}{5}$ E) $\frac{5}{31}$

15. $\sum_{i=1}^{6} \left(\sum_{i=2}^{5} (2i+1)\right) = ?$

A) 190 B) 191 C) 192 D) 193 E) 194

16. $z = 1 + i,\ (i^2 = -1) \Rightarrow \sum_{i=1}^{12} (1-z) \cdot z = ?$

A) − 60 B) − 66 C) − 72 D) − 84 E) − 96

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	B	A	A	D	C	B	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	C	C	E	B	A	C	B

1. $\prod_{k=1}^{3} 2 + \prod_{n=0}^{5} 3n + \prod_{m=1}^{4} m = ?$

A) 24 B) 26 C) 30 D) 32 E) 36

2. $\prod_{k=1}^{15} \frac{k}{k+1} = ?$

A) $\frac{1}{16}$ B) $\frac{1}{15}$ C) $\frac{1}{12}$ D) $\frac{1}{8}$ E) $\frac{1}{4}$

3. $\prod_{k=5}^{m} \left(\frac{k+4}{k+3}\right) = 7 \Rightarrow m = ?$

A) 50 B) 52 C) 54 D) 56 E) 58

4. $\prod_{k=3}^{10} \left(1-\frac{1}{k}\right) = ?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

5. $\prod_{k=4}^{1900} \left(1-\frac{10}{k}\right) = ?$

A) 4 B) 3 C) 0 D) 10 E) 20

6. $\prod_{k=1}^{10} \left(1+\frac{1}{k+1}\right) = ?$

A) 4 B) 5 C) 6 D) 8 E) 10

7. $\prod_{n=1}^{18} \left(1+\frac{1}{n+5}\right) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

8. $\prod_{k=1}^{6} 2^k = ?$

A) 2^7 B) 2^{14} C) 2^{21} D) 2^{28} E) 2^{35}

9. $\prod_{n=1}^{7} 3^{2n-3} = 3^x \Rightarrow x = ?$

A) 27 B) 30 C) 33 D) 35 E) 36

10. $\prod_{k=-5}^{7} (k^2 - 6k + 9) = ?$

A) −21 B) −14 C) 0 D) 14 E) 21

11. $\prod_{k=1}^{10} (k^2 - 6k + 9) = ?$

A) 1210 B) 1080 C) 976 D) 940 E) 0

12. $\prod_{k=3}^{8} (k^2 - 6k - 16) = ?$

A) − 48 B) − 24 C) 0 D) 24 E) 48

13. $\prod_{k=1}^{20} \left(\frac{k^2 - k - 6}{k^2 - 2k + 3}\right) = ?$

A) 0 B) $\frac{10}{7}$ C) $\frac{13}{2}$ D) 11 E) $\frac{22}{13}$

14. $\prod_{k=2}^{31} \log_{(k)}(k+1) = ?$

A) 5 B) 6 C) 7 D) 8 E) 10

15. $\prod_{k=3}^{80} \log_{(k+1)}(k) = ?$

A) $\frac{1}{4}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$ D) 3 E) 4

16. $f(x) = 2x - 1 \Rightarrow \prod_{k=1}^{4} f(k) = ?$

A) 85 B) 87 C) 95 D) 100 E) 105

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	A	B	D	C	C	C	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	C	E	C	A	A	A	E

1. $\prod_{k=1}^{n} 3^{k+3} = 3^{15} \Rightarrow n = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

2. $\prod_{k=1}^{8} \left(\frac{2}{3}\right)^k = \left(\frac{27}{8}\right)^x \Rightarrow k = ?$

A) −12 B) −9 C) −3 D) 9 E) 12

3. $\prod_{k=1}^{45} \sqrt{\frac{k+2}{k+3}} = ?$

A) $\frac{1}{6}$ B) $\frac{1}{5}$ C) $\frac{1}{4}$ D) $\frac{1}{3}$ E) $\frac{1}{2}$

4. $f(x) = 2x - 1,\ g(x) = x + 1$

$\Rightarrow \prod_{k=1}^{3} [f(k) \cdot g(k)] = ?$

A) 2!·3! B) 5! C) 2·5! D) 3·5! E) 6!

5. $f(x) = \prod_{k=1}^{x} k,\ g(x) = \prod_{k=-2}^{x} (k+3)$

$\Rightarrow (fog)(0) = ?$

A) 6 B) 24 C) 120 D) 540 E) 720

6. $x^2 - 4x + 5 - m = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$\prod_{k=1}^{2} x_k = -8 \Rightarrow m = ?$

A) 8 B) 10 C) 12 D) 13 E) 15

7. $\prod_{x=30}^{120} \cos x^\circ = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

8. $\prod_{k=1}^{89} \tan k^\circ = ?$

A) 1 B) $\frac{1}{\sqrt{2}}$ C) $-\frac{1}{\sqrt{2}}$ D) −1 E) 0

9. $\prod_{x=1}^{90} (\sin 2x) = ?$

A) -1 B) 0 C) $\frac{1}{2}$ D) $\frac{\sqrt{3}}{2}$ E) 1

10. $i^2 = -1 \Rightarrow \prod_{k=1}^{20} i = ?$

A) $-i$ B) -1 C) 0 D) 1 E) i

11. $\log_3\left(\prod_{k=1}^{n} 3^k\right) = 28 \Rightarrow n = ?$

A) 6 B) 7 C) 9 D) 12 E) 14

12. $\prod_{k=2}^{121} \log_{(k+3)}{}^{(k+4)} = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

13. $\log_5\left(\prod_{k=7}^{10} 25\right) = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

14. $\prod_{k=1}^{18} 2^{\log\left(\frac{k+1}{k+2}\right)} = ?$

A) $-\frac{1}{2}$ B) 2 C) $\frac{1}{2}$ D) 2^2 E) 2^4

15. $\sum_{n=1}^{10} \prod_{m=2}^{8} (m \cdot n - 3n) = ?$

A) -726 B) -363 C) 0 D) 363 E) 726

16. $\prod_{n=1}^{a} \sum_{k=1}^{n} \left(\frac{1}{k \cdot (k+1)}\right) = ?$

A) $\frac{1}{a-1}$ B) $\frac{1}{a}$ C) $\frac{1}{a+1}$ D) $\frac{1}{2a}$ E) $\frac{1}{2a+2}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	A	C	D	E	D	C	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	B	B	B	E	C	C	C

1. $\sum_{k=1}^{10} \prod_{m=2}^{3} (m+k-2) = ?$

A) 350 B) 360 C) 380 D) 420 E) 440

2. $\sum_{k=3}^{82} \prod_{n=1}^{19} \left(1-\frac{1}{n+1}\right) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $\prod_{k=-2}^{5} \sum_{n=1}^{3} (nk-2) = ?$

A) −12 B) −6 C) 0 D) 6 E) 12

4. $\sum_{n=4}^{9} \prod_{k=1}^{n} \frac{k+1}{k} = ?$

A) 45 B) 48 C) 50 D) 52 E) 54

5. $\sum_{m=1}^{2} \prod_{k=2}^{3} (m \cdot k^m) = ?$

A) 150 B) 162 C) 180 D) 192 E) 196

6. $i^2 = -1,$

$\sum_{m=-2}^{3} \prod_{n=1}^{21} i^n = ?$

A) −6i B) −3i C) −i D) 3i E) 6i

7. $\prod_{k=4}^{8} \sum_{m=2}^{4} m \cdot (m-3) = ?$

A) 8 B) 16 C) 32 D) 64 E) 128

8. $\sum_{k=0}^{3} (2^k - k!) = x \Rightarrow \prod_{n=3}^{5} x = ?$

A) 25 B) 32 C) 64 D) 125 E) 128

9. $i^2 = -1$,

$$\sum_{k=1}^{73} i^k = x \Rightarrow \prod_{n=1}^{15} x^n = ?$$

A) $-i$ B) -1 C) 0 D) 1 E) i

10. $f: x \to \sum_{k=1}^{x} k,\ g: x \to \prod_{k=1}^{x} k$

$\Rightarrow (gof)(2) = ?$

A) 6 B) 5 C) 4 D) 3 E) 2

11. $x^2 + 6x - 5 = 0$, ÇK(SS) $= \{x_1, x_2\}$

$$\Rightarrow \prod_{k=1}^{2} 4x_k + \sum_{k=1}^{2} (3 - x_k) = ?$$

A) -80 B) -68 C) -40 D) 40 E) 80

12. $f(n) = \begin{cases} n-5, & n \equiv 0 \pmod 3 \\ \frac{n}{n-1}, & n \equiv 1 \pmod 3 \\ n, & n \equiv 2 \pmod 3 \end{cases}$

$$\Rightarrow \sum_{k=2}^{6} 3 \cdot f(k) = ?$$

A) 11 B) 18 C) 22 D) 24 E) 27

13. $\sum_{n=0}^{46} n! \equiv x \pmod 5 \Rightarrow x = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

14. $\sum_{k=-2}^{33} (k+2) \equiv x \pmod 9 \Rightarrow x = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

15. $\sum_{k=m}^{n+m} m = 7n + 7 \Rightarrow \sum_{k=1}^{m} k = ?$

A) 6 B) 8 C) 9 D) 28 E) 32

16. $\prod_{m=1}^{2} \sum_{n=3}^{5} \left(\frac{m \cdot n - 5}{2m}\right) = x^3 \Rightarrow x = ?$

A) $-\frac{1}{2}$ B) -1 C) $-\frac{3}{2}$ D) -2 E) $-\frac{5}{2}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	D	C	A	A	A	C	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	A	B	C	E	A	D	C

1. $2011-2010+2009-2008+...+3-2+1=?$

A) 1004 B) 1008 C) 1000 D) 1006 E) 1002

2. $a_n=\begin{cases}3n+3, & n\equiv 0\ (\text{mod}3)\\ 2n+5, & n\equiv 1(\text{mod}3)\\ 3n^2+n, & n\equiv 2(\text{mod}3)\end{cases}$

$\Rightarrow a_5+a_7+a_9=?$

A) 130 B) 129 C) 128 D) 127 E) 126

3. $a_n=\begin{cases}-5n, & n\equiv 0(\text{mod}2)\\ \dfrac{n^2-3}{n+1}, & n\equiv 1(\text{mod}2)\end{cases}$

$\Rightarrow a_4+a_7=?$

A) $-\frac{43}{8}$ B) $-\frac{41}{8}$ C) $-\frac{57}{8}$ D) $-\frac{41}{4}$ E) $-\frac{57}{4}$

4. $a_n=\begin{cases}3^n, & n\equiv 0(\text{mod}3)\\ 3n-1, & n\equiv 1(\text{mod}3)\\ \dfrac{2n+3}{5}, & n\equiv 2(\text{mod}3)\end{cases}$

$\Rightarrow a_3+a_{10}+a_{11}=?$

A) 50 B) 51 C) 60 D) 61 E) 62

5. $a_n=\begin{cases}2^n+1, & n\equiv 0(\text{mod}2)\\ 2^n-1, & n\equiv 1(\text{mod}2)\end{cases}$

$\Rightarrow \dfrac{a_9-a_7}{a_8-4a_6}=?$

A) -2^8 B) -2^7 C) -2^6 D) $1-2^5$ E) $1-2^4$

6. $a_k=\begin{cases}k^2+1, & k=2n-1\\ \dfrac{k}{k-3}, & k=2n\end{cases}$ $\Rightarrow a_5\cdot a_6=?$

A) 50 B) 52 C) 54 D) 56 E) 60

7. $a_n=\begin{cases}0, & n\equiv 0(\text{mod}3)\\ n, & n\equiv 1(\text{mod}3)\\ -n, & n\equiv 2(\text{mod}3)\end{cases}$

$b_n=\sum_{k=0}^{n}a_k$

$\Rightarrow b_4=?$

A) −2 B) −1 C) 0 D) 2 E) 3

8. $(a_n)=\frac{1}{n!}\Rightarrow \dfrac{a_5}{a_6}=?$

A) $-\frac{1}{5}$ B) $\frac{1}{6}$ C) $\frac{1}{8}$ D) 5 E) 6

9. $a_n = a_{n-1} \cdot (n-1)$, $a_1 = 1$

$\Rightarrow$ $\mathbf{a_3 = ?}$

A) 1 B) 2 C) 6 D) 9 E) 24

10. $(a_n) = 2 \cdot (a_{n-1})$,

$a_1 = 5 \Rightarrow \mathbf{a_5 = ?}$

A) 40 B) 48 C) 64 D) 72 E) 80

11. $a_{n+1} = a_n + \frac{2}{n}$, $a_1 = 2$

$\Rightarrow$ $\mathbf{a_4 = ?}$

A) $\frac{8}{3}$ B) 4 C) $\frac{14}{3}$ D) 5 E) $\frac{17}{3}$

12. $a_1 = 7$, $a_{n+1} = a_n + 2n \Rightarrow \mathbf{a_4 = ?}$

A) 17 B) 19 C) 21 D) 23 E) 25

13. $a_1 = 40$,

$a_{k+1} = a_k - k \quad (k = 1, 2, 3, \ldots)$

$\Rightarrow$ $\mathbf{a_8 = ?}$

A) 4 B) 7 C) 12 D) 15 E) 19

14. $a_{n+1} = \frac{n}{n+1} \cdot a_n$, $a_1 = 2$

$\Rightarrow$ $\mathbf{a_{10} = ?}$

A) $\frac{1}{3}$ B) $\frac{1}{5}$ C) $\frac{2}{5}$ D) $\frac{3}{5}$ E) $\frac{2}{3}$

15. $a_{n+1} = a_n + 2n - 1$, $a_3 = 5$

$\Rightarrow$ $\mathbf{a_{23} = ?}$

A) 485 B) 490 C) 495 D) 500 E) 505

16. $n \geq 1$,

$a_n = \sum_{k=1}^{n} \frac{1}{k(k+1)} \Rightarrow \mathbf{a_{99} = ?}$

A) $\frac{100}{99}$ B) $-\frac{99}{100}$ C) $-\frac{100}{99}$ D) $\frac{98}{99}$ E) $\frac{99}{100}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	B	E	D	B	B	E	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	E	E	B	C	B	A	E

1. $(a_n)=\left(\frac{2n+4}{3n-1}\right)$, $(b_n)=\left(\frac{3n+3}{n+2}\right) \Rightarrow \mathbf{a_5-b_1=?}$

A) -3 B) -2 C) -1 D) 0 E) 1

2. $a_{n+1}=\frac{3}{2}\cdot a_n$, $a_2=\frac{3}{2} \Rightarrow \mathbf{a_9=?}$

A) $\frac{3}{2}$ B) $\left(\frac{3}{2}\right)^3$ C) $\left(\frac{3}{2}\right)^6$ D) $\left(\frac{3}{2}\right)^8$ E) $\left(\frac{3}{2}\right)^{10}$

3. $(a_n)=\left(\frac{2n+1}{3n+4}\right)$, $a_k=\frac{1}{2} \Rightarrow \mathbf{k=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $(a_n)=\left(\frac{5n+3}{n+5}\right)$, $a_x=3 \Rightarrow \mathbf{x=?}$

A) 4 B) 5 C) 6 D) 7 E) 8

5. $(a_n)=\left(\frac{3^n}{(n+2)!}\right)$, $\frac{a_n}{a_{n+1}}=4 \Rightarrow \mathbf{n=?}$

A) 9 B) 10 C) 12 D) 14 E) 15

6. $(a_n)=n+1$,

$f(x)=3x-2$

$\Rightarrow \sum_{n=1}^{2} \mathbf{a_n\ f(a_n)=?}$

A) 4 B) 10 C) 20 D) 26 E) 29

7. $(a_n)=\left(\frac{8-2n}{n+3}\right)$, $(a_n)>0 \Rightarrow \sum \mathbf{n=?}$

A) 18 B) 12 C) 6 D) 4 E) 3

8. $(a_n)\leq 0$,

$(a_n)=\left(\frac{n-12}{2n-5}\right) \Rightarrow \sum \mathbf{n=?}$

A) 66 B) 69 C) 72 D) 75 E) 78

9. $0 < (a_n)$,

$(a_n) = \left(\dfrac{-n^2+2n+15}{n^2-2n}\right) \Rightarrow \sum n = ?$

A) 7 B) 9 C) 12 D) 15 E) 17

10. $(a_n) = \left(\dfrac{n^2-9n+14}{n^2+5n+16}\right) < 0 \Rightarrow \sum n = ?$

A) 6 B) 9 C) 12 D) 15 E) 18

11. (a_n) bir aritmetik dizidir.

(a_n) is an arithmetic sequence.

$a_1 = 5,\ a_2 = 12,\ a_3 = 19,\ a_4 = 26 \Rightarrow a_{35} = ?$

A) 231 B) 238 C) 243 D) 250 E) 257

12. (a_n) bir aritmetik dizidir.

(a_n) is an arithmetic sequence.

$a_1 = x-2,\ a_2 = x+1,\ a_3 = 3x-4$

$\Rightarrow a_1 + a_2 + \ldots + a_{20} = ?$

A) 600 B) 610 C) 620 D) 630 E) 640

13. (a_n) bir geometrik dizidir.

(a_n) is a geometric sequence.

$a_4 = 1,\ a_7 = \frac{1}{8} \Rightarrow a_{20} = ?$

A) 2^{-15} B) 2^{-16} C) 2^{-17} D) 2^{-19} E) 2^{-20}

14. (a_n) bir geometrik dizidir.

(a_n) is a geometric sequence.

$a_k = x-2,\ a_{k+1} = x+1,\ a_{k+2} = x+5 \Rightarrow x = ?$

A) -11 B) -10 C) 2 D) 10 E) 11

15. $(a_n) = (-2n^2+8n-3) \Rightarrow \max(a_n) = ?$

A) 5 B) 7 C) 8 D) 9 E) 11

16. $4 \cdot 2 + 8 \cdot 3 + 12 \cdot 4 + \ldots + 40 \cdot 11 = ?$

A) 1760 B) 1987 C) 2287 D) 3287 E) 3306

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	D	B	C	A	E	C	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	E	C	B	B	E	A	A

1. $200 + 100 + 50 + \ldots = ?$

A) 400 B) 420 C) 425 D) 450 E) 500

2. $3 + 3\cdot\frac{1}{2} + 3\cdot\left(\frac{1}{2}\right)^2 + \ldots + 3\cdot\left(\frac{1}{2}\right)^n + \ldots = ?$

A) 4 B) 5 C) 6 D) 8 E) 9

3. $1\cdot 3 + 3\cdot 5 + 5\cdot 7 + 7\cdot 9 + \ldots = ?$

A) $\sum_{k=1}^{\infty}(2k-1)\cdot(2k+1)$ B) $\sum_{k=1}^{4}(k+1)\cdot(k+3)$

C) $\sum_{k=1}^{3}k\cdot(k+2)$ D) $\sum_{k=2}^{5}(k-1)\cdot(k+2)$

E) $\sum_{k=1}^{\infty}3\cdot(4k-3)$

4. $\sum_{n=0}^{\infty}\left(\frac{3}{4}\right)^n = ?$

A) 2 B) $\frac{9}{4}$ C) $\frac{5}{2}$ D) $\frac{11}{4}$ E) 4

5. $\sum_{k=1}^{\infty}\left(-\frac{2}{7}\right)^k = ?$

A) $-\frac{1}{9}$ B) $-\frac{2}{9}$ C) $-\frac{7}{9}$ D) $-\frac{2}{7}$ E) $-\frac{3}{7}$

6. $\sum_{k=0}^{\infty}\frac{1}{3^{2k}} = ?$

A) $\frac{9}{8}$ B) $\frac{3}{5}$ C) $\frac{3}{8}$ D) $\frac{3}{4}$ E) $\frac{4}{3}$

7. $\sum_{n=3}^{\infty}\frac{1}{2^n} = ?$

A) $\frac{1}{32}$ B) $\frac{1}{8}$ C) $\frac{1}{16}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

8. $\sum_{k=1}^{\infty}\frac{2^k}{3^{k+1}} = ?$

A) $\frac{2}{3}$ B) $\frac{3}{2}$ C) $\frac{4}{3}$ D) $\frac{5}{2}$ E) 3

9. $\sum_{n=1}^{\infty} \frac{2^{2n+3}+3^{n+1}}{6^n} = ?$

A) 15 B) 16 C) 17 D) 18 E) 19

10. $\sum_{n=x}^{\infty} \left(\frac{2}{3}\right)^n = \frac{8}{9} \Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $\sum_{k=1}^{\infty} \frac{3+2^k}{4^k} = ?$

A) 1 B) 2 C) 3 D) 4 E) 6

12. $\sum_{k=4}^{\infty} 3^{-k+2} = ?$

A) $\frac{1}{6}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$ D) 1 E) 2

13. $\sum_{k=1}^{\infty} \frac{x+2^k}{3^k} = 10 \Rightarrow x = ?$

A) 8 B) 9 C) 10 D) 12 E) 16

14. $\sum_{n=0}^{\infty} \frac{3^{n+1}}{4^{n-1}} = ?$

A) 32 B) 36 C) 48 D) 52 E) 64

15. $\sum_{k=0}^{\infty} \frac{1+2^k+3^k}{4^k} = ?$

A) $\frac{19}{3}$ B) $\frac{20}{3}$ C) 7 D) $\frac{22}{3}$ E) $\frac{23}{3}$

16. $\prod_{k=1}^{\infty} (9)^{3^{-k}} = ?$

A) 1 B) 3 C) 9 D) 27 E) 81

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	C	A	E	B	A	D	A
9	10	11	12	13	14	15	16
E	C	B	A	E	C	D	B

1. $a_n = \begin{cases} n^2, & n \equiv 0 \pmod 3 \\ \dfrac{n-10}{2n+1}, & n \equiv 1 \pmod 3 \\ n+1, & n \equiv 2 \pmod 3 \end{cases} \Rightarrow \dfrac{a_5 - a_{10}}{a_6} = ?$

A) $\frac{1}{36}$ B) $\frac{1}{27}$ C) $\frac{1}{18}$ D) $\frac{1}{9}$ E) $\frac{1}{6}$

2. $(a_n) = \left(\frac{3n+3}{n-2}\right) \Rightarrow a_3 + a_5 = ?$

A) 24 B) 18 C) 16 D) 10 E) 2

3. $(a_n) = \left(\frac{3n-4}{n+2}\right)$, $(b_n) = \left(\frac{10}{n+2}\right) \Rightarrow a_{1987} + b_{1987} = ?$

A) 10 B) 7 C) 4 D) 3 E) 1

4. $a_n = \frac{a_{n+1}+1}{n+4}$, $a_3 = 3 \Rightarrow a_4 = ?$

A) 40 B) 20 C) 10 D) 5 E) 0

5. $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots = ?$

A) $\frac{1}{3}$ B) $\frac{1}{9}$ C) $\frac{4}{9}$ D) $\frac{9}{4}$ E) $\frac{1}{2}$

6. $\sum_{n=1}^{\infty} \left(\frac{1}{e}\right)^n = ?$

A) e B) e − 1 C) e + 1 D) $\frac{1}{e+1}$ E) $\frac{1}{e-1}$

7. $0 < r < 1$, $\sum_{n=1}^{\infty} r^{n+1} = \frac{1}{2} \Rightarrow r = ?$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{8}$ D) $\frac{1}{16}$ E) $\frac{1}{32}$

8. $\sum_{n=1}^{\infty} \frac{2^n - 1}{3^{n+1}} = ?$

A) $\frac{2}{3}$ B) $\frac{3}{2}$ C) $\frac{1}{2}$ D) 2 E) 4

9. $0 < x < \frac{\pi}{2}$,

$$\sum_{n=1}^{\infty} \cos^n x = ?$$

A) $\frac{1}{1-\cos x}$ B) $\frac{1}{1+\cos x}$ C) $\frac{-\sin x}{1-\cos x}$

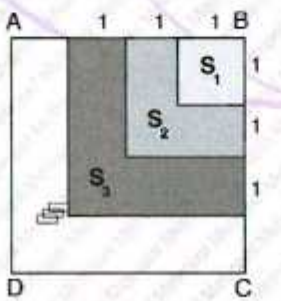
D) $\frac{-\cos x}{1-\cos x}$ E) $\frac{\cos x}{1-\cos x}$

10. $\sum_{n=1}^{\infty} 3\cdot\left(\frac{1}{\sqrt{3}}\right)^{n-2} = ?$

A) $\frac{9}{1-\sqrt{3}}$ B) $\frac{9}{1+\sqrt{3}}$ C) $\frac{1}{1-\sqrt{3}}$

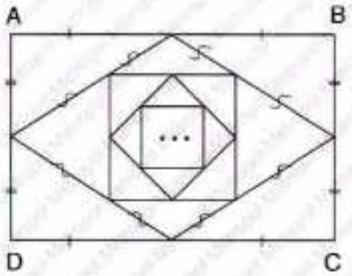
D) $1-\sqrt{3}$ E) $9-9\sqrt{3}$

11. $S_{10} = ?$ br^2 / u^2



A) 9 B) 14 C) 17 D) 19 E) 26

12.



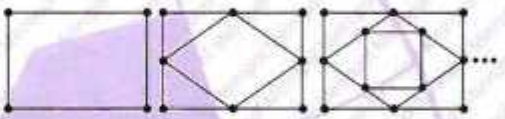
ABCD bir dikdörtgendir. ABCD is a rectangle.

|AB| = 8 cm, |AD| = 4 cm

⇒ **Toplam alan / The total area = ? br^2 / u^2**

A) 256 B) 128 C) 64 D) 32 E) 16

13.



1. terim = 4 **2. terim = 8** **3. terim = 12**

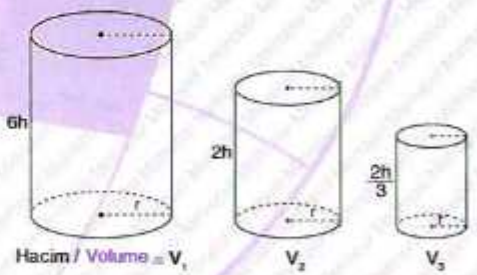
1st term = 4 **2nd term = 8** **3rd term = 12**

48. terimde kaç tane nokta bulunur?

How many points does the 48th term have?

A) 192 B) 96 C) 48 D) 24 E) 15

14.



Hacim / Volume = V_1 V_2 V_3

$$\Rightarrow \sum_{k=1}^{\infty} V_k = ?$$

A) $9\pi r^2 h$ B) $6\pi r^2 h$ C) $3\pi r^2 h$

D) $2\pi r^2 h$ E) $\pi r^2 h$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
E	B	D	B	E	E	A
8	**9**	**10**	**11**	**12**	**13**	**14**
C	E	A	D	C	A	A

1. $n \in Z^+$

$$n! + \sum_{k=0}^{8} (n+k)! \cdot (n+k) = ?$$

A) $(n+7)!$ B) $(n+8)!$ C) $(n+9)!$ D) $(2n+8)!$ E) $(2n+10)!$

2. $\sum_{k=0}^{90} 2^k = A(\text{mod}5) \rightarrow A = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $n \in Z^+$,

$$\sum_{k=1}^{n} (-1)^{k+1} \cdot k = 10 \Rightarrow n = ?$$

A) 17 B) 18 C) 19 D) 20 E) 21

4. $\sum_{k=2}^{4} \cos(2 \cdot k \cdot x) = T$

$$\Rightarrow \sum_{k=2}^{4} \cos^2(k \cdot x) = ?$$

A) $T+2$ B) $T+4$ C) $\frac{T+1}{2}$ D) $\frac{T+2}{2}$ E) $\frac{T+3}{2}$

5. $\prod_{n=1}^{7} (3n+2) \equiv 0(\text{mod } 10^m)$

$\Rightarrow m \in Z,\ \max(m) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

6. $A,\ n \in Z^+$,

$$\prod_{k=1}^{20} k = A \cdot 10^n \Rightarrow \sum n = ?$$

A) 10 B) 9 C) 8 D) 7 E) 6

7. $a_{n+2} = a_{n+1} + a_n \ (n = 1, 2, \ldots)$

$a_8 = 6 \Rightarrow a_6 + a_9 = ?$

A) 9 B) 10 C) 12 D) 15 E) 16

8. $(a_n) = \left(\frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \ldots + \frac{1}{2^n}\right)$

$\Rightarrow a_1 + a_2 + a_3 = ?$

A) $\frac{7}{8}$ B) $\frac{11}{8}$ C) $\frac{13}{8}$ D) $\frac{15}{8}$ E) $\frac{17}{8}$

9. $(a_n) = (2^{2n-1}) \Rightarrow a_1 + a_2 + a_3 + \dots + a_n = ?$

A) $\frac{2}{3}(4^n - 1)$ B) $\frac{2}{3}(4^n + 1)$ C) $\frac{2}{3}(2^n - 1)$ D) $\frac{2}{3}(2^n + 1)$ E) $\frac{1}{3}(2^n - 1)$

10. $a_n = \frac{3n^2 + 6n + 11}{n + 5} < 2 \Rightarrow$ **ÇK(SS) = ?**

A) R B) $(-\infty, -5)$ C) $\left(-1, -\frac{1}{3}\right)$ D) $(-5, -1)$ E) Ø

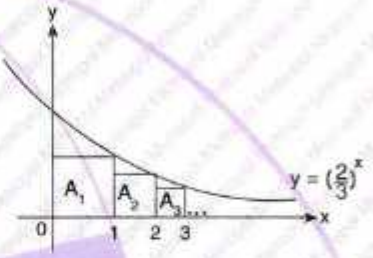
11. $\sum_{k=-5}^{\infty} p^k = 64 \Rightarrow p = ?$

A) $\frac{1}{5}$ B) $\frac{1}{4}$ C) $\frac{1}{3}$ D) $\frac{1}{2}$ E) 1

12. $\sum_{k=1}^{\infty} (-1)^{k+1} \cdot 2^k \cdot 3^{2-k} = ?$

A) $\frac{3}{5}$ B) $\frac{9}{5}$ C) $\frac{18}{5}$ D) $\frac{1}{3}$ E) $\frac{27}{5}$

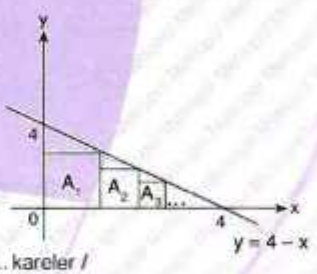
13.



$\Rightarrow A\left(\sum_{n=1}^{\infty} An\right) = \text{Area}\left(\sum_{n=1}^{\infty} An\right) = ?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) 1 D) $\frac{4}{3}$ E) 2

14.



$A_1, A_2, A_3, \dots$ kareler /

$A_1, A_2, A_3, \dots$ are squares

$\Rightarrow A\left(\sum_{n=1}^{\infty} An\right) = \text{Area}\left(\sum_{n=1}^{\infty} An\right) = ?$

A) $\frac{9}{2}$ B) $\frac{11}{2}$ C) $\frac{14}{3}$ D) $\frac{16}{3}$ E) $\frac{20}{3}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
C	B	C	E	A	A	C
8	**9**	**10**	**11**	**12**	**13**	**14**
E	A	E	D	C	E	D

1. $f(x) = x^2 + 1$

$x_k = 2k - 1$

$\Rightarrow \sum_{k=1}^{3} \left(f(k) \cdot x_k\right) = ?$

A) 53 B) 57 C) 61 D) 67 E) 75

[YÜZÜNCÜ YIL ÜNİVERSİTESİ – YÖS 2019]

2. $\sum_{n=-4}^{13} \prod_{k=1}^{n} \left(1 + \frac{1}{k}\right) = ?$

A) 99 B) 98 C) 97 D) 96 E) 95

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

3. $\sum_{n=0}^{\infty} \frac{3^{n-1}}{5^n} = ?$

A) $\frac{5}{2}$ B) $\frac{5}{3}$ C) $\frac{5}{4}$ D) $\frac{5}{6}$ E) $\frac{5}{8}$

[BALIKESİR ÜNİVERSİTESİ – YÖS 2018]

4. **Bir aritmetik dizinin ilk üç terimi sırasıyla a – 1, 2a + 5, 5a + 1 olduğuna göre, bu dizinin beşinci terimi kaçtır?**

According to the fact that first three terms of arithmetic sequence are a – 1, 2a + 5, and 5a + 1, respectively. What is the fifth term of this sequence?

A) 39 B) 42 C) 46 D) 48 E) 52

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2018]

5. **Bir geometrik dizinin ilk üç terimi sırasıyla (x – 3), (2x – 3) ve (4x + 3) olduğuna göre, bu dizinin sekizinci terimi kaçtır?**

According to the fact that first three terms of a geometrical sequence are (x – 3), (2x – 3) and (4x + 3), respectively. What is the eighth term of this sequence?

A) 3^4 B) 3^5 C) 3^6 D) 3^7 E) 3^8

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2018]

6. $\prod_{n=1}^{x} a_n = 9^{x^2} \Rightarrow a_4 = ?$

A) 9^{36} B) 9^{24} C) 3^{50} D) 3^{36} E) 3^{24}

[BALIKESİR ÜNİVERSİTESİ – YÖS 2017]

7. $\prod_{k=-3}^{2n-3} \left(\frac{k+4}{k+5}\right) = \frac{1}{20} \Rightarrow n = ?$

A) 9 B) 10 C) 11 D) 12 E) 13

[BALIKESİR ÜNİVERSİTESİ – YÖS 2017]

8. $\sum_{k=0}^{10} k \cdot n^4 \cdot \prod_{m=1}^{3} \frac{2m}{n} = ?$

A) 2640·n B) 1056·n C) 2640 + n D) $\frac{2640}{n}$ E) 10560·n

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

9. $\sum_{k=0}^{15} 2^{k+4} = ?$

A) $2^{20} - 15$ B) $1 - 2^{20}$ C) $1 - 2^{19}$ D) $2^{20} - 14$ E) $2^{20} - 16$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

10. **p bir pozitif tamsayı olmak üzere,**

If p is a positive integer,

$\sum_{n=0}^{17} (3n + p) = ?$

A) 459 + 18p B) 462 + 17p C) 54 + p D) 459 + 17p E) 462 + 18p

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2015]

11. $\sum_{k=1}^{120} (-1)^k \cdot (k+1) = ?$

A) 10 B) 30 C) 60 D) 120 E) 160

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2015]

12. $n \in \mathbb{N},\ n \geq 1$

$a_0 = 1,\ a_n = \frac{1}{n+1} \cdot a_{n-1} \Rightarrow a_5 = ?$

A) 5! B) 6! C) $\frac{1}{5!}$ D) $\frac{1}{6!}$ E) $\frac{5!}{6!}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2015]

13. $\prod_{k=1}^{31} \left(\frac{2}{3}\right)^{(-1)^k} = ?$

A) −1 B) 1 C) $\frac{2}{3}$ D) $\frac{3}{2}$ E) $\frac{4}{9}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

14. $a_1 = 1$

$(a_n) = \frac{n}{n+2} \cdot (a_{n-1}) \Rightarrow a_6 = ?$

A) $\frac{3}{28}$ B) $\frac{3}{56}$ C) $\frac{3}{14}$ D) $\frac{5}{32}$ E) $\frac{5}{24}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

15. $\sum_{k=0}^{10} \frac{n}{n+1} = ?$

A) 10 B) 11 C) $\frac{10n}{n+1}$ D) $\frac{11n}{n+1}$ E) 0

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

16. $|x| < 1 \Rightarrow \sum_{n=1}^{\infty} x^n = ?$

A) $\frac{1}{1-x}$ B) $\frac{1}{1+x}$ C) $\frac{x}{1-x}$ D) 1 E) 10

[İSTANBUL ÜNİVERSİTESİ – YÖS 2013]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	A	D	D	E	D	A	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	A	C	D	D	A	D	C

BÖLÜM CHAPTER 10

TARİHSEL NOT / HISTORICAL NOTE

BÎRÛNÎ [973 - 1051]

Matematik, Gökbilim, Doğa Bilimleri, Coğrafya ve Tarih alanındaki çalışmalarıyla tanınır. Bîrûnî'nın matematikçi yönü en çok bilinen yönüdür. Yaşadığı yüzyılın en büyük matematikçisi olan Bîrûnî, trigonometrik fonksiyonlarda yarıçapın bir birim olarak kabul edilmesini öneren ilk kişi olup sinüs ve kosinüs gibi fonksiyonlara sekant, kosekant ve kotanjant fonksiyonlarını ilave etmiştir. Bîrûnî'nın bu yönü Batı Dünyası tarafından ancak iki asır sonra keşfedilip kullanılabilmiştir.

He is known for his work in mathematics, astronomy, natural sciences, geography and history. The mathematician aspect of Bîrûnî is the most known aspect. Bîrûnî, the greatest mathematician of the century in which he lived, was the first to propose that the radius be accepted as a unit in trigonometric functions and he added secant, cosecant and cotangent functions to functions such as sine and cosine. This work of Bîrûnî was not discovered and used by the Western World until after two centuries.

ÖZEL TANIMLI FONKSİYONLAR
FUNCTIONS with SPECIAL DEFINITION

Bu bölüm 16 alıştırma sorusu, 50 test sorusu, 8 YÖS sorusu içermektedir.
This chapter includes 16 exercise questions, 50 test questions, and 8 YÖS questions.

BÖLÜM / CHAPTER 10

ÖZEL TANIMLI FONKSİYONLAR / FUNCTIONS with SPECIAL DEFINITION

ÖZEL TANIMLI FONKSİYONLAR
FUNCTIONS with SPECIAL DEFINITION

1. $f:(-1,2] \to A$,
$f(x) = 4x - 2 \Rightarrow A = ?$

Yanıt / The Answer is $(-6, 6]$

2. $f:(0,7] \to A$,
$f(x) = x^2 - 6x + 5 \Rightarrow A = ?$

Yanıt / The Answer is $[-4, 12]$

3. $f:\left[\frac{1}{6}, \infty\right) \to (0, \infty)$
$f(x) = \sqrt{6x - 1} \Rightarrow f^{-1}(x) = ?$

Yanıt / The Answer is $\frac{x^2+1}{6}$

4. $f:[3,\infty) \to [-1,\infty)$,
$f(x) = x^2 - 4x + 3 \Rightarrow f^{-1}(x) = ?$

Yanıt / The Answer is $\sqrt{x+1} + 2$

5. $f:(5,\infty) \to R$
$f(x) = \log_2(x-5) \Rightarrow f^{-1}(x) = ?$

Yanıt / The Answer is $2^x + 5$

6. $f:A \to B,\ A,B \subseteq R$
$f(x) = \sqrt{1 - x^2} \Rightarrow A = ?$

Yanıt / The Answer is $[-1, 1]$

7. $f:A \to B,\ A,B \subseteq R$
$f(x) = \sqrt[3]{\frac{x+2}{x-1}} \Rightarrow A = ?$

Yanıt / The Answer is $R - \{1\}$

8. $f:A \to B,\ A,B \subseteq R$
$f(x) = \frac{x-5}{|x-2| - 1} \Rightarrow A = ?$

Yanıt / The Answer is $R - \{1, 3\}$

9. $f(x)=\begin{cases}2x-5, & x<2\\ 3x+1, & x\geq 2\end{cases} \Rightarrow f(0)+f(2)=?$

Yanıt / The Answer is 2

10. $|x+2|-4x=6 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\left\{-\frac{4}{3}\right\}$

11. $||x-1|-2|=4 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\{-5, 7\}$

12. $\text{sgn}(x^2-x-6)=1 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $R-[-2, 3]$

13. $\text{sgn}(x^2+x+1)=-1 \Rightarrow$ ÇK(SS) = ?

Yanıt / The Answer is $\emptyset$

14. $\left[\left[-5,89\right]\right]+\left[\left[\frac{1}{e}\right]\right]+\left[\left[-\pi\right]\right]+\left[\left[3,1\right]\right]=?$

Yanıt / The Answer is -7

15. $f(2^x)=\left[\left[x\cdot e\right]\right] \Rightarrow f\left(\frac{1}{4}\right)=?$

Yanıt / The Answer is -6

16. $f: A \to B,\ A, B \subseteq R$

$f(x)=\dfrac{\sqrt{15-x}}{x^2-6x+8} \Rightarrow A=?$

Yanıt / The Answer is $(-\infty, 15]-\{2,4\}$

1. $f(x)=\begin{cases}2x+1, & x>3\\ x+3, & x\le 3\end{cases} \Rightarrow (fof)(2)=?$

A) 7 B) 8 C) 9 D) 10 E) 11

2. $f:R\to R,\ g:R\to R$

$f(x)=\begin{cases}3x+2, & x\le 4\\ x-3, & 4<x\end{cases}$, $g(x)=\begin{cases}x^2+1, & x<2\\ 2x-4, & 2\le x\end{cases}$

$\Rightarrow (fog)(3)=?$

A) 8 B) 9 C) 10 D) 12 E) 14

3. $f(x)=\begin{cases}3-x^2, & x\ge 3\\ x^2-1, & x<3\end{cases}$, $g(x)=\begin{cases}x-2, & x>0\\ x-3, & x\le 0\end{cases}$

$\Rightarrow (fog)(4)+(gof)(4)=?$

A) −19 B) −16 C) −13 D) −10 E) −8

4. $x<1,$

$f(x)=|x-1|+|x+|x-1||\ \Rightarrow f(x)=?$

A) x B) $2-x$ C) $x+2$ D) $3-x$ E) 1

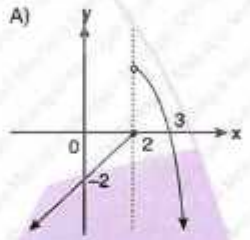
5. $f:A\to R,$

$f(x)=|x+1|+4\ \Rightarrow f(A)=?$

A) $[-1,\infty)$ B) $[0,\infty)$ C) $[2,\infty)$ D) $[3,\infty)$ E) $[4,\infty)$

6. $f(x)=\begin{cases}x-2, & x\le 2\\ 9-x^2, & 2<x\end{cases}$

$\Rightarrow$ **Grafik** / Graph = ?

A)


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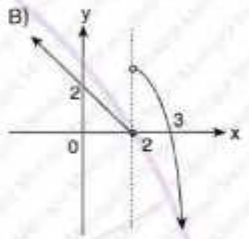

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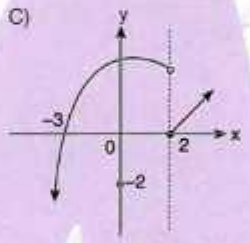

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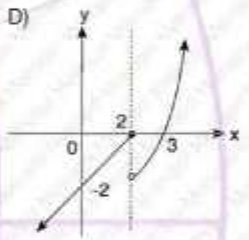

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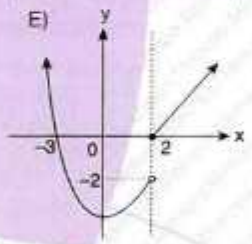
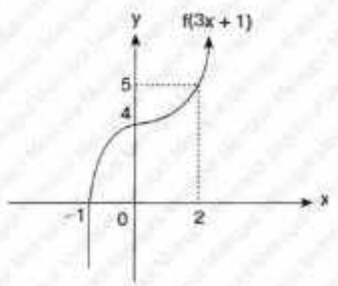
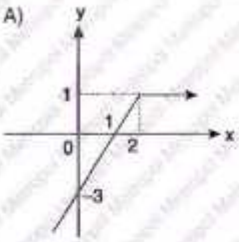


7. $\dfrac{f(7)+f^{-1}(0)}{f^{-1}(4)}=?$



A) −3 B) −2 C) 0 D) 2 E) 3

8. $f(x) = -x + 1 + |x - 2| \Rightarrow$ **Grafik / Graph = ?**

A)


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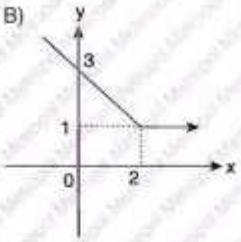

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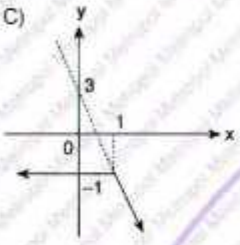

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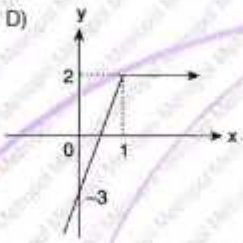

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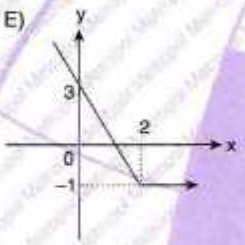


9. $f(x) = y = ?$

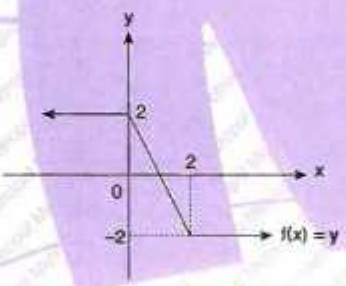
A) $y = |x - 2| - |x|$

B) $y = |x + 2| - |x|$

C) $y = |x - 2| + |x|$

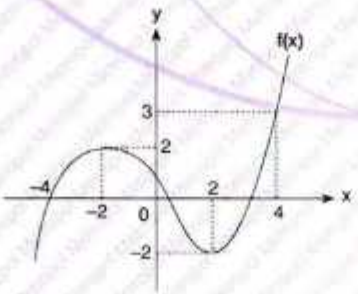
D) $y = |x + 2| + |x|$

E) $y = |x - 2|$



10. $g(x) = 2 - f(x - 1)$

$\Rightarrow$ **$g(-1) + g(5) = ?$**



A) –2 B) –1 C) 0 D) 1 E) 2

11. $f(x) = |x| + |x - 1| = ?$

A) $f(x) = \begin{cases} 2x - 1, & x \geq 1 \\ 2x + 1, & x < 1 \end{cases}$

B) $f(x) = \begin{cases} 2x - 1, & x \geq 1 \\ 1, & 0 \leq x < 1 \\ -2x + 1, & x < 0 \end{cases}$

C) $f(x) = \begin{cases} 1, & x \geq 1 \\ 2x - 1, & 0 \leq x < 1 \\ -1, & x < 0 \end{cases}$

D) $f(x) = \begin{cases} x - 1, & x > 1 \\ 2x - 1, & 0 \leq x \leq 1 \\ 1, & x > 0 \end{cases}$

E) $f(x) = \begin{cases} 3x - 1, & x \geq 1 \\ 2x - 1, & 0 \leq x < 1 \\ x - 1, & x < 0 \end{cases}$

12. $x \in Z,\ f(x) \in R,$

$f(x) = \sqrt{5 - |2x - 3|} \Rightarrow \sum x = ?$

A) 8 B) 9 C) 10 D) 12 E) 15

13. $f(x) = \sqrt{1 + |x^2 - 1|} \Rightarrow x \in ?$

A) $[-1, 1]$ B) $[-1, 0]$ C) R D) $R \setminus [-1, 1]$ E) Ø

14. $f(x) = \sqrt[3]{\dfrac{x^2 - 2x + 1}{x^2 - 5x + 6}} \Rightarrow \sum x = ?$

A) –6 B) –5 C) 0 D) 5 E) 6

YANITLAR / ANSWERS

1	2	3	4	5	6	7
E	A	C	B	E	A	E
8	**9**	**10**	**11**	**12**	**13**	**14**
E	A	B	B	B	C	B

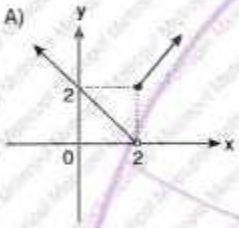
1. $f(x) = \begin{cases} x^2 - 2, & 2 \le x \\ x + 2, & x < 2 \end{cases}$

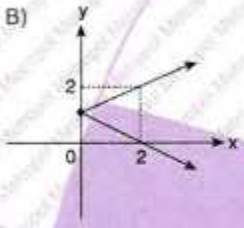
$\Rightarrow$ **(fofof)(1) = ?**

A) 45 B) 46 C) 47 D) 48 E) 49

2. $f(x) = \begin{cases} x + 2, & 2 < x \\ 2, & x = 2 \\ -x + 2, & x < 2 \end{cases}$

$\Rightarrow$ **Grafik / Graph = ?**

A)


B)


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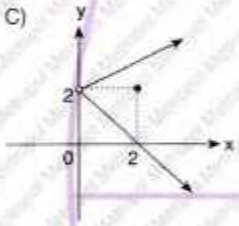

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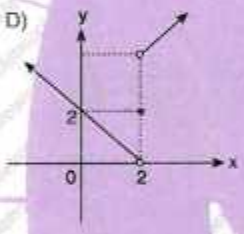

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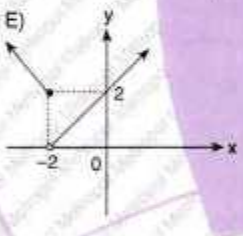


3. $f(x) = |x - 2| + |x - 7| \Rightarrow$ **min(f(x)) = ?**

A) 3 B) 4 C) 5 D) 6 E) 7

4. $f(x) = |2x - \pi| - |x - e|$

$\Rightarrow$ **$f(\pi + 1) = ?$**

A) e^2 B) e C) 2e D) e + 1 E) e − 1

5. $x \in N$,

$|x^2 - 9| = 9 - x^2 \Rightarrow \sum x = ?$

A) 0 B) 1 C) 2 D) 3 E) 6

6. $|x - 4| + x \le 3 \Rightarrow$ **ÇK(SS) = ?**

A) $\left(-\infty, \frac{7}{2}\right]$ B) $\left[\frac{7}{2}, \infty\right)$ C) $\left[\frac{7}{2}, 4\right]$ D) $\varnothing$ E) R

7. $f(x) \in R$, $x \in Z$,

$f(x) = \dfrac{\sqrt{7 - |2x - 1|}}{x - 2} \Rightarrow \sum x = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

8. $f(x) = \dfrac{\sqrt{9 - x^2}}{x^2 + 3x} \Rightarrow x \in Z, \sum x = ?$

A) −3 B) −1 C) 0 D) 1 E) 3

9. $f(x) \in R$,

$f(x) = \sqrt{\dfrac{x - 1}{|x| - 2}} \Rightarrow$ **ÇK(SS) = ?**

A) $[1, 2)$ B) $(-2, 1] \cup (2, \infty)$ C) $(-2, \infty)$ D) $(-2, 1]$ E) $[1, \infty)$

10. $f(x)=\dfrac{x^2+4x+10}{x^2-8x+15} \Rightarrow x \in R, \sum x = ?$

A) -8 B) -6 C) 0 D) 6 E) 8

11. $f: R \to R-\left\{\dfrac{\pi}{4}, \dfrac{3\pi}{4}\right\}$

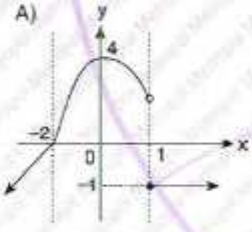
$$f(x)=\begin{cases} \cos 2x, & x \le \dfrac{3\pi}{2} \\ \dfrac{1-\sin^2 x}{2}, & x > \dfrac{3\pi}{2} \end{cases}$$

$\Rightarrow f\left(\dfrac{\pi}{2}\right)+f(2\pi)=?$

A) $-\dfrac{1}{2}$ B) $-\dfrac{1}{4}$ C) $-\dfrac{1}{8}$ D) $-\dfrac{1}{16}$ E) $-\dfrac{1}{32}$

12. $f(x)=\begin{cases} x+2, & x<-2 \\ 4-x^2, & -2 \le x < 1 \\ -1, & 1 \le x \end{cases}$

$\Rightarrow$ **Grafik / Graph = ?**

A)


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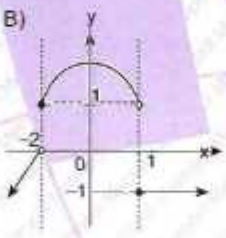

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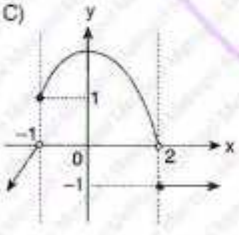
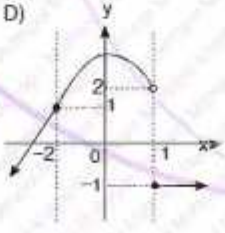


D)


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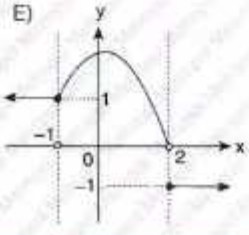
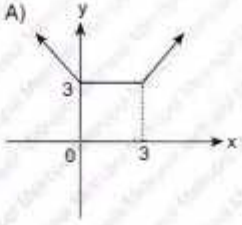


13. $f(x) = |x-3| + |x| \Rightarrow$ **Grafik / Graph = ?**

A)


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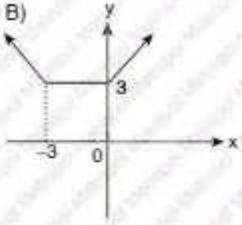

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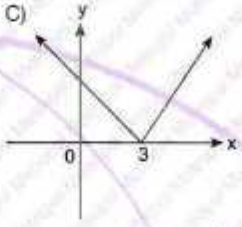

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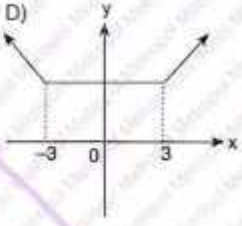

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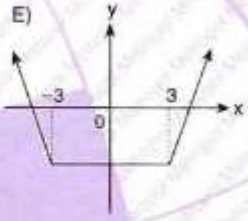
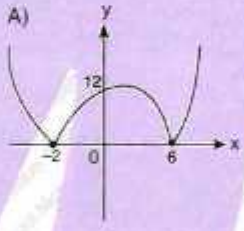


14. $y = |x^2-4x-12| = ?$

A)


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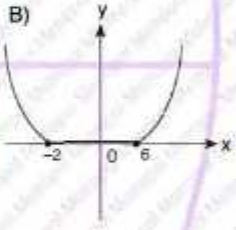

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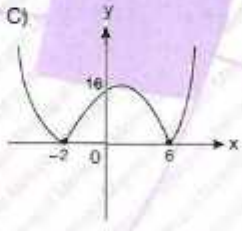
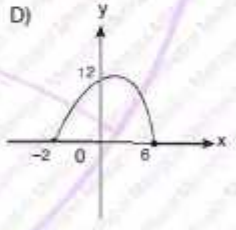
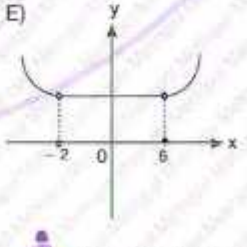


D)


E)


YANITLAR / ANSWERS

1	2	3	4	5	6	7
C	D	C	D	E	D	A
8	**9**	**10**	**11**	**12**	**13**	**14**
E	B	A	A	A	A	A

1. $A = |x-4| + |7-x| \Rightarrow \min(A) = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

2. $-2 \le |2x-8| \le 8 \Rightarrow$ **ÇK(SS) = ?**

A) $[0,1]$ B) $[0,4]$ C) $[0,8]$ D) $[0,16]$ E) $[0,32]$

3. $f(x) = \sqrt{6-|2-x|} \Rightarrow x \in ?$

A) $[2,8]$ B) $[-4,8]$ C) $(-4,8]$ D) $(-4,8)$ E) $(2,8)$

4. $f(x) = \sqrt{9-x^2} + \dfrac{1}{x^2-4} \Rightarrow x \in \mathbb{Z}, \sum x = ?$

A) 3 B) 2 C) 1 D) 0 E) −3

5. $f(x) = \dfrac{\sqrt{9-x^2}}{1-[|x|]} \Rightarrow$ **ÇK(SS) = ?**

A) $[-3,3]$ B) $[1,2)$ C) $[-3,1)$ D) $(2,3]$ E) $[-3,3]-[1,2)$

6. $[|x + [|x + [|x|]|]|] = 9 \Rightarrow$ **ÇK(SS) = ?**

A) [1, 2) B) [2, 3) C) [3, 4) D) [4, 5) E) [5, 6)

7. $[|x|]^2 - 5\cdot[|x|] + 6 = 0 \Rightarrow x \in \mathbb{Z}, \sum x = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

8. $x^2 - 2 = x\cdot\text{sgn}(x) \Rightarrow$ **ÇK(SS) = ?**

A) {0} B) {−2, 0, 2} C) {−2} D) {2} E) {−2, 2}

9. $\operatorname{sgn}(x^2+3) = \left\| \frac{x}{3} - 1 \right\|$

$x \in Z$ için / for $\sum x = ?$

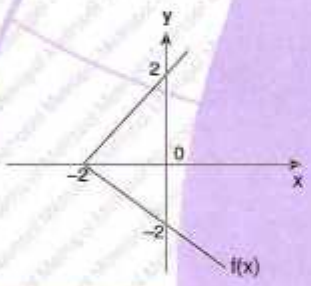
A) 13 B) 14 C) 15 D) 21 E) 24

10. $f(x) = |x-1| - \operatorname{sgn}(1-x)$,

$0 < x < 1 \Rightarrow f(x) = ?$

A) $-x-1$ B) $-x+1$ C) $-x$ D) $x-1$ E) x

11.



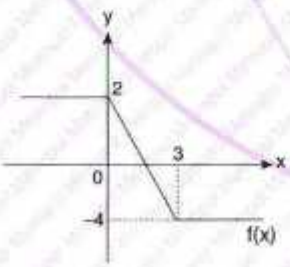
$\Rightarrow f(x) = ?$

A) $y = |x+2|$ B) $|y| = x+2$

C) $|y| = |x+2|$ D) $|y| - |x| = 2$

E) $|y-x| = 2$

12.



$\Rightarrow f(x) = ?$

A) $y = |x+3| - |x| - 1$ B) $y = |x-2| + |x| - 2$

C) $y = |x-3| - |x| - 1$ D) $y = |x+4| - |x| - 2$

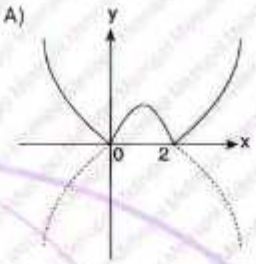
E) $y = |x-2| - |x|$

13. $f : R^+ \to R$,

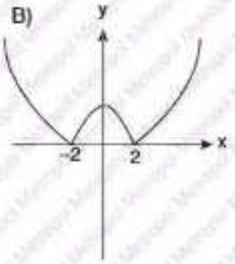
$f(x) = x\,|x-2|$ fonksiyonunun grafiği aşağıdakilerden hangisidir?

Which of the following is the graph of the function $f(x) = x|x-2|$?

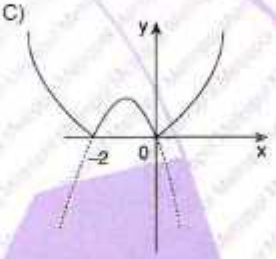
A)



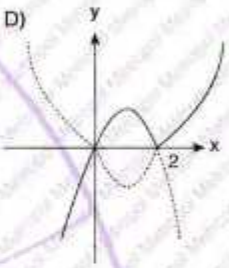
B)



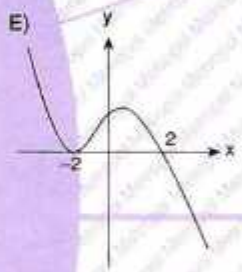
C)



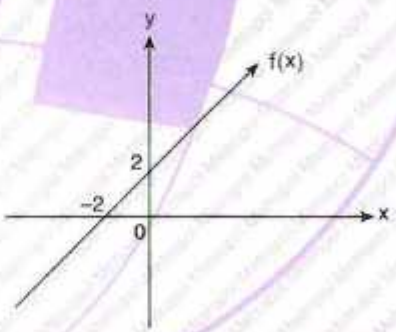
D)



E)



14.



$\Rightarrow -f(-x) = ?$

A) $x+2$ B) $x+1$ C) $-x+2$ D) $x-2$ E) $x-1$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
A	C	B	D	E	C	D
8	**9**	**10**	**11**	**12**	**13**	**14**
E	D	C	B	C	D	D

1. $f: R \to R$

$f(x) = \sqrt{x-2} + \sqrt{2-x} + 4x - 3$

$\Rightarrow$ **f(2020) = ?**

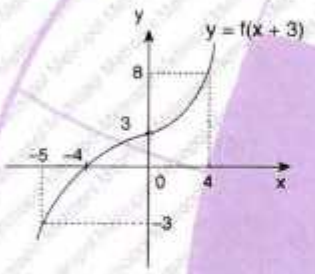
A) 2 B) 3 C) 4 D) 5 E) 12

2. $f(x) = |1 - x^2|$, $g(x) = |1 - 2x|$

$\Rightarrow$ **(fog)(1) = ?**

A) 3 B) 2 C) 1 D) 0 E) −2

3.



$$\Rightarrow \frac{f^{-1}(8) + f(3)}{f(-1) + f^{-1}(-3)} = ?$$

A) −8 B) −6 C) −5 D) 0 E) 7

4. $f(x) = |x + 1|$,

$x \cdot f(x-2) \le 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, 2]$ B) $\left(-\infty, \frac{2}{3}\right)$ C) $(-\infty, 0] \cup \{1\}$

D) $[-1, 1]$ E) $[0, \infty)$

5. $f(x) = \begin{cases} \frac{x-3}{4}, & x \le 4 \\ x^2 + 4, & x > 4 \end{cases}$

$g(x) = \begin{cases} x^2 - 3, & x < 5 \\ 2, & 5 < x \le 7 \\ 2x - 3, & 7 < x \end{cases}$

$\Rightarrow$ **(fog)(6) + (f + g)(3) = ?**

A) $\frac{21}{4}$ B) $\frac{4}{21}$ C) 4 D) $\frac{23}{4}$ E) $\frac{4}{23}$

6. $f: [0, 3] \to R$

$f(x) = x^2 - |6x - x^2|$

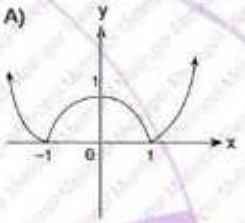
$\Rightarrow$ **min(f(x)) = ?**

A) $-\frac{1}{2}$ B) $-\frac{3}{2}$ C) $-\frac{5}{2}$ D) $-\frac{7}{2}$ E) $-\frac{9}{2}$

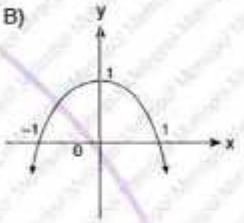
7. **$|y| = x^2 - 1$ fonksiyonunun grafiği aşağıdakilerden hangisidir?**

Which of the following is the graph of the function $|y| = x^2 - 1$?

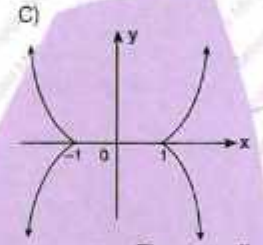
A)



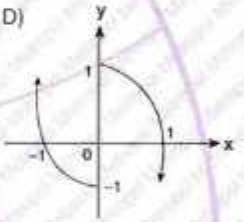
B)



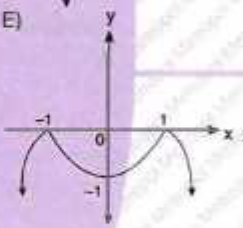
C)



D)



E)



8. $f: R \to R$, $g: R \to R$

$f(x) = \begin{cases} 2x - 1, & x \le 6 \\ x + 3, & 6 < x \end{cases}$

$g(x) = \begin{cases} -4x, & x < 0 \\ x^2, & 0 \le x \end{cases}$ $\Rightarrow$ **(f + g)(5) = ?**

A) 31 B) 32 C) 33 D) 34 E) 35

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	D	C	C	D	E	C	D

1. $f(x)=\sqrt{\log\frac{2-x}{x-6}}$ **fonksiyonunun tanım kümesinde kaç tam sayı vardır?**

How many integers are there in the domain of function $f(x)=\sqrt{\log\frac{2-x}{x-6}}$?

A) 5 B) 4 C) 3 D) 2 E) 1

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

2. $\frac{\sqrt{x-2y}+3x+2y}{\sqrt{2y-x}-x+y}$ **ifadesi bir reel sayıya eşit ise o sayı kaçtır?**

If the expression $\frac{\sqrt{x-2y}+3x+2y}{\sqrt{2y-x}-x+y}$ is equal to a real number, what is that number?

A) −8 B) −4 C) −2 D) −6 E) −10

[ULUDAĞ ÜNİVERSİTESİ – YÖS 2018]

3. $|x|=-x,\ y^2<y$

$\Rightarrow |x-y|-\sqrt{x^2}-\sqrt{y^2}+3\cdot|x|=?$

A) 3x B) 0 C) −3x D) 2x E) −2x

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

4. $f(x,y)=x^y-y^x \Rightarrow f(f(3,1),2)=?$

A) 0 B) 1 C) 2 D) 3 E) 4

[İNÖNÜ ÜNİVERSİTESİ – YÖS 2018]

5. $f(x)=\begin{cases}x+1, & x<0\\ x-2, & x>0\end{cases}$ ve (and) $g(x,y)=\frac{3y-2}{xy+1}$

$\Rightarrow (fog)(0,1)=?$

A) 3 B) 2 C) 10 D) 7 E) −1

[SELÇUK ÜNİVERSİTESİ – YÖS 2017]

6. $f(x)=5x-7$

$g(x)=\begin{cases}x^3+1; & x\geq 0\\ 3x+5; & x<0\end{cases} \Rightarrow (gofog)(-1)=?$

A) 2 B) 9 C) 13 D) 18 E) 28

[İSTANBUL ÜNİVERSİTESİ – YÖS 2016]

7. $f(n+1)=\begin{cases}\frac{1}{n-1}, & n\equiv 0(\text{mod}2)\\ \frac{1}{n+1}, & n\equiv 1(\text{mod}2)\end{cases}$

$\Rightarrow f(3)+f(4)=?$

A) $\frac{7}{4}$ B) $\frac{5}{2}$ C) $\frac{5}{4}$ D) $\frac{4}{5}$ E) $\frac{2}{5}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

8. $x<\frac{5}{3}$

$\rightarrow |5-3x|-\sqrt{9x^2-30x+25}+3x-1=?$

A) 4 B) 3x − 1 C) 9 − 3x D) 3x − 9 E) 1 − 3x

[İSTANBUL ÜNİVERSİTESİ – YÖS 2013]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	A	C	A	E	E	C	B

BÖLÜM CHAPTER 11

TARİHSEL NOT / HISTORICAL NOTE

LEONHARD EULER [1707 - 1783]

İsviçreli matematikçi ve fizikçi. 18. yüzyılın en önemli ve tüm zamanların önde gelen matematikçilerinden biri kabul edilmektedir. En üretken matematikçilerden biri olarak çalışmalarının bütünü 70 cildi aşmaktadır. Euler pek çok yeni kavram geliştirmiş, basit aritmetikten sayılar teorisi ve topolojiye kadar farklı alanlarda uzun süre kabul gören birçok teorem ispatlamıştır. Bu çalışmaları esnasında, günümüzde kullanılan modern matematik terminolojisinin yaratıcısı olmuş, fonksiyon kavramı ve onun yazımını tanımlamıştır (yaptığı bu çalışma için verilebilecek örneklerden bazıları trigonometrik fonksiyonlar için yaptığı sin, cos ve tan tanımlamalarıdır).

Swiss mathematician and physicist. It is regarded as one of the most important and all-time leading mathematicians of the 18th century. As one of the most prolific mathematicians, his works exceed 70 volumes. Euler has developed a number of new concepts, and has proved many theorems that have long been accepted in different fields from simple arithmetic to number theory and topology. During these practices, he became the creator of modern mathematics terminology used today and he also defined the concept writing and of function (some of the examples that he made for this study are the definitions of sin, cos and tan for trigonometric functions).

LİMİT
LIMITS

Bu bölüm 64 alıştırma sorusu, 68 test sorusu, 8 YÖS sorusu içermektedir.

This chapter includes 64 exercise questions, 68 test questions, and 8 YÖS questions.

BÖLÜM / CHAPTER 11

LİMİT / LIMITS

1. $\lim\limits_{x \to 2}(x^3 - 5x + 1) = ?$

Yanıt / The Answer is -1

2. $\lim\limits_{x \to -1}(x^4 - 3x^3 + x^2 - 1) = ?$

Yanıt / The Answer is 4

3. $\lim\limits_{x \to 3}(3x^2 - 2m + 1) = 20 \Rightarrow m = ?$

Yanıt / The Answer is 4

4. $\lim\limits_{x \to -3}(x^3 - ax) = 9 \Rightarrow a = ?$

Yanıt / The Answer is 12

5. $\lim\limits_{x \to -1} 4 + \lim\limits_{x \to 2} 6 + \lim\limits_{x \to 0} 1 = ?$

Yanıt / The Answer is 11

6. $\lim\limits_{x \to 3}(\sqrt{x+13} - \sqrt{7-x}) = ?$

Yanıt / The Answer is 2

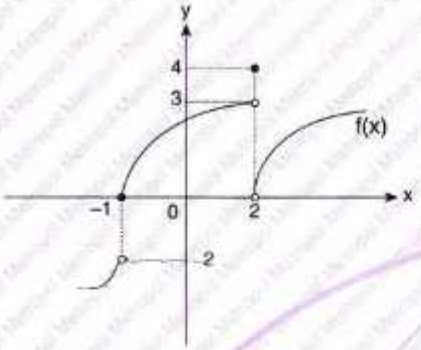
7. $\lim\limits_{x \to \frac{1}{2}}(\sqrt{22 - |4x - 8|}) = ?$

Yanıt / The Answer is 4

8. $\lim\limits_{x \to 3}(3x + \log_2(3x+7)) = ?$

Yanıt / The Answer is 13

9 – 11. soruları aşağıdaki grafiğe göre yanıtlayınız.
Answer the questions 9 – 11 based on the following graph.



9. $\lim\limits_{x \to 2^+} f(x) = ?$

Yanıt / The Answer is 0

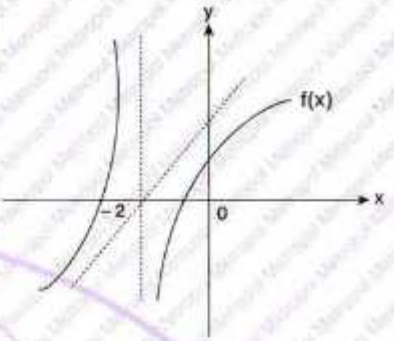
10. $\lim\limits_{x \to -1^-} f(x) = ?$

Yanıt / The Answer is −2

11. $\lim\limits_{x \to 2} f(x) = ?$

Yanıt / The Answer is Limit yoktur./
Limit does not exist.

12 – 14. soruları aşağıdaki grafiğe göre yanıtlayınız.
Answer the questions 12 – 14 based on the following graph.



12. $\lim\limits_{x \to -2^+} f(x) = ?$

Yanıt / The Answer is $-\infty$

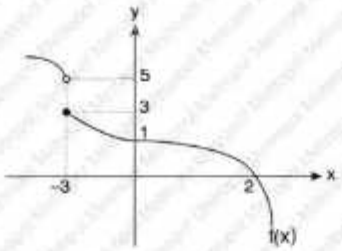
13. $\lim\limits_{x \to -\infty} f(x) = ?$

Yanıt / The Answer is $-\infty$

14. $\lim\limits_{x \to \infty} f(x) = ?$

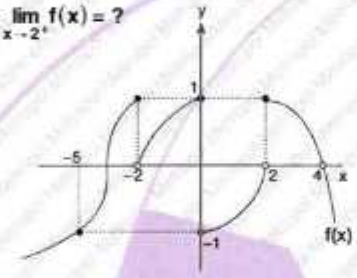
Yanıt / The Answer is ∞

15. $\dfrac{\lim\limits_{x \to -3^+} f(x)}{\lim\limits_{x \to -3^-} f(x)} = ?$



Yanıt / The Answer is $\dfrac{3}{5}$

16. $\lim\limits_{x \to -5} f(x) + \lim\limits_{x \to -2^+} f(x) - \lim\limits_{x \to 2^+} f(x) = ?$



Yanıt / The Answer is -2

17 – 19. soruları aşağıdaki fonksiyona göre yanıtlayınız.

Answer the questions 17–19 based on the following function.

$$f(x) = \begin{cases} 3x+1, & x \geq 2 \\ x-2, & x < 2 \end{cases}$$

17. $\lim\limits_{x \to -2} f(x) = ?$

Yanıt / The Answer is -4

18. $\lim\limits_{x \to 2^+} f(x) = ?$

Yanıt / The Answer is 7

19. $\lim\limits_{x \to 2} f(x) = ?$

Yanıt / The Answer is Limit yoktur./ Limit does not exist.

20. $f(x) = \begin{cases} kx+3, & x < -1 \\ 3, & x = -1 \\ x+4, & x > -1 \end{cases}$

$\lim\limits_{x \to -1} f(x) = 3 \Rightarrow k = ?$

Yanıt / The Answer is 0

21. $f(x) = \begin{cases} 4-x^2, & x \geq 1 \\ x+2, & x < 1 \end{cases}$

$\Rightarrow \lim\limits_{x \to 1} f(x) = ?$

Yanıt / The Answer is 3

22. $f(x) = \begin{cases} x^2-4a, & x \leq 2 \\ -5x+b, & x > 2 \end{cases}$

$\lim\limits_{x \to 2} f(x) = -4 \Rightarrow a-b = ?$

Yanıt / The Answer is -4

23. $\lim\limits_{x \to 4^+} |4-x| = ?$

Yanıt / The Answer is 0

24. $\lim\limits_{x \to 0^-} \dfrac{|x|}{x} = ?$

Yanıt / The Answer is -1

25. $\lim\limits_{x \to 0^+} \frac{|x|}{x} = ?$

Yanıt / The Answer is 1

26. $\lim\limits_{x \to 2^+} \frac{|2-x|}{x-2} = ?$

Yanıt / The Answer is 1

27. $\lim\limits_{x \to 3^-} \frac{x^2-9}{|x-3|} = ?$

Yanıt / The Answer is −6

28. $\lim\limits_{x \to 2^+} \frac{4}{x-2} = ?$

Yanıt / The Answer is ∞

29. $\lim\limits_{x \to 4^+} \frac{1}{4-x} = ?$

Yanıt / The Answer is −∞

30. $\lim\limits_{x \to 5^+} \frac{5x+1}{x-5} = ?$

Yanıt / The Answer is ∞

31. $\lim\limits_{x \to -1^+} \frac{x+3}{x+1} = ?$

Yanıt / The Answer is ∞

32. $\lim\limits_{x \to \infty} \frac{8}{x-2} = ?$

Yanıt / The Answer is 0

33. $\lim\limits_{x \to \infty} 2^x = ?$

Yanıt / The Answer is ∞

34. $\lim\limits_{x \to \infty} \left(\frac{1}{2}\right)^x = ?$

Yanıt / The Answer is 0

35. $\lim\limits_{x \to 1^+} \frac{4x+2}{x-1} = ?$

Yanıt / The Answer is ∞

36. $\lim\limits_{x \to 1^-} \frac{4x+2}{(x-1)^2} = ?$

Yanıt / The Answer is ∞

37. $\lim\limits_{x \to 1} \frac{4x+2}{(x-1)^2}$

Yanıt / The Answer is ∞

38. $\lim\limits_{x \to 0} (4^{\frac{1}{x}} - 2^x + 4) = ?$

Yanıt / The Answer is 3

39. $\lim\limits_{x \to \infty} \left(\frac{1}{2}\right)^{-x} = ?$

Yanıt / The Answer is ∞

40. $\lim\limits_{x \to -\infty} \left(\frac{5}{2}\right)^x = ?$

Yanıt / The Answer is 0

41. $\lim\limits_{x \to -\infty} 5^{-x} = ?$

Yanıt / The Answer is ∞

42. $\lim\limits_{x \to 1^-} \dfrac{1}{2^{x-1}} = ?$

Yanıt / The Answer is 1

43. $\lim\limits_{x \to \infty} (x^2 + x + 4) = ?$

Yanıt / The Answer is ∞

44. $\lim\limits_{x \to \infty} (-2x^3 + 2) = ?$

Yanıt / The Answer is $-\infty$

45. $\lim\limits_{x \to -\infty} (4x^7 - x^3 + 1) = ?$

Yanıt / The Answer is $-\infty$

46. $\lim\limits_{x \to \frac{\pi}{2}} \left(\dfrac{\cos x + 1}{2 - \sin x}\right) = ?$

Yanıt / The Answer is 1

47. $\lim\limits_{x \to \frac{\pi}{3}} (\cos x + \sin x) = ?$

Yanıt / The Answer is $\dfrac{\sqrt{3} + 1}{2}$

48. $\lim\limits_{x \to 1} (3x \cdot f(x)) = 12$

$\Rightarrow \lim\limits_{x \to 1} f(x) = ?$

Yanıt / The Answer is 4

49. $\lim\limits_{x \to \frac{3\pi}{4}} \left(\dfrac{-1-\tan x}{6-4\cot x}\right) = ?$

Yanıt / The Answer is 0

50. $\lim\limits_{x \to \frac{2\pi}{3}} \left(\dfrac{\sqrt{3}\cdot \sin x}{\frac{-1}{2}+\cos x}\right) = ?$

Yanıt / The Answer is $-\dfrac{3}{2}$

51. $\lim\limits_{x \to \frac{\pi}{2}} \left(\dfrac{\sin^2 x-\cos^2 x}{1+\cot^2 x}\right) = ?$

Yanıt / The Answer is 1

52. $\lim\limits_{x \to \frac{\pi}{2}} (\sin x - 1) = ?$

Yanıt / The Answer is 0

53. $\lim\limits_{x \to 2} (x^2+2a-1) = 9 \Rightarrow a = ?$

Yanıt / The Answer is 3

54. $\lim\limits_{x \to 0} \dfrac{x^3+3x-5}{x^2+x+1} = ?$

Yanıt / The Answer is -5

55. $m \in R^+$,

$\lim\limits_{x \to -1} (x^2-mx)^2 \cdot (x+2) = 9 \Rightarrow m = ?$

Yanıt / The Answer is 2

56. $\lim\limits_{x \to 3} f(x) = 2,\ \lim\limits_{x \to 3} g(x) = -2$

$\Rightarrow \lim\limits_{x \to 3} [f(x)+2\cdot g(x)] = ?$

Yanıt / The Answer is -2

57. $\lim\limits_{x \to -1} f(x) = -2,\ \lim\limits_{x \to -1} g(x) = 2$

$\Rightarrow \lim\limits_{x \to -1} \sqrt{f^3(x) + 4 \cdot g^2(x) + 1} = ?$

Yanıt / The Answer is 3

58. $\lim\limits_{x \to 2} (-2)^{2x^2 - x} = ?$

Yanıt / The Answer is 64

59. $\lim\limits_{x \to 4} \left[\left(\log_3(2x^2 - x - 1)\right)\right] = ?$

Yanıt / The Answer is 3

60. $\lim\limits_{x \to 3} \left[\log_2(5x^2) - \log_2(x^2)\right] = ?$

Yanıt / The Answer is $\log_2^5$

61. $\lim\limits_{x \to \infty} (\ln|x+1| + \ln|x-1|) = ?$

Yanıt / The Answer is ∞

62. $\lim\limits_{x \to \infty} (\ln|2x| - \ln|2x^2|) = ?$

Yanıt / The Answer is $-\infty$

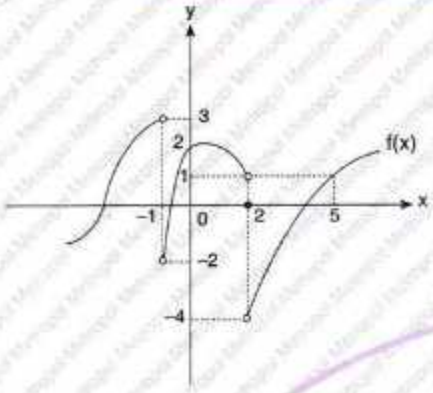
63. $\lim\limits_{x \to 5} e^{2x^2 + 1} = ?$

Yanıt / The Answer is e^{51}

64. $\lim\limits_{x \to -\infty} e^{\frac{1}{2x^2 + 1}} = ?$

Yanıt / The Answer is 1

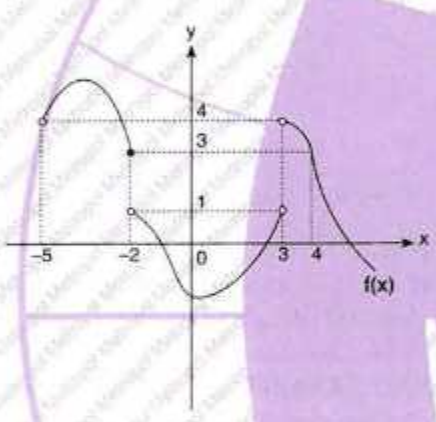
1.



$\Rightarrow \lim\limits_{x \to -1^-} f(x) + \lim\limits_{x \to 0^+} f(x) + \lim\limits_{x \to 2^+} f(x) + \lim\limits_{x \to 5} f(x) = ?$

A) – 2 B) – 1 C) 0 D) 1 E) 2

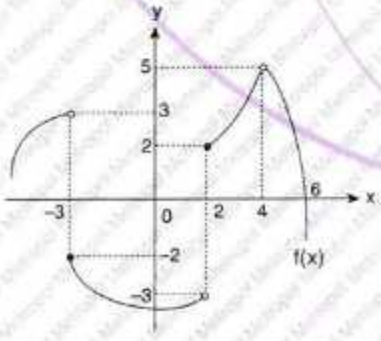
2.



$\Rightarrow \lim\limits_{x \to -5^+} f(x) + \lim\limits_{x \to -2^+} f(x) + \lim\limits_{x \to 3^-} f(x) + \lim\limits_{x \to 4} f(x) = ?$

A) –3 B) 0 C) 3 D) 6 E) 9

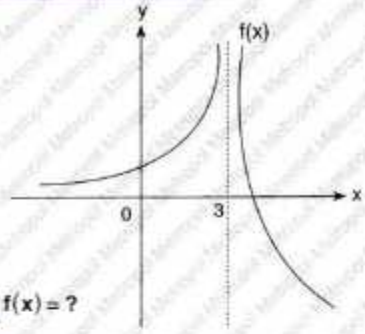
3.



$\Rightarrow \lim\limits_{x \to -3^+} f(x) + \lim\limits_{x \to 4} f(x) - \lim\limits_{x \to -3^-} f(x) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

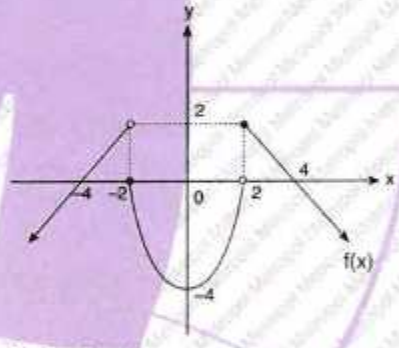
4.



$\Rightarrow \lim\limits_{x \to 3} f(x) = ?$

A) $-\infty$ B) 0 C) 3 D) ∞ E) Limit yoktur./ Limit does not exist.

5.



$\Rightarrow \lim\limits_{x \to 0} f(x) + \lim\limits_{x \to 2^+} f(x) + \lim\limits_{x \to -2} f(x) = ?$

A) –4 B) –2 C) 0 D) 2 E) 4

6. $f(x) = \begin{cases} 5 + x, & x \geq 5 \\ x^2 - 1, & x < 5 \end{cases} \Rightarrow \lim\limits_{x \to 5} f(x) = ?$

A) 10 B) 24 C) 1 D) –10 E) Limit yoktur./ Limit does not exist.

7. $f(x)=\begin{cases} x^2+x-7, & x<-2 \\ 4x+3, & x>-2 \end{cases}$

$\Rightarrow \lim\limits_{x\to -2} f(x)+\lim\limits_{x\to -3} f(x)+\lim\limits_{x\to 3} f(x)=?$

A) 4 B) 5 C) 9 D) 10 E) 15

8. $f(x)=\begin{cases} x^2+3, & x>0 \\ 2x+1, & x=0 \\ 3x+7, & x<0 \end{cases}$

$\Rightarrow \lim\limits_{x\to -1} f(x)=?$

A) 4 B) 8 C) 12 D) 16 E) 20

9. $f(x)=\begin{cases} 2x-1, & x\geq 3 \\ 5x+1, & x<3 \end{cases} \Rightarrow \lim\limits_{x\to 3^-} f(x)+\lim\limits_{x\to 3^+} f(x)=?$

A) 5 B) 8 C) 14 D) 17 E) 21

10. $f(x)=\begin{cases} 1-x^3, & x<3 \\ 2x+1, & 3\leq x \end{cases} \Rightarrow \lim\limits_{x\to 3} f(x)=?$

A) −26 B) −8 C) −7 D) 7 E) Limit yoktur./ Limit does not exist.

11. $f(x)=\begin{cases} 3x+\frac{2}{x}, & x<0 \\ \ln x, & x>0 \end{cases} \Rightarrow \lim\limits_{x\to 0} f(x)=?$

A) $-\infty$ B) −1 C) 0 D) Limit yoktur./ Limit does not exist. E) ∞

12. $f(x)=\begin{cases} 2x+a, & x>1 \\ 7, & x=1 \\ 3x-b, & x<1 \end{cases}$

$\lim\limits_{x\to 1} f(x)=c, c\in R \Rightarrow a+b=?$

A) −1 B) 0 C) 1 D) 3 E) 5

13. $f(x)=\begin{cases} x-|x-2|, & x<2 \\ 2x-1, & x=2 \\ 2-\log_2(x^3-4), & x>2 \end{cases}$

$\Rightarrow \lim\limits_{x\to 2^-} f(x)+\lim\limits_{x\to 2^+} f(x)=?$

A) −2 B) −1 C) 0 D) 1 E) 2

14. $f(x)=\begin{cases} x^2+b, & x<2 \\ ax+3, & 2<x \end{cases}$

$\lim\limits_{x\to 2} f(x)=7 \Rightarrow 3a-b=?$

A) 1 B) 2 C) 3 D) 4 E) 5

YANITLAR / ANSWERS

1	2	3	4	5	6	7
E	E	A	D	C	E	C
8	**9**	**10**	**11**	**12**	**13**	**14**
A	E	E	A	C	E	C

1. $\lim\limits_{x \to 1} (x^2 - x + 1) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $\lim\limits_{x \to 3} (x^2 - 3x + 5) = ?$

A) 9 B) 5 C) 3 D) 2 E) 1

3. $\lim\limits_{y \to 4} \sqrt{y^2 + y + 5} = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

4. $\lim\limits_{x \to 0} \dfrac{x^2 - 1}{7 - 2x + 8x^2} = ?$

A) -8 B) $-\dfrac{8}{7}$ C) $-\dfrac{1}{7}$ D) $\dfrac{1}{7}$ E) -1

5. $\lim\limits_{x \to 1} \dfrac{x^2 - 3x + 1}{x^2 + 1} = ?$

A) $\dfrac{1}{2}$ B) 2 C) -2 D) $-\dfrac{1}{2}$ E) -4

6. $\lim\limits_{h \to 0} \dfrac{h}{h^2 - 7h + 1} = ?$

A) 7 B) 4 C) 1 D) 0 E) ∞

7. $\lim\limits_{x \to a} f(x) = -2$ ve/and $\lim\limits_{x \to a} g(x) = 3$

$\Rightarrow \lim\limits_{x \to a} \dfrac{2f(x) - g(x)}{g^2(x)} = ?$

A) $-\dfrac{9}{7}$ B) $-\dfrac{7}{9}$ C) $-\dfrac{8}{9}$ D) $-\dfrac{7}{8}$ E) $-\dfrac{7}{2}$

8. $\lim\limits_{x \to 0} \dfrac{x^3 + 2x^2 + x}{x^3 + x + 1} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

9. $\lim\limits_{x \to 6} \left(\log_{\frac{1}{5}} (x-5) \right) = ?$

A) 5 B) −5 C) 0 D) 6 E) 12

10. $\lim\limits_{x \to 2} [\ln(x+1)] = A \Rightarrow e^A = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $\lim\limits_{x \to k} [f(x) - g(x)] = 10$

$\lim\limits_{x \to k} [f(x) + g(x)] = 8$

$\Rightarrow \lim\limits_{x \to k} [f(x) \cdot g(x)] = ?$

A) −9 B) −5 C) −1 D) 5 E) 9

12. $f(x) = (x^2 - x - 1)^2$, $g(x) = (x-1)^2 + 1 \Rightarrow \lim\limits_{x \to 1} [f(x) + g(x)] = ?$

A) −1 B) 0 C) 1 D) 2 E) 3

13. $\lim\limits_{x \to 0^+} \dfrac{5x+4}{x^2+x} = ?$

A) $-\infty$ B) −1 C) 0 D) 1 E) ∞

14. $\lim\limits_{x \to \infty} \left(\dfrac{4}{5}\right)^{x+1} = ?$

A) $-\infty$ B) −1 C) 0 D) 1 E) ∞

15. $\lim\limits_{x \to \infty} \left(5^x + \dfrac{12}{x} + 12^{1/x}\right) = ?$

A) $-\infty$ B) −1 C) 0 D) 1 E) ∞

16. $\lim\limits_{x \to 0} \dfrac{x-2}{x^5} = ?$

A) $-\infty$ B) −1 C) 0 D) 1 E) ∞

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	B	D	C	D	D	B	C
9	10	11	12	13	14	15	16
C	C	A	D	E	C	E	E

1. $\lim\limits_{x \to 7} \left(\sqrt{x+2} - \sqrt{11-x}\right) = ?$

A) 3 B) 2 C) 1 D) −1 E) −3

2. $\left.\begin{array}{l} f(x) = x^3 - 3x + 4 \\ g(x) = x^3 - 5 \end{array}\right\} \Rightarrow \lim\limits_{x \to 2} \dfrac{2 \cdot f(x)}{g(x)} = ?$

A) 12 B) 8 C) 4 D) 2 E) 1

3. $f(x) = \log_3 \dfrac{6x+3}{x-3} \Rightarrow \lim\limits_{x \to 4} f(x) = ?$

A) 1 B) 3 C) 5 D) 7 E) 9

4. $\lim\limits_{x \to 8} \left[\log_3(x^2 - 2x - 3) - \log_9(x^2 - 6x + 9)\right] = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

5. $\lim\limits_{x \to 1} \dfrac{2x^2 - ax + 4}{4x + 1} = 4 \Rightarrow a = ?$

A) −28 B) −14 C) −7 D) 7 E) 14

6. $\lim\limits_{x \to \frac{\pi}{3}} \dfrac{2\tan^2 x - 1}{2\cos x + 3} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) 1 E) $\frac{5}{4}$

7. $\lim\limits_{x \to \frac{\pi}{3}} \sec x = ?$

A) $\frac{2}{\sqrt{3}}$ B) $-\frac{2}{\sqrt{3}}$ C) −2 D) 2 E) 1

8. $f(x) = \dfrac{\sin x - \sqrt{3}}{\cos x + 1} \Rightarrow \lim\limits_{x \to \frac{\pi}{3}} f(x) = ?$

A) $-\frac{\sqrt{3}}{3}$ B) $\frac{\sqrt{3}}{3}$ C) $\sqrt{3}$ D) $-\sqrt{3}$ E) 1

9. $\lim\limits_{x \to \left(\frac{\pi}{2}\right)} \frac{|\cos x|}{\cos x} = ?$

A) -1 B) 0 C) 1 D) $\frac{1}{2}$ E) $-\frac{\sqrt{3}}{2}$

10. $\lim\limits_{x \to \pi^+} \frac{|\sin x|}{\sin x} = ?$

A) -1 B) 0 C) 1 D) $-\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

11. $\lim\limits_{x \to 2^+} \frac{|x-2|}{x^2-4} = ?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{8}$ E) $\frac{1}{16}$

12. $\lim\limits_{x \to 5^+} \frac{|x-5|}{x^2-25} = ?$

A) $\frac{1}{5}$ B) $\frac{1}{10}$ C) $\frac{1}{20}$ D) $\frac{1}{25}$ E) $\frac{1}{30}$

13. $\lim\limits_{x \to 1^+} \frac{3x-3}{|1-x|} = ?$

A) 1 B) 3 C) 5 D) -1 E) -3

14. $\lim\limits_{x \to 3^+} \frac{|x-3|+3x-9}{x^2-3x-4} = ?$

A) 0 B) 4 C) 3 D) 7 E) 9

15. $\lim\limits_{x \to 3^+} \frac{|x|}{|9-3x|} = ?$

A) $-\infty$ B) 3 C) 1 D) -3 E) ∞

16. $\lim\limits_{x \to 2} \frac{|2x-4|}{x-2} = ?$

A) 2 B) 0 C) -2 D) -1 E) Limit yoktur./ Limit does not exist.

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	C	B	A	B	E	D	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	C	B	B	A	E	E

1. $\lim\limits_{x \to 2} \dfrac{x^2-4}{x^3-8} = ?$

A) $\dfrac{1}{3}$ B) 3 C) $\dfrac{1}{9}$ D) 9 E) 12

2. $\lim\limits_{y \to x} \dfrac{x^2-y^2}{y-x} = ?$

A) $-x$ B) $-y$ C) $2x$ D) $-2x$ E) $-2y$

3. $\lim\limits_{x \to 2} \sqrt{\dfrac{x^4-16}{x^3-8}} = ?$

A) $\sqrt{6}$ B) $\sqrt{3}$ C) $2\sqrt{6}$ D) $\dfrac{2\sqrt{6}}{3}$ E) $-\dfrac{2\sqrt{6}}{3}$

4. $\lim\limits_{y \to 2} \sqrt{\dfrac{y^2-4}{y^2-3y+2}} = ?$

A) 4 B) 8 C) 2 D) 16 E) 9

5. $\lim\limits_{x \to 1} \dfrac{x^3-1}{x-1} = ?$

A) 9 B) 6 C) 3 D) 2 E) 1

6. $\lim\limits_{\theta \to 2} \sqrt{\dfrac{\theta^3-8}{\theta^2-4}} = ?$

A) $\sqrt{21}$ B) $\sqrt{19}$ C) $\sqrt{7}$ D) $\sqrt{3}$ E) $\sqrt{2}$

7. $\lim\limits_{x \to -1} \dfrac{x^3+1}{x+1} = ?$

A) 1 B) 3 C) 5 D) 7 E) 9

8. $\lim\limits_{x \to -2} \dfrac{x^2+2x}{x+2} = ?$

A) -4 B) -3 C) -2 D) -1 E) 0

9. $\lim\limits_{x \to 2} \dfrac{x^3-8}{x-2} = ?$

A) 15 B) 12 C) 9 D) 6 E) 3

10. $\lim\limits_{y \to b} \dfrac{y\sqrt{y}-b\sqrt{b}}{\sqrt{y}-\sqrt{b}} = ?$

A) 3y B) 3b C) −3y D) −3b E) −b

11. $\lim\limits_{h \to 0} \dfrac{(x+h)^2-x^2}{h} = ?$

A) 2 B) x C) 2x D) 4x E) 8x

12. $\lim\limits_{x \to 2} \dfrac{x^2-x-2}{x-2} = ?$

A) 9 B) 8 C) 5 D) 4 E) 3

13. $\lim\limits_{x \to 0^+} \left(3^{-\frac{1}{x}} + 2^x - \dfrac{4}{5^{-x}} - 1\right) = ?$

A) −5 B) −4 C) −3 D) 1 E) 2

14. $\lim\limits_{x \to 3} f(x) = 4$

$\Rightarrow \lim\limits_{x \to 3} \dfrac{(f(x)-3)\cdot(f^2(x)-4f(x)+1)}{x+3} = ?$

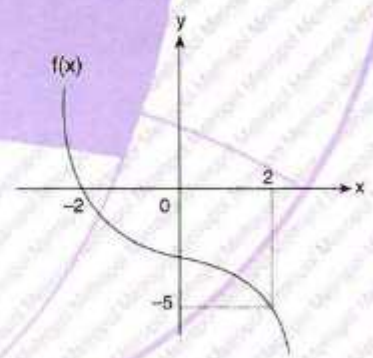
A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

15. $\lim\limits_{x \to 3^+} f(x) = 1$ ve/and $\lim\limits_{x \to 3^-} f(x) = 2$

$\Rightarrow \lim\limits_{x \to 2^+} \dfrac{f(2x-1)+f(5-x)}{f(x^2-1)} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

16.



$\Rightarrow \lim\limits_{x \to 2} \dfrac{(f(x))^2+7\cdot f(x)+10}{f(x)+5} = ?$

A) 1 B) 0 C) −1 D) −2 E) −3

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	D	D	C	C	D	B	C
9	10	11	12	13	14	15	16
B	B	C	E	B	E	C	E

1. $f(x)=\begin{cases}5x-2, & x\geq 3\\ x^2+4, & x<3\end{cases}$

$\Rightarrow \lim\limits_{x\to 3} f(x)+\lim\limits_{x\to 1} f(x)-\lim\limits_{x\to 5} f(x)=?$

A) −6 B) −5 C) −3 D) −1 E) 0

2. $\lim\limits_{x\to -\infty}\left(2^{\frac{1}{x}}+\frac{1}{2^{-x}}+2\right)=?$

A) 0 B) 1 C) 2 D) 3 E) 4

3. $b<0,$

$\lim\limits_{x\to 3}\frac{b^2+x^2-2}{x-1}=8 \Rightarrow b=?$

A) −1 B) −2 C) −3 D) −4 E) −5

4. $f(x)=\begin{cases}x^2-a, & x>4\\ ax+1, & x<4\end{cases}$

x = 4 de limiti var ise a = ?

If f(x) has a limit in x = 4, a = ?

A) 1 B) 2 C) 3 D) 4 E) 5

5. $f:R\to R^+$

$\lim\limits_{x\to -1} f^2(x)=36 \Rightarrow \lim\limits_{x\to -1}\frac{(f(x)+3)\cdot(f^2(x)-3\cdot f(x)-12)}{x+2}=?$

A) 18 B) 36 C) 54 D) 64 E) 96

6. $\lim\limits_{x\to 0}\frac{e^{3x}-1}{(e^x-1)\cdot(e^x+1)}=?$

A) 1 B) $\frac{1}{2}$ C) $\frac{3}{2}$ D) 2 E) 3

7. $\lim\limits_{x\to 1}\frac{1}{-(x-1)^2}=?$

A) Limit yoktur. / Limit does not exist. B) 0 C) ∞ D) $-\infty$ E) 1

8. $\lim\limits_{x\to 1}\frac{1}{-(x-1)^3}=?$

A) Limit yoktur. / Limit does not exist. B) 0 C) ∞ D) $-\infty$ E) 1

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	D	C	C	C	C	D	A

1. $\lim\limits_{x \to \infty} \left(5^{\frac{1}{x}} + \frac{1}{5^x} - 2\right) = ?$

A) 3 B) 2 C) 1 D) 0 E) −1

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2. $\lim\limits_{x \to \frac{\pi}{2}} \frac{\cos x - \sin 4x}{\cot x} = ?$

A) −5 B) −3 C) 1 D) 3 E) 5

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2018]

3. $f(x) = \begin{cases} 3x+2, & x > 2 \\ 2^{x+1}, & x < 2 \end{cases}$

$\Rightarrow \lim\limits_{x \to 2} f(x) = ?$

A) 2 B) 3 C) 4 D) 7 E) 8

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

4. $\lim\limits_{x \to 2} \frac{a^2 - x - 2}{x + 1} = 7 \Rightarrow a > 0,\ a = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

5. $\lim\limits_{x \to 0} \frac{5^x - 2^x}{3 \cdot 2^x} = ?$

A) $\frac{5}{3}$ B) $\frac{3}{5}$ C) $\frac{1}{2}$ D) 0 E) 1

[KÜNİB – YÖS 2018]

6. $f(x) = \begin{cases} mx + 4, & x > 1 \\ x^2 + 2m, & x < 1 \end{cases}$

x = 1 de limiti var ise **m = ?**

If f(x) has a limit in x = 1, m = ?

A) 3 B) 2 C) 1 D) 0 E) −1

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

7. $\lim\limits_{x \to 3} f(x) = 4$

$\Rightarrow \lim\limits_{x \to 3} \frac{(f(x) - 3) \cdot (f^2(x) - 4 \cdot f(x) + 1)}{x + 3} = ?$

A) 0 B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) $\frac{1}{2}$ E) 5

[İSTANBUL ÜNİVERSİTESİ – YÖS 2013]

8. $\lim\limits_{x \to \infty} \left(e^{-x} - \pi^{\frac{1}{x}}\right) = ?$

A) −1 B) 0 C) 1 D) e E) −e

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2013]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	E	E	B	D	A	B	A

BÖLÜM CHAPTER 12

TARİHSEL NOT / HISTORICAL NOTE

ÖMER HAYYAM [1048 - 1131]

İranlı şair, filozof, matematikçi ve astronom. Hayyam, üçüncü dereceden bilinmeyen denklemlerle ilgili yazdığı bir eserinde bilinmeyen rakamın yerine Arapça'da "şey" anlamına gelen kelimeyi kullanmıştır. Daha sonra bu eseri diğer dillere çevrilirken İspanyolcaya "Xay" olarak geçmiştir. Daha sonra bu kelime ilk harfine indirgenerek bilinmeyen rakamın simgesi "x" olarak kullanılmaya başlamıştır. Binom açılımını ilk kullanan bilim insanıdır.

Iranian poet, philosopher, mathematician and astronomer. Khayyam, in a book he wrote about the equations of the third degree unknowns, used the word "thing" in Arabic instead of the unknown figure. Later this work was translated into other languages and passed to Spanish as "Xay". Then this word is reduced to the first letter of the unknown number "x" as the symbol began to be used. He is the first scientist to use binomial expansion.

LİMİTTE BELİRSİZLİKLER VE FONKSİYONLARIN SÜREKLİLİĞİ
INDETERMINATE FORMS and CONTINUITY of FUNCTIONS

Bu bölüm 48 alıştırma sorusu, 128 test sorusu, 16 YÖS sorusu içermektedir.
This chapter includes 48 exercise questions, 128 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 12

LİMİTTE BELİRSİZLİKLER VE FONKSİYONLARIN SÜREKLİLİĞİ
INDETERMINATE FORMS and CONTINUITY of FUNCTIONS

1. $\lim\limits_{x \to 1} \dfrac{x^2-1}{x-1} = ?$

Yanıt / The Answer is 2

2. $\lim\limits_{x \to 1} \dfrac{x-1}{x^2-6x+5} = ?$

Yanıt / The Answer is $-\dfrac{1}{4}$

3. $\lim\limits_{x \to -1} \dfrac{x^3+1}{x^2-1} = ?$

Yanıt / The Answer is $-\dfrac{3}{2}$

4. $\lim\limits_{x \to a} \dfrac{x^2-a^2}{x-a} = ?$

Yanıt / The Answer is 2a

5. $\lim\limits_{x \to 4} \dfrac{2x^3-8x^2}{x-4} = ?$

Yanıt / The Answer is 32

6. $a, b \in R,$

$\lim\limits_{x \to 2} \dfrac{x^2+a}{2x-4} = b \Rightarrow a = ?$

Yanıt / The Answer is -4

7. $\lim\limits_{x \to 1} \dfrac{3x-k}{x-1} = m, \ (k, m \in R) \Rightarrow k = ?$

Yanıt / The Answer is 3

8. $a, b \in R$

$\lim\limits_{x \to 1} \dfrac{x^2-ax-5}{x-1} = b \Rightarrow a+b = ?$

Yanıt / The Answer is 2

9. $a, b \in R$,

$$\lim_{x \to 1} \frac{x^2+x+a}{x-1} = b \Rightarrow a+b = ?$$

Yanıt / The Answer is 1

10. $k, m \in R$,

$$\lim_{x \to 2} \frac{2x-\sqrt{x+k}}{x^2-4} = m \Rightarrow k = ?$$

Yanıt / The Answer is 14

11. $$\lim_{x \to 3} \frac{x^3-3x^2+3x-9}{x^3-3x^2-x+3} = ?$$

Yanıt / The Answer is $\frac{3}{2}$

12. $$\lim_{x \to 0} \frac{\sin 5x}{3x} = ?$$

Yanıt / The Answer is $\frac{5}{3}$

13. $$\lim_{x \to 0} \frac{\tan 5x}{3x} = ?$$

Yanıt / The Answer is $\frac{5}{3}$

14. $$\lim_{x \to 0} \frac{3x}{\tan 6x} = ?$$

Yanıt / The Answer is $\frac{1}{2}$

15. $$\lim_{x \to 2} \frac{\sin(x-2)}{x-2} = ?$$

Yanıt / The Answer is 1

16. $$\lim_{x \to -1} \frac{2x+2}{\tan(3x+3)} = ?$$

Yanıt / The Answer is $\frac{2}{3}$

17. $\lim\limits_{x \to 0} \dfrac{\tan 6x + \sin 8x}{2x} = ?$

Yanıt / The Answer is 7

18. $\lim\limits_{x \to \infty} \dfrac{\sin \frac{3}{x}}{\frac{6}{x}} = ?$

Yanıt / The Answer is $\frac{1}{2}$

19. $\lim\limits_{x \to 4} \dfrac{\sin(2x-8)}{x-4} = ?$

Yanıt / The Answer is 2

20. $\lim\limits_{x \to 2} \dfrac{x-2}{\tan(x^2-4)} = ?$

Yanıt / The Answer is $\frac{1}{4}$

21. $\lim\limits_{x \to 0} \dfrac{3x^2}{\sin^2 x} = ?$

Yanıt / The Answer is 3

22. $\lim\limits_{x \to 0} \dfrac{\sin^3 4x}{\tan^3 2x} = ?$

Yanıt / The Answer is 8

23. $\lim\limits_{x \to 0} \dfrac{5x - \sin ax}{\tan x} = 4 \Rightarrow a = ?$

Yanıt / The Answer is 1

24. $\lim\limits_{x \to \frac{\pi}{4}} \dfrac{\cos 2x}{\sin x - \cos x} = ?$

Yanıt / The Answer is $-\sqrt{2}$

25. $\lim\limits_{x \to -\infty} \dfrac{5x^3+5}{x-2} = ?$

Yanıt / The Answer is ∞

26. $\lim\limits_{x \to -\infty} \dfrac{2x+1}{x^2+2x+1} = ?$

Yanıt / The Answer is 0

27. $\lim\limits_{x \to \infty} \dfrac{3x+4}{4x-1} = ?$

Yanıt / The Answer is $\dfrac{3}{4}$

28. $\lim\limits_{x \to \infty} \dfrac{4x^2-2x+1}{-2x^2+x+1} = ?$

Yanıt / The Answer is -2

29. $\lim\limits_{x \to \infty} \dfrac{3x^3-2x^2+1}{x^4-3x^2-2} = ?$

Yanıt / The Answer is 0

30. $\lim\limits_{x \to \infty} \dfrac{-7x^4-3x^3+2x^2+1}{3x^4+2x^3-x^2-1} = ?$

Yanıt / The Answer is $-\dfrac{7}{3}$

31. $\lim\limits_{x \to \infty} \dfrac{(x-3)^2}{2x^2-x} = ?$

Yanıt / The Answer is $\dfrac{1}{2}$

32. $\lim\limits_{x \to -\infty} \dfrac{(x+1)^2 \cdot (2x+1)^3}{2x^5} = ?$

Yanıt / The Answer is 4

33. $\lim\limits_{x\to\infty} \dfrac{(a-2)x^2+x+1}{-3x+1} = -\dfrac{1}{3} \Rightarrow a = ?$

Yanıt / The Answer is 2

34. $\lim\limits_{x\to\infty} \dfrac{(k-2)x^3+(m+1)x^2-4x+1}{2x^2-1} = 3 \Rightarrow k+m = ?$

Yanıt / The Answer is 7

35. $\lim\limits_{x\to\infty} \dfrac{2\cdot 2^x+4\cdot 3^x}{3^x+2\cdot 2^x} = ?$

Yanıt / The Answer is 4

36. $\lim\limits_{x\to\infty} \dfrac{3\pi^x+2e^x}{3e^x-\pi^x} = ?$

Yanıt / The Answer is -3

37. $\lim\limits_{x\to\infty} \dfrac{x+\sqrt{x^2+4}}{3x+\sqrt{x^2+2x+1}} = ?$

Yanıt / The Answer is $\dfrac{1}{2}$

38. $\lim\limits_{x\to-\infty} \dfrac{6x-\sqrt{x^2+1}}{2x} = ?$

Yanıt / The Answer is $\dfrac{7}{2}$

39. $\lim\limits_{x\to\infty} \left[\log_2\sqrt{x+3}-\log_2\sqrt{4x+1}\right] = ?$

Yanıt / The Answer is -1

40. $\lim\limits_{x\to\infty} \left(\sqrt{16x^2-4x+1}-4x\right) = ?$

Yanıt / The Answer is $-\dfrac{1}{2}$

41. $\lim\limits_{x \to \infty} \left(x \cdot \sin\frac{10}{x}\right) = ?$

Yanıt / The Answer is 10

42. $\lim\limits_{x \to 0} (4x \cdot \cot x) = ?$

Yanıt / The Answer is 4

43. $\lim\limits_{x \to 0} (1+3x)^{\frac{1}{x}} = ?$

Yanıt / The Answer is e^3

44. $\lim\limits_{x \to \infty} \left(1+\frac{x-1}{2x^2+1}\right)^{4x-1} = ?$

Yanıt / The Answer is e^2

45. $f(x) = \begin{cases} 2x^2-3, & x < -2 \\ ax+b, & -2 \leq x < 1 \\ 4-3x, & x \geq 1 \end{cases}$

fonksiyonu $\forall x \in R$ için sürekli ise **3b − 3a = ?**

If the function is continuous for $\forall x \in R$, $3b - 3a = ?$

Yanıt / The Answer is 11

46. $f(x) = \begin{cases} \frac{\sin 2x}{3x}, & x > 0 \\ a+2, & x = 0 \\ 2x-3b, & x < 0 \end{cases}$

fonksiyonu $\forall x \in R$ için sürekli ise **a + b = ?**

If the function is continuous for $\forall x \in R$, $a+b = ?$

Yanıt / The Answer is $-\frac{14}{9}$

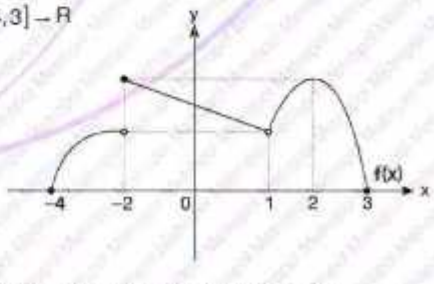
47. $f(x) = \begin{cases} x-4, & x < 3 \\ \operatorname{sgn}(a^2-a-12), & x = 3 \\ 2x-7, & x > 3 \end{cases}$

fonksiyonu x = 3 için sürekli ise $\sum a = ?$

If the function is continuous for x = 3, $\sum a = ?$

Yanıt / The Answer is 3

48. $f:[-4,3] \to R$



fonksiyonu kaç tam sayı için **süreklidir?**

For how many integers the function is continuous?

Yanıt / The Answer is 4

1. $\lim\limits_{x \to \frac{\pi}{4}} (\cos 2x + \tan 3x - \sin 2x) = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

2. $\lim\limits_{x \to 0} \dfrac{\sin 5x}{3x} = ?$

A) $\frac{3}{4}$ B) $\frac{5}{3}$ C) 1 D) $-\frac{3}{5}$ E) -1

3. $\lim\limits_{x \to \pi} \dfrac{\sin 3x}{\sin x} = ?$

A) 3 B) 1 C) 0 D) π E) 3π

4. $\lim\limits_{x \to 0} \dfrac{\tan 3x + \sin 2x}{5x} = ?$

A) $\frac{1}{3}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) 1 E) $\frac{6}{5}$

5. $\lim\limits_{x \to 0} \dfrac{\tan 2x}{\sin 7x} = ?$

A) $\frac{7}{2}$ B) $\frac{2}{7}$ C) 0 D) $\frac{2x}{7}$ E) $\frac{7}{2x}$

6. $\lim\limits_{x \to 0} \left(\dfrac{\sin 3x + \tan 5x}{2x}\right) = ?$

A) $\frac{3}{2}$ B) 2 C) $\frac{5}{2}$ D) 3 E) 4

7. $\lim\limits_{x \to 2} \dfrac{\tan(x-2)}{x-2} = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

8. $\lim\limits_{x \to 2} \dfrac{x^2-4}{\sin(x-2)} = ?$

A) -2 B) 0 C) 2 D) 4 E) 6

9. $\lim\limits_{x \to 2} \dfrac{\sin(2-x)}{x^2-4} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{8}$ C) $\frac{1}{16}$ D) $\frac{1}{32}$ E) $-\frac{1}{4}$

10. $\lim\limits_{x \to 3} \dfrac{\sin(3-x)}{x^2-9} = ?$

A) $-\frac{1}{9}$ B) $-\frac{1}{6}$ C) $-\frac{1}{3}$ D) $\frac{1}{3}$ E) $\frac{1}{6}$

11. $\lim\limits_{x \to 3} \dfrac{3x^2-27}{\sin(x-3)} = ?$

A) 0 B) 5 C) 9 D) 18 E) 23

12. $\lim\limits_{x \to 0} \dfrac{\sin x^4}{x^2} = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

13. $\lim\limits_{x \to 0} \dfrac{\sin^3 3x}{8x^3} = ?$

A) $\frac{3}{8}$ B) $\frac{27}{5}$ C) $\frac{27}{8}$ D) $\frac{3}{2}$ E) $\frac{9}{8}$

14. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{1+\cos 2x}{\cos x} = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

15. $\lim\limits_{x \to 0} \dfrac{x \cdot \sin x}{1-\cos x} = ?$

A) 1 B) 0 C) 2 D) −1 E) −2

16. $\lim\limits_{x \to 0^+} \left(\dfrac{\tan 5x \cdot \sin 2x}{9x^2}\right) = ?$

A) $\frac{9}{10}$ B) $\frac{10}{3}$ C) $\frac{10}{9}$ D) $\frac{3}{10}$ E) 0

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	B	A	D	B	E	B	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	B	D	A	C	C	C	C

1. $\lim\limits_{x \to 1} \dfrac{x^2-1}{x-1} = ?$

A) 0 B) 1 C) 2 D) 3 E) 5

2. $\lim\limits_{x \to 1} \dfrac{x^2-3x+2}{x^2-5x+4} = ?$

A) $-\dfrac{1}{3}$ B) 1 C) $\dfrac{1}{3}$ D) $\dfrac{1}{4}$ E) $\dfrac{1}{6}$

3. $\lim\limits_{x \to 2} \dfrac{x^3-3x^2+4}{x^3-5x^2+8x-4} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $\lim\limits_{x \to 1} \dfrac{x^5-1}{x-1} = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

5. $\lim\limits_{x \to 3} \dfrac{9-x^2}{x^3-27} = ?$

A) $\dfrac{1}{3}$ B) 0 C) $-\dfrac{1}{3}$ D) $-\dfrac{2}{9}$ E) $-\dfrac{1}{9}$

6. $\lim\limits_{x \to 2} \dfrac{x^4-16}{x^3-8} = ?$

A) $\dfrac{2}{3}$ B) $\dfrac{4}{3}$ C) $\dfrac{8}{3}$ D) $\dfrac{16}{3}$ E) 4

7. $\lim\limits_{x \to 16} \dfrac{2x-32}{\sqrt{x}-4} = ?$

A) 2 B) 4 C) 6 D) 8 E) 16

8. $\lim\limits_{x \to 9} \dfrac{x^2-81}{\sqrt{x}-3} = ?$

A) 27 B) 54 C) 81 D) 108 E) 121

9. $\lim\limits_{x \to 1} \dfrac{\sqrt{x^3}-1}{x^2-1} = ?$

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{4}$ D) 1 E) $\frac{3}{2}$

10. $\lim\limits_{x \to 0} \dfrac{3x \cdot \sin x}{1-\cos x} = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

11. $\lim\limits_{x \to 0} \dfrac{1-\cos x}{x^2} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) $\frac{\sqrt{2}}{2}$ E) $\frac{\sqrt{3}}{2}$

12. $\lim\limits_{x \to 0} \dfrac{1-\cos x}{3x^2} = ?$

A) $\frac{1}{9}$ B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) 3 E) 6

13. $\lim\limits_{x \to \frac{\pi}{4}} \dfrac{\cos 2x}{\sin x - \cos x} = ?$

A) $-\sqrt{2}$ B) $-\frac{\sqrt{2}}{2}$ C) 0 D) $\frac{\sqrt{2}}{2}$ E) $\sqrt{2}$

14. $\lim\limits_{x \to 0} \dfrac{\cos 2x - 1}{\tan x} = ?$

A) -1 B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) 1

15. $\lim\limits_{x \to 5} \dfrac{\sin(\sqrt{x}-\sqrt{5})}{x-5} = ?$

A) $\sqrt{5}$ B) $\frac{\sqrt{5}}{5}$ C) 1 D) $\frac{\sqrt{5}}{10}$ E) $\frac{2\sqrt{5}}{5}$

16. $\lim\limits_{x \to 0} \dfrac{\sin 4x \cdot \tan 6x}{3x^2} = ?$

A) $\frac{5}{3}$ B) $\frac{10}{3}$ C) 4 D) 6 E) 8

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1	2	3	4	5	6	7	8
C	C	C	D	D	C	E	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	E	B	B	A	C	D	E

1. $\lim\limits_{a \to b} \dfrac{2b^3 - 2a^3}{3a^2 - 3b^2} = ?$

A) $-3b$ B) $-2b$ C) $-b$ D) $2b$ E) $3b$

2. $\lim\limits_{x \to 2} \dfrac{3x^2 - x - 10}{x - 2} = ?$

A) 5 B) 6 C) 8 D) 9 E) 11

3. $\lim\limits_{x \to \frac{\pi}{2}} (\sec x - \tan x) = ?$

A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

4. $\lim\limits_{x \to \infty} \left(\ln x \cdot \dfrac{1}{x}\right) = ?$

A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

5. $\lim\limits_{x \to \infty} x \cdot \cos\dfrac{1}{x} = ?$

A) 1 B) ∞ C) 0 D) $-\infty$ E) -1

6. $\lim\limits_{x \to 0} \dfrac{1 - \cos x}{4x^2} = ?$

A) $\dfrac{1}{8}$ B) $\dfrac{1}{6}$ C) $\dfrac{1}{4}$ D) $\dfrac{1}{2}$ E) 1

7. $\lim\limits_{x \to 0} \dfrac{\sqrt{1 - \cos 2x}}{3x} = ?$

A) $\dfrac{1}{\sqrt{3}}$ B) $\dfrac{\sqrt{2}}{\sqrt{3}}$ C) 1 D) $\dfrac{\sqrt{2}}{3}$ E) $\dfrac{2}{3}$

8. $\lim\limits_{x \to 0} \dfrac{x \cdot \cos x}{e^{2x} - 1} = ?$

A) $-\dfrac{1}{2}$ B) $\dfrac{1}{2}$ C) 1 D) $\sqrt{2}$ E) 2

9. $\lim\limits_{x \to \infty} 2x \cdot \tan\frac{1}{x} = ?$

A) -1 B) 0 C) $\frac{1}{2}$ D) 2 E) $\frac{3}{2}$

10. $\lim\limits_{x \to 0} x \cdot \cot 2x = ?$

A) 1 B) $\frac{1}{2}$ C) 2 D) 3 E) 4

11. $\lim\limits_{x \to \pi} \sin x \cdot \tan\frac{x}{2} = ?$

A) $\frac{1}{2}$ B) 1 C) 2 D) 0 E) $\frac{1}{3}$

12. $\lim\limits_{x \to \infty} 2x \cdot \sin\frac{3}{4x} = ?$

A) 0 B) $\frac{2}{3}$ C) 1 D) $\frac{3}{2}$ E) ∞

13. $\lim\limits_{x \to 0} \frac{2x - \sin 3x}{x + \tan x} = ?$

A) -1 B) $-\frac{1}{2}$ C) $-\frac{1}{3}$ D) $\frac{1}{2}$ E) $\frac{3}{2}$

14. $\lim\limits_{x \to 0} 5x \cdot \cot 3x = ?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) $\frac{3}{5}$ D) $\frac{3}{2}$ E) $\frac{5}{3}$

15. $\lim\limits_{x \to \infty} 4x \cdot \tan\frac{3}{x} = ?$

A) $\frac{3}{4}$ B) $\frac{4}{3}$ C) 6 D) 12 E) 18

16. $\lim\limits_{x \to \pi} (3x - 3\pi) \cdot \cot x = ?$

A) -3 B) -1 C) 0 D) 1 E) 3

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1	2	3	4	5	6	7	8
C	E	C	C	B	A	D	B
9	10	11	12	13	14	15	16
D	B	C	D	B	E	D	E

1. $\lim\limits_{x\to\infty} \dfrac{3x^2+1}{3x^2-1} = ?$

A) -1 B) -2 C) 0 D) 1 E) 2

2. $\lim\limits_{x\to\infty} \dfrac{6x^2+4x-1}{3x^2+x-1} = ?$

A) 6 B) $\dfrac{4}{3}$ C) -6 D) $-\dfrac{1}{3}$ E) 2

3. $\lim\limits_{x\to\infty} \dfrac{3x^2+3x}{2x^2+5x-1} = ?$

A) $\dfrac{2}{3}$ B) 0 C) $\dfrac{3}{5}$ D) -3 E) $\dfrac{3}{2}$

4. $\lim\limits_{x\to\infty} \dfrac{3x^2+4x+5}{4x^2-3} = ?$

A) 1 B) $\dfrac{4}{3}$ C) $\dfrac{3}{4}$ D) 5 E) 2

5. $\lim\limits_{x\to\infty} \dfrac{4x^3+x}{2x^3+3} = ?$

A) $\dfrac{1}{2}$ B) $\dfrac{4}{3}$ C) $\dfrac{1}{3}$ D) 0 E) 2

6. $\lim\limits_{x\to\infty} \dfrac{3x^2-x+1}{3x^3+x^2-x} = ?$

A) ∞ B) 1 C) -1 D) $-\infty$ E) 0

7. $\lim\limits_{x\to\infty} \dfrac{4x^4-6x^6}{2x^6+3x^4} = ?$

A) -3 B) -2 C) $\dfrac{4}{3}$ D) 2 E) 3

8. $\lim\limits_{x\to\infty} \dfrac{1+3+5+\ldots+(2x-1)}{7x^2+1} = ?$

A) $-\dfrac{2}{7}$ B) $-\dfrac{1}{7}$ C) 1 D) $\dfrac{1}{7}$ E) $\dfrac{2}{7}$

9. $\lim\limits_{x\to\infty}\left(\log_2\left(\dfrac{2n^2-4n-8}{32n^2+16n+8}\right)\right)=?$

A) -4 B) $-\frac{1}{4}$ C) $\frac{1}{4}$ D) 4 E) 16

10. $\lim\limits_{x\to\infty}\left(\log_2(8x^2-4x+1)-\log_2(x^2-1)\right)=?$

A) 8 B) 6 C) 4 D) 3 E) 1

11. $\lim\limits_{x\to\infty}\dfrac{3^{x+1}+2\cdot 7^x}{3^x-5\cdot 7^x}=?$

A) $-\frac{2}{5}$ B) $-\frac{1}{5}$ C) $\frac{1}{3}$ D) 3 E) 5

12. $\lim\limits_{x\to\infty}\dfrac{7^x-3^x+1}{7^{x+1}-3^x-1}=?$

A) $-\frac{2}{5}$ B) $-\frac{1}{5}$ C) $\frac{1}{7}$ D) 3 E) 5

13. $\lim\limits_{x\to-\infty}\dfrac{5^x-3^{x+2}}{5^x+3^{x-2}}=?$

A) -81 B) -9 C) 9 D) 27 E) 81

14. $\lim\limits_{n\to\infty}(27)^{\frac{2n-1}{3n+1}}=?$

A) 1 B) 3 C) 9 D) 27 E) ∞

15. $\lim\limits_{x\to\infty}\dfrac{6e^x+3\pi^x}{3e^x+\pi^x}=?$

A) 2 B) 3 C) 4 D) 5 E) 6

16. $\lim\limits_{x\to\infty}\dfrac{\sin\frac{2}{x}}{\sin\frac{1}{x}}=?$

A) 0 B) $\frac{1}{4}$ C) $\frac{1}{2}$ D) 3 E) 2

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1	2	3	4	5	6	7	8
D	E	E	C	E	E	A	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	D	A	C	A	C	B	E

1. $\lim\limits_{x \to \infty} \left(\sqrt{x^2+6x} - \sqrt{x^2-6x}\right) = ?$

A) 0 B) ∞ C) -6 D) $-\infty$ E) 6

2. $\lim\limits_{x \to \infty} \left(\sqrt{x^2-2x-1} - \sqrt{x^2-7x+3}\right) = ?$

A) $\frac{1}{2}$ B) $\frac{3}{2}$ C) $\frac{5}{2}$ D) $\frac{7}{2}$ E) $\frac{9}{2}$

3. $\lim\limits_{x \to \infty} \left(\sqrt{4x^2+2x-5} - \sqrt{4x^2+5x+2}\right) = ?$

A) $-\frac{1}{4}$ B) $-\frac{1}{2}$ C) $-\frac{3}{4}$ D) -1 E) -2

4. $\lim\limits_{x \to -\infty} \left(\sqrt{x^2+2x-4} + x\right) = ?$

A) 1 B) ∞ C) -1 D) $-\infty$ E) 0

5. $\lim\limits_{x \to \infty} \sqrt{x^2+2x} - x = ?$

A) 1 B) 3 C) 5 D) 6 E) 7

6. $\lim\limits_{x \to -\infty} \left(\sqrt{9x^2-x+5} + 3x\right) = ?$

A) $-\frac{1}{6}$ B) $-\frac{1}{4}$ C) 0 D) $\frac{1}{4}$ E) $\frac{1}{6}$

7. $\lim\limits_{x \to \infty} \left(\sqrt{x^2-3x+1} - x + 4\right) = ?$

A) $\frac{5}{2}$ B) 3 C) $\frac{7}{2}$ D) 4 E) $\frac{9}{2}$

8. $\lim\limits_{x \to \infty} \dfrac{\sqrt{x^2+5x+6} + \sqrt{9x^2+5}}{5x-21} = ?$

A) $-\infty$ B) $-\frac{4}{5}$ C) 0 D) $\frac{4}{5}$ E) ∞

9. $\lim\limits_{x\to\infty} \dfrac{\sqrt{9x^2-5x+4}+\sqrt{4x^2+3x-1}}{2x-3} = ?$

A) $\frac{3}{2}$ B) 2 C) $\frac{5}{2}$ D) 3 E) $\frac{7}{2}$

10. $\lim\limits_{x\to\infty} \dfrac{\sqrt{x^2+4x-1}+\sqrt{9x^2-3x+2}}{x+5} = ?$

A) –4 B) –2 C) 2 D) 3 E) 4

11. $\lim\limits_{x\to\infty} \dfrac{(m-5)x^2+(n+3)x-6}{x+4} = 0$

$\Rightarrow$ **m·n = ?**

A) –15 B) –8 C) 2 D) 8 E) 15

12. $\lim\limits_{x\to\infty} \dfrac{(m-5)x^3+(2n+3)x^2-2x+1}{(5n-3)x^2+4x+3} = \dfrac{1}{3}$

$\Rightarrow$ **m – n = ?**

A) –7 B) –5 C) 5 D) 7 E) 17

13. $\lim\limits_{x\to\infty} \left(\dfrac{(a-2)x^3+(3b-6)x^2+x+6}{bx^2-5x+15}\right) = 1 \Rightarrow$ **a + b = ?**

A) 0 B) 3 C) 5 D) 7 E) 9

14. $\lim\limits_{x\to 2} \dfrac{x^2+ax+6}{x-2} = 10 \Rightarrow$ **a = ?**

A) –5 B) –3 C) 3 D) 4 E) 5

15. $n \in R$,

$\lim\limits_{x\to 2} \dfrac{2x-\sqrt{3x+m}}{x^2-4} = n \Rightarrow$ **m = ?**

A) 4 B) 6 C) 8 D) 10 E) 12

16. $\lim\limits_{x\to -\infty} \left(\dfrac{x^2}{x-1} - \dfrac{x^3}{x^2+1}\right) = ?$

A) $-\infty$ B) –1 C) 0 D) 1 E) ∞

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	C	C	C	A	E	A	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	E	A	E	C	A	D	D

1. $\lim\limits_{x \to 0^+} \left(1+\frac{1}{x}\right)^{\frac{1}{x}} = ?$

A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

2. $\lim\limits_{x \to 0} (1+2x)^{\frac{1}{x}} = ?$

A) e^2 B) e^4 C) e^{-2} D) e^{-4} E) e^{-8}

3. $\lim\limits_{x \to 0} (1+2\sin x)^{\frac{1}{x}} = ?$

A) e B) e^2 C) e^3 D) e^4 E) e^5

4. $\lim\limits_{x \to 0} (1+6\tan x)^{\frac{1}{2x}} = ?$

A) e^4 B) e^3 C) e^2 D) e E) e^{-1}

5. $\lim\limits_{x \to \infty} \left(1+\frac{x-1}{2x^2+1}\right)^{3x-1} = ?$

A) e B) $\sqrt{e}$ C) $e\sqrt{e}$ D) $e^2\sqrt{e}$ E) e^3

6. $\lim\limits_{x \to \infty} \left(\frac{2x+6}{2x+1}\right)^{4x+3} = ?$

A) e^5 B) e^6 C) e^8 D) e^{10} E) e^{12}

7. $\lim\limits_{x \to \infty} \left(\frac{4x+3}{4x+5}\right)^{12x+3} = ?$

A) e^{-8} B) e^{-6} C) e^6 D) e^{12} E) ∞

8. $\lim\limits_{x \to -\infty} \left(\frac{x^2+2x}{x^2+x}\right)^{x^2} = ?$

A) 0 B) 1 C) e D) e^{-1} E) ∞

9. $\lim\limits_{x \to \infty} \left(\dfrac{-3x^4+x^3+5}{-3x^4+2x-1}\right)^{4x} = ?$

A) $e^{-\frac{4}{3}}$ B) $e^{-\frac{3}{4}}$ C) e^{-1} D) $e^{\frac{3}{4}}$ E) $e^{\frac{4}{3}}$

10. $\lim\limits_{x \to \infty} \left(\dfrac{x+3}{x}\right)^{x} = ?$

A) e^{-3} B) e^{-1} C) e D) e^{2} E) e^{3}

11. $\lim\limits_{x \to 0} (e^x+x)^{\frac{1}{x}} = ?$

A) 1 B) e C) e^2 D) e^4 E) ∞

12. $\lim\limits_{x \to 0} (e^x+2x)^{\frac{2}{x}} = ?$

A) e^2 B) e^4 C) e^6 D) e^9 E) e^{12}

13. $\lim\limits_{x \to \infty} \left[\ln\left(\dfrac{x+3}{x}\right)^{2x}\right] = ?$

A) 3 B) 5 C) 6 D) e^3 E) e^6

14. $\lim\limits_{x \to 1} x^{\left(\frac{1}{x-1}\right)} = ?$

A) 0 B) $\dfrac{1}{e}$ C) 1 D) e E) ∞

15. $\lim\limits_{x \to 0} (\cos 2x)^{x} = ?$

A) e^2 B) e C) 1 D) e^{-1} E) e^{-2}

16. $\lim\limits_{x \to \infty} \left(\dfrac{2x+m}{2x-5}\right)^{3x+2} = e^6 \Rightarrow m = ?$

A) -3 B) -1 C) 1 D) 2 E) 3

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	A	B	B	C	D	B	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	E	C	C	C	D	C	B

1. $f(x)=\begin{cases} 2x+a, & x<1 \\ 3, & x=1 \\ 4x-1, & x>1 \end{cases}$

$\lim\limits_{x\to 1} f(x)=f(1) \Rightarrow$ **a = ?**

A) −1 B) 0 C) 1 D) 2 E) 3

2. $f(x)=\begin{cases} mx^2+n, & x<2 \\ n, & x=2 \\ x+3, & x>2 \end{cases}$

$\lim\limits_{x\to 2} f(x)=f(2) \Rightarrow$ **m · n = ?**

A) −5 B) −3 C) 0 D) 3 E) 5

3. $f(x)=\begin{cases} mx+n, & 1>x \\ 5, & x=1 \\ x^2+m, & x>1 \end{cases}$

$\forall x_0 \in R$ için / for $\lim\limits_{x\to x_0} f(x)=f(x_0) \Rightarrow$ **n = ?**

A) −2 B) −1 C) 1 D) 2 E) 4

4. $f(x)=\begin{cases} ax+b, & x=3 \\ \dfrac{x^2-9}{3-x}, & x\neq 3 \end{cases}$

$\forall x_0 \in R$ için / for $\lim\limits_{x\to x_0} f(x)=f(x_0) \Rightarrow$ **3a + b = ?**

A) −4 B) −5 C) −6 D) −7 E) −8

5. $f: R \to R,$

$f(x)=\begin{cases} ax-3, & x<3 \\ 6, & x=3 \\ 4x-b, & x>3 \end{cases}$

fonksiyonu $\forall x \in R$ için sürekli ise **a + b = ?**

If the function is continuous for $\forall x \in R$, a+b=?

A) 5 B) 6 C) 9 D) 12 E) 15

6. $f(x)=\begin{cases} \dfrac{x^2+3}{x-1}, & x<1 \\ 2x+4, & 1\le x<2 \\ \dfrac{3x+1}{x^2-7x+12}, & x>2 \end{cases}$

fonksiyonu kaç noktada **süreksizdir?**

At how many points the function is discontinuous?

A) 1 B) 2 C) 3 D) 4 E) 5

7. $f(x)=\begin{cases} \dfrac{1}{x^2-16}, & x<-1 \\ 2x, & -1\le x\le 3 \\ x^2-3, & x>3 \end{cases}$

fonksiyonu kaç noktada **süreksizdir?**

At how many points the function is discontinuous?

A) 1 B) 2 C) 3 D) 4 E) 5

8. $f(x)=\begin{cases} \log_2(x+4), & x>-2 \\ \dfrac{5}{x-x^2}, & x\le -2 \end{cases}$

fonksiyonu kaç noktada **süreksizdir?**

At how many points the function is discontinuous?

A) 1 B) 2 C) 3 D) 4 E) 5

9. $f(x)=\begin{cases}\dfrac{x-3}{x+2}, & x\le 0\\ \sqrt{5-x}, & 0<x<8\\ \dfrac{x}{x-30}, & x\ge 8\end{cases}$

fonksiyonu kaç tam sayı **için süreksizdir?**

At how many integers the function is discontinuous?

A) 2 B) 3 C) 4 D) 5 E) 6

10. $f(x)=\begin{cases}1, & x\le 3\\ ax+b, & 3<x<5\\ 7, & x\ge 5\end{cases}$

$\forall x_0\in R$ **için** / for $\lim\limits_{x\to x_0} f(x)=f(x_0) \Rightarrow$ **a + b = ?**

A) −5 B) −6 C) 5 D) 6 E) 11

11. $f(x)=\sqrt{-x^2+4}$

fonksiyonu $\forall x\in R$ **için sürekli** $\Rightarrow x\in ?$

If the function is continuous for $\forall x\in R \Rightarrow x\in ?$

A) [−1, 1] B) [−2, 2] C) [−2, −1] D) [−2, 0] E) [0, 2]

12. $f(x)=\dfrac{8x+5}{x^2+mx+1}$

fonksiyonu $\forall x\in R$ **için sürekli** $\Rightarrow m\in ?$

If the function is continuous for $\forall x\in R \Rightarrow m\in ?$

A) (−1, 1) B) (−2, 2) C) (−2, −1) D) (−4, 4) E) [−2, 2]

13. $f(x)=\dfrac{x^2+3x+11}{x^2+(m-5)\cdot x+1}$

fonksiyonu $\forall x\in R$ **için sürekli** $\Rightarrow$ **? < m < ?**

If the function is continuous for $\forall x\in R \Rightarrow ? < m < ?$

A) $-2<m<-1$ B) $m\ge 3$ C) $3<m<7$ D) $m\le 5$ E) $-1<m\le 3$

14. $f(x)=\dfrac{\sqrt{x^2-x-2}}{x^2-9}$ fonksiyonu kaç tam sayı **için süreksizdir?**

At how many integers the function is discontinuous?

A) 1 B) 2 C) 3 D) 4 E) 5

15. $f(x)=|x-2|+\dfrac{x-1}{|x-3|}+\dfrac{3}{x^2-2x}$

fonksiyonu kaç noktada **süreksizdir?**

At how many points the function is discontinuous?

A) 1 B) 2 C) 3 D) 4 E) 5

16. $f(x)=\begin{cases}\dfrac{x}{x^2-9}, & x<2\\ \dfrac{x+1}{|x-1|-4}, & x\ge 2\end{cases}$

fonksiyonu kaç noktada **süreksizdir?**

At how many points the function is discontinuous?

A) 1 B) 2 C) 3 D) 4 E) 5

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	C	C	C	C	D	B	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	A	B	B	C	D	C	C

1. $f(x)=\begin{cases}\dfrac{|x-2|}{x-2}, & x\neq 2\\ 4, & x=2\end{cases}$

$\Rightarrow \lim\limits_{x\to 2} f(x)=?$

A) -1 B) 1 C) 0 D) 4 E) Limit yoktur./ Limit does not exist.

2. $\lim\limits_{x\to 3}\dfrac{x^2-5x+6}{x-\sqrt{2x+3}}=?$

A) 0 B) $\frac{2}{3}$ C) 1 D) $\frac{3}{2}$ E) 2

3. $\lim\limits_{x\to 1}\dfrac{\sin(\sqrt{x}-1)}{\ln x}=?$

A) $-\frac{1}{2}$ B) -1 C) 0 D) $\frac{1}{2}$ E) 1

4. $\lim\limits_{x\to 0}\dfrac{1-\cos(\tan x)}{\tan x}=?$

A) -2 B) -1 C) 0 D) 1 E) 2

5. $L\in\mathbb{R}$,

$\lim\limits_{x\to\infty}\left(ax+2-\sqrt{9x^2-6x+5}\right)=L \Rightarrow L=?$

A) 6 B) 3 C) -6 D) -9 E) -12

6. $\lim\limits_{x\to -\pi^+}\dfrac{1+\tan 2x}{|\sin x-\cos x|}=?$

A) -1 B) 0 C) 1 D) $-\infty$ E) ∞

7. $\lim\limits_{\left(\frac{x}{y}\right)\to -3}\dfrac{2x-5y}{3x+4y}=?$

A) $-\frac{5}{3}$ B) $\frac{1}{2}$ C) $-\frac{5}{4}$ D) $\frac{2}{3}$ E) $\frac{1}{13}$

8. $f(x)=x^3-2x^2+mx-5$,

$\lim\limits_{x\to -2} f(x)=9 \Rightarrow \lim\limits_{x\to 1} f(x)=?$

A) -21 B) -20 C) -19 D) -18 E) -17

9. $f(x) = x^2 - 8$

$\Rightarrow \lim\limits_{x \to 3^-} (fof)(x) = ?$

A) -8 B) -7 C) -6 D) -5 E) -4

10. $\lim\limits_{x \to 1} \dfrac{(x + x^2 + x^3 + \ldots + x^{20}) - 20}{(x + x^2 + x^3 + \ldots + x^{10}) - 10} = ?$

A) 4 B) $\frac{42}{11}$ C) 3 D) $\frac{23}{11}$ E) 2

11. $\lim\limits_{x \to 0} \dfrac{\cos 5x - \cos 3x}{\cos 3x - \cos x} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

12. $\lim\limits_{x \to 0^+} \dfrac{\arctan(x^2)}{1 - \cos 2x} = ?$

A) $-\frac{1}{2}$ B) $\frac{1}{2}$ C) -1 D) 1 E) $\frac{1}{\sqrt{2}}$

13. $\lim\limits_{x \to \left(\frac{\pi}{2}\right)^-} \dfrac{1 - \sin x}{\cot^2 x} = ?$

A) $-\frac{\pi}{2}$ B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) $\frac{\pi}{2}$ E) ∞

14. $\lim\limits_{x \to 0} \dfrac{\sin 2x + \sin 3x + \cos 4x}{\tan 2x + \tan 3x + \cos 4x} = ?$

A) $\frac{7}{6}$ B) $\frac{6}{7}$ C) 1 D) $\frac{1}{4}$ E) $\frac{2}{3}$

15. $\lim\limits_{x \to \infty} \left(1 + \frac{1}{x}\right)^x = e \Rightarrow \lim\limits_{x \to 0^+} \dfrac{\ln(1 + x)}{x} = ?$

A) 1 B) 0 C) -1 D) $-\infty$ E) Limit yoktur./ Limit does not exist.

16. $f(x) = \begin{cases} \dfrac{ax + |x|}{x}, & x > 0 \\ \dfrac{2x - |x|}{x}, & x < 0 \end{cases}$

$\lim\limits_{x \to 0} f(x) \in \mathbb{R} \Rightarrow a = ?$

A) 2 B) 1 C) 0 D) -1 E) -2

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	D	D	C	B	C	E	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	B	E	B	C	C	A	A

1. $\lim\limits_{x \to 0} \dfrac{1-\cos 2x}{x^2+\tan^2 x} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

2. $f(x) = \begin{cases} \dfrac{8x+2}{x^2+x-12}, & x < 1 \\ \dfrac{5x+7}{x^2-3x-10}, & x \geq 1 \end{cases}$

fonksiyonunun süreksiz olduğu noktaların toplamı kaçtır?

What is sum of the points in which the function is discontinuous?

A) 0 B) 1 C) 2 D) 3 E) 4

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

3. $\lim\limits_{x \to 3} \dfrac{x^2+ax-6}{x^2-2x-3} = m,\ m \in R$

$\Rightarrow m = ?$

A) $\frac{5}{2}$ B) $\frac{2}{5}$ C) $\frac{5}{3}$ D) $\frac{5}{4}$ E) $\frac{3}{5}$

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2019]

4. $\lim\limits_{x \to \infty} \dfrac{ax^2+4x-5}{cx+3} = \dfrac{1}{4}$

$\Rightarrow a + c = ?$

A) 5 B) 9 C) 16 D) 20 E) 24

[GAZİANTEP ÜNİVERSİTESİ – YÖS 2019]

5. $\lim\limits_{x \to \infty} \left(\sqrt{4x^2+2x} - 2x\right) = ?$

A) 1 B) -1 C) 2 D) $\frac{1}{2}$ E) $\frac{3}{2}$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

6. $\lim\limits_{x \to \infty} \sqrt{x^2-9x} - x = ?$

A) $-\frac{9}{2}$ B) $\frac{9}{2}$ C) $\frac{3}{2}$ D) $\frac{5}{3}$ E) $\frac{4}{3}$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

7. $f(x) = \begin{cases} \dfrac{3x}{x^2-16}, & x \leq 2 \\ \dfrac{x-2}{x^2-5x+6}, & x > 2 \end{cases}$

fonksiyonu kaç noktada süreksizdir?

At how many points the function is discontinuous?

A) 1 B) 2 C) 3 D) 4 E) 5

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2018]

8. $\lim\limits_{x \to 0} x \cdot \cot 3x = ?$

A) 1 B) -1 C) 3 D) 0 E) $\frac{1}{3}$

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

9. $f(x)=\begin{cases} x^2-nx+m, & x\le n \\ mx, & x>n \end{cases}$

$\lim\limits_{x\to n} f(x)=2m-8 \Rightarrow \dfrac{f(m)}{f(n)}=?$

A) 1 B) 2 C) 4 D) 6 E) 8

[ERCİYES ÜNİVERSİTESİ – YÖS 2017]

10. $\lim\limits_{x\to 64}\left(\dfrac{\sqrt{x}-\sqrt[8]{x}}{\sqrt[3]{x}-\sqrt[6]{x}}\right)=?$

A) 2 B) $\frac{3}{2}$ C) 1 D) $\frac{1}{2}$ E) $\frac{1}{6}$

[ERCİYES ÜNİVERSİTESİ – YÖS 2017]

11. $\lim\limits_{x\to 0}\dfrac{3x^2}{1-\cos ax}=?$

A) $\frac{a}{6}$ B) $\frac{6}{a}$ C) $\frac{6}{a^2}$ D) $-\frac{6}{a^2}$ E) $6a^2$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2017]

12. $\lim\limits_{x\to\infty}\dfrac{e^x-1}{2x^2}=?$

A) 1 B) $\frac{e}{2}$ C) $\frac{1}{2}$ D) $-\infty$ E) ∞

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

13. $\lim\limits_{x\to 0}\dfrac{\sin^3(2x)}{x^3}=?$

A) 1 B) 2 C) $\frac{1}{2}$ D) 0 E) 8

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

14. $\lim\limits_{h\to 1}\dfrac{\sin(h-1)\cdot\cos(h-1)}{h^3-1}=?$

A) $-\frac{1}{3}$ B) $-\frac{1}{4}$ C) 0 D) $\frac{1}{4}$ E) $\frac{1}{3}$

[EGE ÜNİVERSİTESİ – YÖS 2016]

15. $\lim\limits_{x\to 0^+}\sqrt[x]{1-2x}=?$

A) e^{-2} B) e^{-1} C) e D) e^2 E) e^3

[İSTANBUL ÜNİVERSİTESİ – YÖS 2016]

16. $\lim\limits_{x\to 1}\dfrac{x\cdot\sqrt{2x-1}}{x-1}=?$

A) $-\infty$ B) -1 C) 0 D) ∞ E) Limit yoktur./ Limit does not exist.

[ANKARA ÜNİVERSİTESİ – YÖS 2013]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
D	B	D	C	D	A	C	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	A	C	E	E	E	A	E

BÖLÜM CHAPTER 13

TARİHSEL NOT / HISTORICAL NOTE

CARL FRİEDRİCH GAUSS (GAUß) [1777 - 1855]

Alman matematikçi ve bilim insanı. Katkıda bulunduğu alanlardan bazıları; Sayılar Kuramı, Analiz, Diferansiyel Geometri, Jeodezi, Elektrik, Manyetizma, Astronomi ve Optiktir. "Matematikçilerin prensi" ve "Antik çağlardan beri yaşamış en büyük matematikçi" olarak da anılan Gauss, matematiğin ve bilimin pek çok alanına etkisini bırakmıştır ve tarihin en nüfuzlu matematikçilerinden biri olarak kabul edilir.

German mathematician and scientist. Some of the areas where he participated are; numbers theory, analysis, differential geometry, geodesy, electricity, magnetism, astronomy and optics. Gauss, also known as "the prince of mathematicians" and "the greatest mathematician since antiquity period", has influenced many areas of mathematics and science and is considered one of the most influential mathematicians of history.

TÜREVİN TANIMI VE FONKSİYONLARIN TÜREVİ
DEFINITION of DERIVATIVE and DERIVATIVE of FUNCTIONS

Bu bölüm 128 alıştırma sorusu, 224 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 128 exercise questions, 224 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 13

TÜREVİN TANIMI VE FONKSİYONLARIN TÜREVİ

DEFINITION of DERIVATIVE and DERIVATIVE of FUNCTIONS

1. $f(x) = -3x^2 - 3x \Rightarrow \lim\limits_{x \to 1} \dfrac{f(x) - f(1)}{x - 1} = ?$

Yanıt / The Answer is -9

2. $f(x) = x^3 + 4x - 2 \Rightarrow \lim\limits_{x \to 2} \dfrac{f(x) - f(2)}{x - 2} = ?$

Yanıt / The Answer is 16

3. $f(x) = 3x^3 - 2x^2 + x + 1 \Rightarrow \lim\limits_{x \to -1} \dfrac{f(x) - f(-1)}{x + 1} = ?$

Yanıt / The Answer is 14

4. $f(x) = 2x^2 - x + 12 \Rightarrow \lim\limits_{h \to 0} \dfrac{f(-1 + h) - f(-1)}{h} = ?$

Yanıt / The Answer is -5

5. $f(x) = x^2 - 4x + 4 \Rightarrow \lim\limits_{x \to -3} \dfrac{f(x) - f(-3)}{x + 3} = ?$

Yanıt / The Answer is -10

6. $f(x) = x^6 \Rightarrow f'(x) = ?$

Yanıt / The Answer is $6.x^5$

7. $f(x) = 3x^{-2} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $-6 \cdot x^{-3}$

8. $f(x) = \dfrac{1}{x} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $-\dfrac{1}{x^2}$

9. $f(x)=\frac{1}{2x^2} \Rightarrow f'(x)=?$

Yanıt / The Answer is $-\frac{1}{x^3}$

10. $f(x)=\sqrt{x} \Rightarrow f'(x)=?$

Yanıt / The Answer is $\frac{1}{2\sqrt{x}}$

11. $f(x)=-6x^{-5} \Rightarrow f'(x)=?$

Yanıt / The Answer is $30\ x^{-6}$

12. $\frac{d(-8x^2)}{dx}=?$

Yanıt / The Answer is $-16x$

13. $y=5t^2 \Rightarrow \frac{dy}{dt}=?$

Yanıt / The Answer is $10t$

14. $f(t)=-t^3-4t+2 \Rightarrow \frac{df}{dt}=?$

Yanıt / The Answer is $-3t^2-4$

15. $y=x^3\cdot(x+1) \Rightarrow y'=?$

Yanıt / The Answer is $4x^3+3x^2$

16. $f(x)=x^3+2x^2+x-4 \Rightarrow f'(0)=?$

Yanıt / The Answer is 1

17. $f(x)=x^2-2x+16,\ f'(k)=f(2) \Rightarrow k=?$

Yanıt / The Answer is 9

18. $f(x)=3x^4+6\sqrt{x}-\frac{1}{x}+1 \Rightarrow f'(1)=?$

Yanıt / The Answer is 16

19. $f(x)=\frac{1}{4}x^4-kx^2+2,\ f'(k)=k^2 \Rightarrow k=?$

Yanıt / The Answer is 3

20. $f(x)=(x^2-4)\cdot(x^3+1) \Rightarrow f'(1)=?$

Yanıt / The Answer is -5

21. $f(x)=(x^2-m)\cdot(x^3+2x),\ f'(0)=-4 \Rightarrow m=?$

Yanıt / The Answer is 2

22. $f(x)=(x^2-1)\cdot g(x),$
$g(1)=2 \Rightarrow f'(1)=?$

Yanıt / The Answer is 4

23. $f(x)=(x-1)\,(x-2)\,(x-3) \Rightarrow f'(0)=?$

Yanıt / The Answer is 11

24. $f(x)=\frac{x-1}{x+1} \Rightarrow f'(x)=?$

Yanıt / The Answer is $\frac{2}{(x+1)^2}$

25. $f(x)=\dfrac{x^2-x+1}{x^2+3x-1} \Rightarrow f'(0)=?$

Yanıt / The Answer is -2

26. $f(x)=\dfrac{1}{x+1} \Rightarrow f'(1)=?$

Yanıt / The Answer is $-\dfrac{1}{4}$

27. $f(x)=\dfrac{g(x)}{1-x^3},\ g'(-1)=-1,\ g(-1)=1 \Rightarrow f'(-1)=?$

Yanıt / The Answer is $\dfrac{1}{4}$

28. $f(2x)=x^2 \Rightarrow f'(2)=?$

Yanıt / The Answer is 1

29. $f(3x)=3x^3+4 \Rightarrow f'(6)=?$

Yanıt / The Answer is 12

30. $f(x)=(x+2)^3 \Rightarrow f'(0)=?$

Yanıt / The Answer is 12

31. $f(x)=\sqrt{x^2+x} \Rightarrow f'(1)=?$

Yanıt / The Answer is $\dfrac{3\sqrt{2}}{4}$

32. $f(x)=\sqrt{x^2+4} \Rightarrow f'(2)=?$

Yanıt / The Answer is $\dfrac{1}{\sqrt{2}}$

33. $f(x)=\sqrt[3]{x^2+2x} \Rightarrow f'(1)=?$

Yanıt / The Answer is $\frac{4}{3\cdot\sqrt[3]{9}}$

34. $f(x)=\frac{-3}{(x^2+x)^2} \Rightarrow f'(1)=?$

Yanıt / The Answer is $\frac{9}{4}$

35. $f(x)=|x+1| \Rightarrow f'(5)=?$

Yanıt / The Answer is 1

36. $f(x)=|x+1| \Rightarrow f'(-5)=?$

Yanıt / The Answer is −1

37. $f(x)=|x-3| \Rightarrow f'(3)=?$

Yanıt / The Answer is Türevi yoktur./ The derivative does not exist.

38. $f(x)=|x^2| \Rightarrow f'(0)=?$

Yanıt / The Answer is 0

39. $f(x)=|x^3-2x^2-x+2| \Rightarrow f'(2)=?$

Yanıt / The Answer is Türevi yoktur./ The derivative does not exist.

40. $f(x)=\sin x+\cos x \Rightarrow f'(x)=?$

Yanıt / The Answer is cosx−sinx

41. $f(x) = x^4 - 4 \cdot \sin x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $4x^3 - 4 \cdot \cos x$

42. $f(x) = x \cdot \sin x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\sin x + x \cdot \cos x$

43. $f(x) = \dfrac{\sin x}{x} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\dfrac{\cos x \cdot x - \sin x}{x^2}$

44. $f(x) = \dfrac{x^3}{\cos x} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\dfrac{3x^2 \cdot \cos x + \sin x \cdot x^3}{\cos^2 x}$

45. $f(x) = \sin(4x+3) \Rightarrow f'(x) = ?$

Yanıt / The Answer is $4 \cdot \cos(4x+3)$

46. $f(x) = \sin(\cos x) \Rightarrow f'(x) = ?$

Yanıt / The Answer is $-\sin x \cdot \cos(\cos x)$

47. $f(x) = \sin^2 3x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $3 \cdot \sin 6x$

48. $\dfrac{d}{dx}(\sin x \cdot \cos x) = ?$

Yanıt / The Answer is $\cos 2x$

49. $f(x) = \sin^2 2x - \cos^2 2x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $4.\sin 4x$

50. $f(x) = (1 + \sin 2x)^2 \Rightarrow f'(x) = ?$

Yanıt / The Answer is $4 \cdot \cos 2x \cdot (1 + \sin 2x)$

51. $f(x) = \tan 3x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $3 \cdot \sec^2 3x$

52. $f(x) = \tan 5x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $5 \cdot \sec^2 5x$

53. $f(x) = \cot x^3 \Rightarrow f'(x) = ?$

Yanıt / The Answer is $-3x^2 \cdot \operatorname{cosec}^2 x^3$

54. $f(x) = 3 \cdot \tan^2 3x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $18 \cdot \tan 3x \cdot \sec^2 3x$

55. $f(x) = \sec x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\sec x.\tan x$

56. $f(x) = \operatorname{cosec} x \Rightarrow f'\left(\frac{3\pi}{4}\right) = ?$

Yanıt / The Answer is $\sqrt{2}$

57. $f(x) = 4 \cdot \tan x \Rightarrow f'\left(\frac{\pi}{3}\right) = ?$

Yanıt / The Answer is 16

58. $f(x) = \tan^2 x - 1 \Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

Yanıt / The Answer is 4

59. $f(x) = \tan^3 4x \Rightarrow f'\left(\frac{\pi}{12}\right) = ?$

Yanıt / The Answer is 144

60. $f(x) = \cos 2x - \sin 3x \Rightarrow f'\left(\frac{\pi}{6}\right) = ?$

Yanıt / The Answer is $-\sqrt{3}$

61. $\frac{d}{dx}(\sin(\cos 2x))\Big|_{x=\frac{\pi}{4}} = ?$

Yanıt / The Answer is -2

62. $f(x) = \arcsin 3x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\frac{3}{\sqrt{1-9x^2}}$

63. $f(x) = \arccos x^3 \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\frac{-3x^2}{\sqrt{1-x^6}}$

64. $f(x) = \arctan(2x-6) \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\frac{2}{1+(2x-6)^2}$

65. $f(x) = \text{arccot}(x^2 - 1) \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\dfrac{-2x}{1+(x^2-1)^2}$

66. $f(x) = \arccos 2x \Rightarrow f'\left(\frac{1}{4}\right) = ?$

Yanıt / The Answer is $-\dfrac{4\sqrt{3}}{3}$

67. $f(x) = 2x^2 \cdot \arctan x \Rightarrow f'(1) = ?$

Yanıt / The Answer is $\pi + 1$

68. $f(x) = \cos(\arctan x) \Rightarrow f'(\sqrt{3}) = ?$

Yanıt / The Answer is $-\dfrac{\sqrt{3}}{8}$

69. $f(x) = \arctan^2(x^3 + 1) \Rightarrow f'(0) = ?$

Yanıt / The Answer is 0

70. $f(x) = \log_3(x^2 + 3x + 3) \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\dfrac{2x+3}{x^2+3x+3} \cdot \dfrac{1}{\ln 3}$

71. $f(x) = 2^{x^2+x} \Rightarrow f'(1) = ?$

Yanıt / The Answer is $12 \cdot \ln 2$

72. $f(x) = \log(\sin x) \Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

Yanıt / The Answer is $\dfrac{1}{\ln 10}$

73. $f(x) = \ln x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\frac{1}{x}$

74. $f(x) = \ln(\sin x) \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\cot x$

75. $f(x) = \ln(3x+2) \Rightarrow f'\left(\frac{1}{3}\right) = ?$

Yanıt / The Answer is 1

76. $f(x) = e^{-x} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $-e^{-x}$

77. $f(x) = e^{4x+2} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $4 \cdot e^{4x+2}$

78. $f(x) = 2e^{\sqrt{x}} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\frac{e^{\sqrt{x}}}{\sqrt{x}}$

79. $f(x) = e^{2 \cdot \sin x - \cos x} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $(2 \cdot \cos x + \sin x) \cdot e^{2 \cdot \sin x - \cos x}$

80. $f(x) = \frac{e^x}{e^x + 1} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\frac{e^x}{(e^x+1)^2}$

81. $f(x) = \sin(-e^{2x}) \Rightarrow f'(x) = ?$

Yanıt / The Answer is $-2 \cdot e^{2x} \cdot \cos(-e^{2x})$

82. $f(x) = (e)^{e^x} \Rightarrow f'(x) = ?$

Yanıt / The Answer is $e^x \cdot (e)^{e^x}$

83. $\left.\dfrac{d(e^{\sin x})}{dx}\right|_{x=\frac{5\pi}{6}} = ?$

Yanıt / The Answer is $-\dfrac{\sqrt{3}e}{2}$

84. $f(x) = e^{\tan x} \Rightarrow f'\left(\dfrac{\pi}{4}\right) = ?$

Yanıt / The Answer is $2 \cdot e$

85. $e^{-x} \cdot \dfrac{d}{dx}\left(e^x \cdot (x^2+1)\right) = ?$

Yanıt / The Answer is $(x+1)^2$

86. $f(x+1) = 2e^x + 2 \Rightarrow f'(0) = ?$

Yanıt / The Answer is $\dfrac{2}{e}$

87. $f(x) = \ln(\sin x) + e^2 \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\cot x$

88. $f(x) = \log_2(x^2+1) \Rightarrow f'(1) = ?$

Yanıt / The Answer is $\dfrac{1}{\ln 2}$

89. $f(x) = e^{2x} \cdot \ln(x+1) \Rightarrow f'(0) = ?$

Yanıt / The Answer is 1

90. $f(x) = \ln\left(\sin\left(\frac{\pi}{3} - x\right)\right) \Rightarrow f'(0) = ?$

Yanıt / The Answer is $-\frac{1}{\sqrt{3}}$

91. $f(x) = \ln(\ln(\sin x)) \Rightarrow f'(x) = ?$

Yanıt / The Answer is $\frac{\cot x}{\ln(\sin x)}$

92. $f(x) = \ln(\sin x \cdot \cos^2 x) \Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

Yanıt / The Answer is -1

93. $f: R^+ \to R,$
$f(x) = 3x^2 - 9 \Rightarrow (f^{-1})'(18) = ?$

Yanıt / The Answer is $\frac{1}{18}$

94. $f: R^- \to R,$
$f(x) = x^2 + 4x + 5 \Rightarrow (f^{-1})'(5) = ?$

Yanıt / The Answer is $-\frac{1}{4}$

95. $f: R \to R,$
$f(x) = (x-2)^3 \Rightarrow (f^{-1})'(8) = ?$

Yanıt / The Answer is $\frac{1}{12}$

96. $f: \left[\frac{5}{2}, \infty\right) \to \left[-\frac{5}{4}, \infty\right), f(x) = x^2 - 5x + 5 \Rightarrow (f^{-1})'(-1) = ?$

Yanıt / The Answer is 1

97. $f(x)=\sqrt{4-2x}-1 \Rightarrow (f^{-1})'(3)=?$

Yanıt / The Answer is -4

98. $f(x)=x^{10} \Rightarrow f^{(9)}(x)=?$

Yanıt / The Answer is $10!\cdot x$

99. $y=(3x+2)^4 \Rightarrow \dfrac{d^4y}{dx^4}=?$

Yanıt / The Answer is $4!\cdot 3^4$

100. $y=e^{2x} \Rightarrow \dfrac{d^8y}{dx^8}=?$

Yanıt / The Answer is $2^8\cdot e^{2x}$

101. $f(x)=\cos 2x \Rightarrow f^{(10)}(x)=?$

Yanıt / The Answer is $-2^{10}\cos 2x$

102. $f(x)=\sin x \Rightarrow f^{(238)}(x)=?$

Yanıt / The Answer is $-\sin x$

103. $f(x)=e^{3x}+(3x-2)^8 \Rightarrow f^{(10)}(x)=?$

Yanıt / The Answer is $3^{10}\cdot e^{3x}$

104. $y=\cos x+\sin x \Rightarrow \dfrac{d^{10}y}{dx^{10}}=?$

Yanıt / The Answer is $-\cos x-\sin x$

105. $y = ax^3 + bx^2,\ \dfrac{d^2y}{dx^2} = 6x + 2 \Rightarrow a + b = ?$

Yanıt / The Answer is 2

106. $f(x) = ax^3 + bx^2 - 3x - 4,$
$f'(1) = 3$ ve/and $f'(-1) = -3$
$\Rightarrow a + b = ?$

Yanıt / The Answer is $\frac{5}{2}$

107. $y = x^{39} + 39x \Rightarrow \dfrac{d^{39}y}{dx^{39}} = ?$

Yanıt / The Answer is 39!

108. $y = x^{65} + 65x + 127 \Rightarrow \dfrac{d^{66}y}{dx^{66}} = ?$

Yanıt / The Answer is 0

109. $\left.\begin{array}{l} y = t^2 + 3t \\ t = x^2 - 1 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=-1} = ?$

Yanıt / The Answer is 6

110. $\left.\begin{array}{l} y = t^3 - 3t^2 + 2 \\ t = 3x^2 - x \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=\frac{1}{6}}$

Yanıt / The Answer is 0

111. $\left.\begin{array}{l} y = t^2 - 2t \\ t = 2x - 1 \\ x = 4u^2 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{du}\right|_{u=-1} = ?$

Yanıt / The Answer is 192

112. $\left.\begin{array}{l} y = 3t^2 - 3t \\ x = 2t + 1 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{t=0} = ?$

Yanıt / The Answer is $-\frac{3}{2}$

113. $\left.\begin{array}{l} y = 2u^2 + 3 \\ x = u^3 + 3 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{u=2} = ?$

Yanıt / The Answer is $\dfrac{2}{3}$

114. $\left.\begin{array}{l} y = t^2 - 5t + 1 \\ x = 2t + 1 \end{array}\right\} \Rightarrow \left.\dfrac{d^2y}{dx^2}\right|_{t=-1} = ?$

Yanıt / The Answer is $\dfrac{1}{2}$

115. $\left.\begin{array}{l} y = 3 \cdot \cos t \\ x = 2 \cdot \sin t \end{array}\right\} \Rightarrow \dfrac{d^2y}{dx^2} = ?$

Yanıt / The Answer is $\dfrac{-3}{4 \cdot \cos^3 t}$

116. $f(x,y) = xy^2 - x^2y \Rightarrow f'(x,y) = ?$

Yanıt / The Answer is $\dfrac{y^2 - 2xy}{2xy - x^2}$

117. $x^2 - 2xy + y^2 + 4x - 5 = 0 \Rightarrow \left.\dfrac{dy}{dx}\right|_{(1,0)} = ?$

Yanıt / The Answer is 3

118. $f(x,y) = \sin x + \cos y + xy = 0 \Rightarrow \dfrac{dy}{dx} = ?$

Yanıt / The Answer is $\dfrac{\cos x + y}{\sin y - x}$

119. $f(x,y) = x^2y^3 - 3xy + 2yx^2 = 0 \Rightarrow \left.\dfrac{dy}{dx}\right|_{(1,1)} = ?$

Yanıt / The Answer is $-\dfrac{3}{2}$

120. $f(x) = x^x \Rightarrow f'(x) = ?$

Yanıt / The Answer is $x^x(\ln x + 1)$

121. $f(x)=(\cos x)^x \Rightarrow f'(0)=?$

Yanıt / The Answer is 0

122. $f(x)=(\sin x)^{\ln x} \Rightarrow f'\left(\frac{\pi}{2}\right)=?$

Yanıt / The Answer is 0

123. $f(x)=\text{sgn}(x^2-x-2) \Rightarrow f'(-1)=?$

Yanıt / The Answer is Türevi yoktur./
The derivative does not exist.

124. $f(x)=\text{sgn}(x^2-x-2) \Rightarrow f'(2)=?$

Yanıt / The Answer is Türevi yoktur./
The derivative does not exist.

125. $f(x)=\text{sgn}(x^2-x-2) \Rightarrow f'(1)=?$

Yanıt / The Answer is 0

126. $f(x)=\text{sgn}(x^2+6x+8) \Rightarrow f'(4)=?$

Yanıt / The Answer is 0

127. $f(x)=[|x+1|] \Rightarrow f'(1)=?$

Yanıt / The Answer is Türevi yoktur./
The derivative does not exist.

128. $f(x)=[|x+1|] \Rightarrow f'\left(\frac{1}{3}\right)=?$

Yanıt / The Answer is 0

1. $f(x) = x^2 + 3x + 2$

$\Rightarrow \lim\limits_{x \to 4} \dfrac{f(x) - f(4)}{x - 4} = ?$

A) 4 B) 5 C) 8 D) 9 E) 11

2. $f(x) = x^2 - 2x - 3$

$\Rightarrow \lim\limits_{h \to 0} \dfrac{f(x+h) - f(x-2h)}{h} = ?$

A) $2x - 2$ B) $2x - 3$ C) $6x - 2$ D) $6x - 3$ E) $6x - 6$

3. $f(x) = x^2 + 2x$

$\Rightarrow \lim\limits_{x \to 3} \dfrac{f(x) - f(3)}{x - 3} = ?$

A) 8 B) 10 C) 12 D) 15 E) 18

4. $f(x) = x^2 - 4x + 5$

$\Rightarrow \lim\limits_{x \to 2} \dfrac{f(x) - f(2)}{x - 2} = ?$

A) -2 B) -1 C) 0 D) 2 E) 4

5. $f(x) = 3x^2 - 2x + 1$

$\Rightarrow \lim\limits_{h \to 0} \dfrac{f(1+h) - f(1)}{h} = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

6. $f(x) = x^3 + mx^2 - 4x + 3$

$\lim\limits_{x \to 3} \dfrac{f(x) - f(3)}{x - 3} = -1 \Rightarrow m = ?$

A) -4 B) -3 C) -2 D) 3 E) 4

7. $f(x) = \sin x + \cos x$

$\Rightarrow \lim\limits_{x \to \frac{\pi}{2}} \dfrac{f(x) - f\left(\frac{\pi}{2}\right)}{x - \frac{\pi}{2}} = ?$

A) $-\sqrt{2}$ B) $-\dfrac{\sqrt{2}}{2}$ C) -1 D) $\dfrac{\sqrt{2}}{2}$ E) $\sqrt{2}$

8. $f(x) = \begin{cases} x^3 - 3x, & x \le 2 \\ 9x - 16, & 2 < x \end{cases}$

$\Rightarrow f'(2) = ?$

A) 2 B) 4 C) 6 D) 9 E) Türevi yoktur. / The derivative does not exist.

9. $f(x) = x^3 - 4x + 7$

$\Rightarrow$ **$f'(1) = ?$**

A) -2 B) -1 C) 1 D) 2 E) 6

10. $f(x) = 4x^3 - 3x^2 + 5$

$\Rightarrow$ **$f'(-1) = ?$**

A) 12 B) 14 C) 16 D) 18 E) 20

11. $f(x) = x^3 + ax^2 - 3x + 1,$

$f'(x) = bx^2 + 4x + c$

$\Rightarrow$ **$a + b + c = ?$**

A) 1 B) 2 C) 3 D) 4 E) 5

12. $f(x) = ax^3 - 3x^2 + 2x - 1,$

$f'(1) = 8 \Rightarrow$ **$a = ?$**

A) 2 B) 4 C) 6 D) 8 E) 10

13. $f(x) = ax^3 + 3x^2 + b$

$f'(2) = 16 \Rightarrow$ **$a = ?$**

A) $\frac{1}{9}$ B) $\frac{1}{3}$ C) 1 D) 3 E) 9

14. $f(x) = x^3 - 4x^2 + (a-1)x + 4$

$f'(2) = f(2) \Rightarrow$ **$a = ?$**

A) 5 B) 4 C) 3 D) 2 E) 1

15. $f(x) - f'(x) = 4x^2 + 6x + 7$

$\Rightarrow$ **$f'(-2) = ?$**

A) -6 B) -4 C) -2 D) -1 E) 0

16. $f(x) - f'(x) = 6x^3 + 3x^2 - 9x + 12$

$\Rightarrow$ **$f(0) = ?$**

A) 40 B) 45 C) 50 D) 55 E) 60

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	E	A	C	B	A	C	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	D	B	B	B	E	C	B

1. $f(x) = 3x^3 - 2x + 5$

$\Rightarrow \lim\limits_{x \to 2} \dfrac{f(x) - f(2)}{x - 2} = ?$

A) 30 B) 34 C) 38 D) 42 E) 46

2. $f(x) = 4x^5 - 7x^3 + 6x^2 - 5x + 2$

$\Rightarrow \lim\limits_{x \to 1} \dfrac{f(x) - f(1)}{x - 1} = ?$

A) 3 B) 6 C) 12 D) 15 E) 16

3. $f(x) = x \cdot \sin x \Rightarrow \lim\limits_{x \to \pi} \dfrac{f(x) - f(\pi)}{x - \pi} = ?$

A) π B) $\dfrac{\pi}{2}$ C) $-\dfrac{\pi}{2}$ D) $-\pi$ E) -2π

4. $f: R \to R$,

$f(4 - 3x) = x^3 + 6x^2 - 9x + 12$

$\Rightarrow \lim\limits_{x \to -2} \dfrac{f(x) - f(-2)}{x + 2} = ?$

A) -81 B) -72 C) -54 D) -36 E) -9

5. $f(x) = x^4 - 6x^2 + (a + 2)x - 7$,

$\lim\limits_{x \to 3} \dfrac{f(x) - f(3)}{x - 3} = 82 \Rightarrow a = ?$

A) 3 B) 4 C) 5 D) 7 E) 8

6. $f(x) = x^2 - 2x + 3$

$\Rightarrow \lim\limits_{h \to 0} \dfrac{f(x + h) - f(x)}{h} = ?$

A) x B) $2x$ C) $x - 2$ D) $2x - 2$ E) $2x + 2$

7. $f(x) = x^3 + 3x^2 - 6x + 8$

$x = 2 \to \lim\limits_{h \to 0} \dfrac{f(x + h) - f(x)}{h} = ?$

A) 18 B) 11 C) 9 D) 7 E) 5

8. $f(x) = x^2 + 2x + 4$

$\Rightarrow \lim\limits_{h \to 0} \dfrac{f(2h + 1) - f(1)}{h} = ?$

A) 8 B) 4 C) 2 D) 16 E) 32

9. $f(x) = x^2 + 1$

$\Rightarrow \lim\limits_{h \to 0} \dfrac{f(x+h)-f(x)}{h} = ?$

A) x B) 2x C) 3x D) 4x E) 5x

10. $f(x) = x^3 + 4x^2 - 8x + 7$

$\Rightarrow \lim\limits_{h \to 0} \dfrac{f(2+h)-f(2)}{h} = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

11. $f : R - \{2\} \to R - \left\{\dfrac{1}{3}\right\}$,

$f(x) = \dfrac{x}{3x-6} \Rightarrow \lim\limits_{h \to 0} \dfrac{f(3+h)-f(3)}{h} = ?$

A) $-\dfrac{1}{3}$ B) $-\dfrac{2}{3}$ C) -1 D) -2 E) $-\dfrac{5}{3}$

12. $f(x) = x^3 - 4x - 8$,

$x = 3 \Rightarrow \lim\limits_{h \to 0} \dfrac{f(x-h)-f(x+h)}{h} = ?$

A) -42 B) -43 C) -44 D) -45 E) -46

13. $f(x) = 3x^2 - ax^3 + b$,

$\lim\limits_{h \to 0} \dfrac{f(1+h)-f(1)}{3h} = 5 \Rightarrow a = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

14. $f(x) = \sin\left(\dfrac{\pi}{2}\right) + \cos\left(\dfrac{\pi}{2}x\right)$

$\Rightarrow \lim\limits_{x \to \frac{3}{2}} \dfrac{f(x)-f\left(\frac{3}{2}\right)}{4x-6} = ?$

A) $-\dfrac{\sqrt{2}}{16}$ B) $-\dfrac{\pi}{16}$ C) $\dfrac{\pi\sqrt{2}}{16}$ D) $-\dfrac{\pi\sqrt{2}}{16}$ E) $-\dfrac{\pi\sqrt{2}}{32}$

15. $f(x) = x^4 - 4x^3 + x^2 - 2x + 1$,

$x = 2 \Rightarrow \lim\limits_{h \to 0} \dfrac{f(x+2h)-f(x)}{2h} = ?$

A) -1 B) -7 C) -14 D) -28 E) -35

16. $f(x) = x^3 + 2x^2 + 12x + 8$

$\Rightarrow \lim\limits_{h \to 0} \dfrac{f(2+5h)-f(2-3h)}{64h} = ?$

A) 2^2 B) 2^3 C) 2^4 D) 2^5 E) 2^6

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	B	D	E	E	D	A	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	D	B	E	C	D	C	A

1. $f(x) = x^4 - 12x^2 + 2 \Rightarrow f'(2) = ?$

A) -2^2 B) -2^3 C) -2^4 D) -2^5 E) -2^6

2. $f(x) = \frac{(x^2+3x)^3}{3} + 3 \Rightarrow f'(1) = ?$

A) 70 B) 75 C) 80 D) 85 E) 90

3. $f(x) = \frac{2}{x} + \frac{3}{x^2} - \frac{4}{2x-3} \Rightarrow f'(1) = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

4. $f(x) = \frac{3}{x} + \frac{1}{x^2} + \frac{2}{2x+3} \Rightarrow f'(-1) = ?$

A) -5 B) -3 C) 0 D) 3 E) 5

5. $f(x) = x^3 + \frac{2}{x^2} + \sqrt[3]{x^2} \Rightarrow f'(1) = ?$

A) -1 B) $-\frac{2}{3}$ C) $-\frac{1}{3}$ D) 1 E) $\frac{3}{2}$

6. $f(x) = \sqrt[3]{x^2} + 3x^{-2} - x + 3 \Rightarrow f'(1) = ?$

A) $-\frac{22}{3}$ B) $-\frac{20}{3}$ C) $-\frac{19}{3}$ D) $-\frac{17}{3}$ E) $-\frac{16}{3}$

7. $f(x) = (2x+5)^3 \Rightarrow f'(-3) = ?$

A) -6 B) -3 C) -1 D) 3 E) 6

8. $f(x) = (x^2 - 5x + 7)^3 \Rightarrow f'(2) = ?$

A) -7 B) -5 C) -3 D) 3 E) 5

9. $f(x) = (x^3 - 3x^2 + 5)^4$

$\Rightarrow f'(-1) = ?$

A) -36 B) -18 C) -12 D) 12 E) 36

10. $f(x) = (3x^2 - 2x)\cdot(x^3 - x + 1)$

$\Rightarrow f'(2) = ?$

A) 148 B) 158 C) 162 D) 168 E) 176

11. $f(x) = (x^2 + 3x - 2)\cdot(2x^2 - x - 3)$

$\Rightarrow f'(1) = ?$

A) -16 B) -12 C) -8 D) -4 E) -1

12. $f(x) = (x^2 + 1)\cdot(2 + x)^3$

$\Rightarrow f'(0) = ?$

A) 3 B) 6 C) 9 D) 12 E) 15

13. $f(x) = (x^2 - x - 1)\cdot(x^4 + 1)^2 \Rightarrow f'(0) = ?$

A) -3 B) -1 C) 0 D) 1 E) 3

14. $f(x) = \sqrt{x^2 - 5x + 16} \Rightarrow f'(5) = ?$

A) $\frac{3}{4}$ B) $\frac{5}{6}$ C) $\frac{5}{8}$ D) $\frac{7}{8}$ E) $\frac{5}{4}$

15. $f(x) = x^3\cdot\sqrt{x^3 + 3} \Rightarrow f'(1) = ?$

A) $\frac{15}{2}$ B) $\frac{17}{2}$ C) $\frac{21}{4}$ D) $\frac{27}{4}$ E) $\frac{31}{4}$

16. $f(x) = \frac{2x}{x^2 + 1} \Rightarrow f'(3) = ?$

A) $\frac{3}{5}$ B) $\frac{4}{5}$ C) $-\frac{1}{25}$ D) $\frac{2}{25}$ E) $-\frac{4}{25}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	C	C	A	C	C	E	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	B	D	D	B	C	D	E

1. $a \in R^+$,

$f(x) = \frac{x-2}{x+3}$, $f'(a) = \frac{1}{5} \Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $f(x) = \frac{x^2+2x-9}{x+2} \Rightarrow f'(-1) = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

3. $f(x) = \frac{6x^2+4x+7}{2x+8} \Rightarrow f'(1) = ?$

A) 1,23 B) 1,26 C) 1,29 D) 1,32 E) 1,35

4. $f(x) = \frac{4x-1}{x^2-5} \Rightarrow f'(2) = ?$

A) −32 B) −28 C) −24 D) 24 E) 28

5. $f(x) = \frac{-1}{x^3+2x^2+8} \Rightarrow f'(-1) = ?$

A) $-\frac{1}{81}$ B) $-\frac{1}{72}$ C) $-\frac{1}{54}$ D) $-\frac{1}{27}$ E) $-\frac{1}{9}$

6. $f(x) = 3\cdot(x^2-2x)^4 \Rightarrow f'(1) = ?$

A) −12 B) −6 C) 0 D) 6 E) 12

7. $f(x) = \sqrt[3]{x^2+5x+2} \Rightarrow f'(1) = ?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) $\frac{4}{3}$ D) $\frac{5}{12}$ E) $\frac{7}{12}$

8. $f(x) = \sqrt[3]{x^2+4} \Rightarrow f'(2) = ?$

A) $\frac{1}{6}$ B) $\frac{1}{5}$ C) $\frac{1}{4}$ D) $\frac{1}{3}$ E) $\frac{1}{2}$

9. $f(3x+2) = x^3 + 2x^2 - 3x + 5 \Rightarrow \mathbf{f'(-4) = ?}$

A) $-\frac{2}{3}$ B) $-\frac{1}{3}$ C) $\frac{1}{3}$ D) $\frac{2}{3}$ E) 1

10. $f(2x+3) = 3x^2 + 4x + 1 \Rightarrow \mathbf{f'(5) = ?}$

A) 1 B) 3 C) 5 D) 7 E) 9

11. $f(2x-6) = x^3 - 2x^2 + 3x - 4 \Rightarrow \mathbf{f'(4) = ?}$

A) 23 B) 25 C) 27 D) 29 E) 32

12. $f(x^3 - 2x) = 3x^2 - 4x - 5 \Rightarrow \mathbf{f'(-4) = ?}$

A) $-\frac{12}{5}$ B) $-\frac{8}{5}$ C) $-\frac{7}{10}$ D) $\frac{8}{5}$ E) $\frac{7}{10}$

13. $x \in Z$,

$f(2x^2 - 3x) = x^4 + x^2 \Rightarrow \mathbf{f'(-1) = ?}$

A) 2 B) 4 C) 6 D) 8 E) 10

14. $x \neq 0$,

$f(x^3 - 2x^2) = 3x^2 - 4x + 7 \Rightarrow \mathbf{f'(0) = ?}$

A) 1 B) 2 C) 3 D) 4 E) 6

15. $(x^2 + 2)\cdot g(x) = f(3x - 1)$,

$g(2) = 3$, $\mathbf{f'(5) = 1 \Rightarrow g'(2) = ?}$

A) $-\frac{7}{2}$ B) $-\frac{5}{2}$ C) $-\frac{3}{2}$ D) $\frac{3}{2}$ E) $\frac{5}{2}$

16. $\left.\begin{array}{l} f(x) = x^2 + 1 \\ g(x) = x^2 + 2x \end{array}\right\} \Rightarrow \mathbf{(gof)'(1) = ?}$

A) 12 B) 10 C) 7 D) 6 E) 8

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1	2	3	4	5	6	7	8
B	B	B	A	A	C	E	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	C	D	B	C	B	C	A

1. $g(2) = 3,\ f'(3) = 6,\ g'(2) = 4 \Rightarrow (fog)'(2) = ?$

A) 18 B) 20 C) 22 D) 24 E) 26

2. $f(x) = x^3 - 2x^2 + 1,$
$g(x) = x^2 + 3x + 2 \Rightarrow (fog)'(-2) = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

3. $f(x) = -2x^2 + 2x + 3$
$g(x) = x - 3$
$\Rightarrow (fog)'(3) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $f(x) = x^3 + 3x$
$g(x) = x^2 - 1$
$\Rightarrow (gof)'(-1) = ?$

A) −40 B) −48 C) −56 D) −64 E) −72

5. $f(x) = 2x - 1,$
$(gof)(x) = -5x^2 + 4x \Rightarrow g'(3) = ?$

A) −18 B) −8 C) −3 D) 3 E) 13

6. $f(x) = 3x^2 + 2x,$
$g(x) = 2x + 4$
$\Rightarrow (fog)'(1) = ?$

A) 72 B) 76 C) 80 D) 84 E) 88

7. $f(x) = x^3 - 4 \Rightarrow (f^{-1})'(4) = ?$

A) $\frac{1}{12}$ B) $\frac{1}{6}$ C) $\frac{2}{5}$ D) $\frac{5}{12}$ E) $\frac{5}{6}$

8. $f(x) = x^3 + 15 \Rightarrow (f^{-1})'(-12) = ?$

A) $-\frac{1}{27}$ B) $-\frac{1}{9}$ C) $\frac{1}{9}$ D) $\frac{1}{27}$ E) $\frac{1}{36}$

9. $x \in R^+$,
$f(x) = x^2 + 4x - 3 \Rightarrow (f^{-1})'(2) = ?$

A) $\frac{1}{2}$ B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) $-\frac{1}{2}$ E) $\frac{5}{12}$

10. $x \in R^-$,
$f(x) = x^2 - 2x - 6 \Rightarrow (f^{-1})'(2) = ?$

A) $-\frac{1}{6}$ B) $-\frac{1}{4}$ C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) $\frac{1}{4}$

11. $x \in R^-$,
$f(x) = x^2 + 3x - 6 \Rightarrow (f^{-1})'(4) = ?$

A) $-\frac{1}{7}$ B) $-\frac{1}{5}$ C) $-\frac{1}{3}$ D) $\frac{1}{7}$ E) $\frac{1}{5}$

12. $f(x) = \frac{2x-5}{x+1} \Rightarrow (f^{-1})'(3) = ?$

A) -7 B) $-\frac{1}{7}$ C) 0 D) $\frac{1}{7}$ E) 7

13. $f(x) = \frac{-3x+4}{2x-1} \Rightarrow (f^{-1})'(-2) = ?$

A) -7 B) -6 C) -5 D) $-\frac{1}{5}$ E) $-\frac{1}{6}$

14. $f(x) = \frac{2x-5}{x+3} \Rightarrow (f^{-1})'(3) = ?$

A) 8 B) 10 C) 11 D) 13 E) 15

15. $f : [1, +\infty) \to [-7, +\infty)$,
$f(x) = x^2 - 2x - 6 \Rightarrow (f^{-1})'(2) = ?$

A) $\frac{1}{6}$ B) $\frac{1}{5}$ C) $\frac{1}{4}$ D) $\frac{1}{3}$ E) $\frac{1}{2}$

16. $f : \left[\frac{1}{2}, \infty\right) \to R$
$f(x) = x^2 - x - 4 \Rightarrow (f^{-1})'(2) = ?$

A) $-\frac{1}{2}$ B) $-\frac{1}{3}$ C) $-\frac{1}{5}$ D) $\frac{1}{5}$ E) $\frac{1}{2}$

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1	2	3	4	5	6	7	8
D	C	B	B	B	B	A	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	A	A	E	C	C	A	D

1. $f(x) = |x^2 - 3| \Rightarrow f'(-1) = ?$

A) -3 B) -2 C) -1 D) 2 E) 3

2. $f(x) = |x^2 + 2x - 7| \Rightarrow f'(2) = ?$

A) 2 B) 4 C) 6 D) 8 E) 0

3. $f(x) = |x^3 - 8| \Rightarrow f'(-2) = ?$

A) -96 B) -72 C) -48 D) -24 E) -12

4. $f(x) = |x^3 + 7| + 3x^2 - 5 \Rightarrow f'(-2) = ?$

A) -24 B) -18 C) 0 D) 12 E) 24

5. $f: R \to R$

$f(x) = |x^3 - 4x^2| + x + 2 \Rightarrow f'(6) = ?$

A) 59 B) 61 C) 63 D) 65 E) 67

6. $F(x, y) = x^2 - xy + y - 4 = 0 \Rightarrow \frac{dy}{dx}(x = 3) = ?$

A) $-\frac{7}{4}$ B) $-\frac{7}{2}$ C) 0 D) $\frac{7}{4}$ E) $\frac{7}{2}$

7. $F(x, y) = x^3 - 2x^2y - 3y - 4x - 6 = 0 \Rightarrow \frac{dy}{dx}(x = 0) = ?$

A) $-\frac{4}{3}$ B) $-\frac{2}{3}$ C) $-\frac{1}{3}$ D) $\frac{2}{3}$ E) $\frac{4}{3}$

8. $4x^2 - 3xy - 5x + 6y - 8 = 0 \Rightarrow \frac{dy}{dx}(x = 1) = ?$

A) -3 B) -2 C) 1 D) 2 E) 3

9. $2x^3 - 3y^3 + 4x^2 + 5y - x + 6 = 0 \Rightarrow f'(-1, 1) = ?$

A) $-\frac{3}{4}$ B) $-\frac{2}{3}$ C) $-\frac{1}{2}$ D) $\frac{2}{3}$ E) $\frac{3}{4}$

10. $x^2y + 3xy^3 - 4x + 5y - 6 = 0 \Rightarrow f'(2, -1) = ?$

A) $-\frac{11}{27}$ B) $-\frac{11}{6}$ C) $-\frac{5}{6}$ D) $\frac{11}{27}$ E) $\frac{11}{6}$

11. $f(x, y) = x^3 + 2xy + y^2 - 5 = 0 \Rightarrow f'(1, 2) = ?$

A) $-\frac{11}{6}$ B) $-\frac{7}{6}$ C) $\frac{7}{6}$ D) $\frac{11}{4}$ E) $\frac{13}{4}$

12. $f(x, y) = x^3 - 3x^2y + 2xy^2 + y^3 - 4 = 0 \Rightarrow f'(-1, 1) = ?$

A) $-\frac{11}{4}$ B) $-\frac{7}{4}$ C) $\frac{7}{4}$ D) $\frac{11}{4}$ E) $\frac{13}{4}$

13. $f(x, y) = x^3 - 4y^2 + 5x^2 + 3y^3 - y - 6 = 0$

$\Rightarrow f'(-2, -1) = ?$

A) $\frac{1}{8}$ B) $\frac{1}{6}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

14. $F(x, y) = 4x^2 - 3xy + 2x + 4y - 5 = 0$

$\Rightarrow \frac{dy}{dx}(x = 1) = ?$

A) -11 B) -12 C) -13 D) -14 E) -15

15. $\sin^2 x + \cos y + \frac{\pi}{3} = 0$

$\Rightarrow f'\left(\frac{\pi}{6}, \frac{\pi}{3}\right) = ?$

A) $-\sqrt{3}$ B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) 1 E) $\sqrt{3}$

16. $x \cdot \sin x - \ln y + 3x = 0$

$\Rightarrow \frac{dy}{dx}(x = 0) = ?$

A) 0 B) 1 C) -2 D) 3 E) -4

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1	2	3	4	5	6	7	8
D	C	E	A	B	D	A	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	D	B	D	D	C	D	D

1. $\left.\begin{array}{l} y = u^2 + 3u - 7 \\ u = 2x + 1 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=0} = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

2. $\left.\begin{array}{l} y = 2e^t \\ x = 3e^{-t} \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{t=0} = ?$

A) $\frac{1}{3}$ B) $-\frac{2}{3}$ C) -1 D) -2 E) -4

3. $\left.\begin{array}{l} y = t + 3 \\ t = 2z - 1 \\ z = x^2 + 2x \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=3} = ?$

A) 20 B) 16 C) 14 D) 12 E) 8

4. $\left.\begin{array}{l} y = t^2 + 2t + 1 \\ t = 2z - 3 \\ z = x + 1 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=-2} = ?$

A) -20 B) -16 C) -12 D) -8 E) -4

5. $\left.\begin{array}{l} x = t^2 - 3t + 5 \\ y = 3t^3 - 4t \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{t=-1} = ?$

A) -2 B) -1 C) 1 D) 2 E) 3

6. $\left.\begin{array}{l} x = 5 \cdot \sec t \\ y = 4 \cdot \tan t \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{t=\frac{\pi}{3}} = ?$

A) $8\sqrt{3}$ B) $\sqrt{3}$ C) $\frac{8\sqrt{3}}{5}$ D) $\frac{8\sqrt{3}}{3}$ E) $\frac{8\sqrt{3}}{15}$

7. $\left.\begin{array}{l} y = 2t^2 - 5t + 3 \\ t = z^2 + 3z \\ z = x - 3 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=2} = ?$

A) -13 B) -7 C) -2 D) 2 E) 7

8. $\left.\begin{array}{l} y = u^3 + 3u \\ u = t^2 - 2t + 1 \\ t = x - 3 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=2} = ?$

A) -204 B) -200 C) -196 D) -192 E) -188

9. $\left.\begin{array}{l} x = u^3 - 4u^2 + 5 \\ y = 3u^2 + 2u - 4 \end{array}\right\} \Rightarrow \dfrac{dy}{dx}(u = 2) = ?$

A) $-\frac{9}{2}$ B) $-\frac{7}{2}$ C) $-\frac{5}{2}$ D) $\frac{7}{2}$ E) $\frac{9}{2}$

10. $\left.\begin{array}{l} x = 2\cos 3t \\ y = \sin 2t \end{array}\right\} \Rightarrow \dfrac{dy}{dx}\left(t = \frac{\pi}{6}\right) = ?$

A) $-\frac{1}{6}$ B) $-\frac{1}{3}$ C) $-\frac{1}{2}$ D) $-\frac{\sqrt{2}}{2}$ E) $-\frac{\sqrt{3}}{2}$

11. $\left.\begin{array}{l} x = 2t - 3 \\ y = t^2 - 2t + 1 \end{array}\right\} \Rightarrow \dfrac{d^2y}{dx^2} = ?$

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

12. $\left.\begin{array}{l} x = t^2 - 2t \\ y = t^3 - 8t + 1 \end{array}\right\} \Rightarrow \left.\dfrac{d^2y}{dx^2}\right|_{t=2} = ?$

A) $-\frac{1}{2}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 4

13. $\left.\begin{array}{l} x = t^2 - 3t - 3 \\ y = 2t + 1 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{\substack{x=1 \\ y=9}} = ?$

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) 1

14. $\left.\begin{array}{l} x = 2 \cdot \sin 3t \\ y = \cos 2t \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{t=\pi/4} = ?$

A) $\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{2}}{2}$ C) $\frac{\sqrt{2}}{3}$ D) $\frac{\sqrt{2}}{4}$ E) $\frac{\sqrt{2}}{6}$

15. $\left.\begin{array}{l} x = t^3 - t^2 \\ y = 3t^2 + 4 \end{array}\right\} \Rightarrow \left.\dfrac{d^2y}{dx^2}\right|_{t=1} = ?$

A) -36 B) -24 C) -18 D) 18 E) 24

16. $\left.\begin{array}{l} x = 2 + \cos t \\ y = 3 - \sin t \end{array}\right\} \Rightarrow \left.\dfrac{d^2y}{dx^2}\right|_{t=\frac{\pi}{4}} = ?$

A) $-2\sqrt{2}$ B) $-\sqrt{2}$ C) $\sqrt{2}$ D) $2\sqrt{2}$ E) $3\sqrt{2}$

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1	2	3	4	5	6	7	8
B	B	B	B	B	E	A	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	A	D	D	B	C	C	D

1. $f(x) = \sin 4x + \cos 3x \Rightarrow f'(0) = ?$

A) -4 B) -2 C) 0 D) 2 E) 4

2. $f(x) = \cos x + 3\sin x \Rightarrow f'\left(\frac{\pi}{6}\right) = ?$

A) $\frac{-1-3\sqrt{3}}{2}$ B) $\frac{1-3\sqrt{3}}{2}$ C) $\frac{-1+3\sqrt{3}}{2}$ D) $1+3\sqrt{3}$ E) $-1+3\sqrt{3}$

3. $f(x) = \sin^3 x \Rightarrow f'(x) = ?$

A) $3\sin x\cos x$ B) $3\sin^2 x\cos x$ C) $3\cos^2 x$ D) $3\sin^2 x$ E) $3\sin x\cos^2 x$

4. $f(x) = \sin x^4 \Rightarrow f'(x) = ?$

A) $4x^3 \cdot \cos x^4$ B) $x^4 \cdot \cos x^4$ C) $4x^3 \cdot \sin x^4$ D) $x^4 \cdot \sin x^4$ E) $3x^3 \cdot \cos x^4$

5. $f(x) = \sin 4x \cdot \cos 2x \Rightarrow f'\left(\frac{\pi}{12}\right) = ?$

A) $-\frac{3\sqrt{3}}{2}$ B) $-\frac{\sqrt{3}}{2}$ C) 0 D) $\frac{\sqrt{3}}{2}$ E) $\frac{3\sqrt{3}}{2}$

6. $f(x) = \sin^2 x \cdot \cos^3 x \Rightarrow f'\left(\frac{\pi}{2}\right) = ?$

A) -3 B) -1 C) 0 D) 1 E) 3

7. $f(x) = \sin(\ln x) \Rightarrow f'(x) = ?$

A) $x \cdot \cos(\ln x)$ B) $x \cdot \sin(\ln x)$ C) $\frac{1}{x} \cdot \cos(\ln x)$ D) $\frac{1}{x} \cdot \sin(\ln x)$ E) $\cos x \cdot \frac{1}{x}$

8. $f(x) = 2 \cdot \tan x \Rightarrow f'\left(\frac{\pi}{3}\right) = ?$

A) -12 B) 8 C) 12 D) $-3\sqrt{2}$ E) $6\sqrt{2}$

9. $f(x) = \tan 2x - \cot 2x \Rightarrow f'\left(\frac{\pi}{8}\right) = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

10. $f(x) = \tan x \cdot (1 + \cot x) \Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

11. $f(x) = \frac{\tan x}{\sin 2x} \Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 4

12. $f(x) = \cos e^x \Rightarrow f'(x) = ?$

A) $-e^x \cdot \sin e^x$ B) $-e^x \cdot \cos e^x$

C) $-e^x \cdot \sin e^x \cdot \cos x$ D) $e^x \cdot \sin e^x$

E) $e^x \cdot \cos e^x$

13. $f(x) = \sin\frac{\pi}{6} + \tan x + \cos\frac{\pi}{4} \Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

14. $f(x) = e^x \cdot \sin x \Rightarrow f'\left(\frac{\pi}{2}\right) = ?$

A) $\frac{\pi}{2}$ B) $\ln\frac{\pi}{2}$ C) $e^{\frac{\pi}{2}}$ D) $\frac{\pi}{2} \cdot e$ E) $\ln 2$

15. $0 < x < \frac{\pi}{2}$,

$f(x) = \ln(\sin x) \Rightarrow f'(x) = ?$

A) $\operatorname{cosec} x$ B) $\sec x$ C) $\tan x$

D) $\cot x$ E) $\sin x$

16. $f(x) = \sin\left(\frac{\pi}{4} \cdot \tan\left(\frac{\pi x}{4}\right)\right) \Rightarrow f'(1) = ?$

A) $\frac{\pi\sqrt{2}}{16}$ B) $\frac{\pi^2\sqrt{2}}{16}$ C) $\frac{\pi\sqrt{2}}{8}$

D) $\frac{\pi^2\sqrt{2}}{8}$ E) $\frac{\pi^2\sqrt{2}}{4}$

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1	2	3	4	5	6	7	8
E	C	B	A	D	C	C	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	C	D	A	E	C	D	B

1. $f(x) = e^x \cdot \cos(\ln x) \Rightarrow f'(1) = ?$

A) $\frac{1}{e}$ B) 0 C) 1 D) e E) e^2

2. $f(x) = \ln(\cos x) \Rightarrow f'(\frac{\pi}{3}) = ?$

A) $-\sqrt{3}$ B) $-\frac{\sqrt{3}}{2}$ C) $\frac{1}{\sqrt{3}}$ D) $\sqrt{3}$ E) $2\sqrt{3}$

3. $f(x) = \tan x^5 \Rightarrow f'(x) = ?$

A) $-5x^4 \cdot (1 + \tan^2 x^5)$ B) $5x^4 \cdot (1 + \tan^2 x^5)$
C) $-5x^4 \cdot (1 - \tan^2 x^5)$ D) $5x^4 \cdot (1 - \tan^2 x^5)$
E) $5x^4 \cdot (1 + \tan x^5)$

4. $f(x) = e^{\tan x} \Rightarrow f'(\frac{\pi}{4}) = ?$

A) e B) 2e C) 3e D) e^2 E) e^3

5. $f(x) = \ln(\tan x) \Rightarrow f'(\frac{\pi}{4}) = ?$

A) 2 B) 4 C) 2e D) e^2 E) e^3

6. $f(x) = \sin(\cos x) \Rightarrow f'(\frac{\pi}{2}) = ?$

A) -1 B) 0 C) 1 D) $\frac{\sqrt{2}}{2}$ E) $\frac{\sqrt{3}}{2}$

7. $f(x) = \sin^2 2x \cdot \cos^2 2x \Rightarrow f'(\frac{\pi}{12}) = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{\sqrt{3}}{4}$ C) 0 D) $\frac{\sqrt{3}}{2}$ E) $\frac{\sqrt{3}}{4}$

8. $f(x) = \cos(2^x) \Rightarrow f'(x) = ?$

A) $-2^x \cdot \ln 2 \cdot \cos(2^x)$
B) $-2^x \cdot \ln 2 \cdot \sin(2^x)$
C) $-2^x \cdot \cos(2^x)$
D) $2^x \cdot \sin(2^x)$
E) $2^x \cdot \cos(2^x)$

9. $f(x)=\sqrt{2+\cos 2x} \Rightarrow f'\left(\frac{\pi}{4}\right)=?$

A) $-\frac{1}{\sqrt{2}}$ B) $\frac{\sqrt{2}}{2}$ C) $-\frac{3}{\sqrt{2}}$ D) $-\sqrt{2}$ E) -1

10. $f(x)=\tan(\ln x) \Rightarrow f'(x)=?$

A) $\frac{1+\tan^2 x}{x}$ B) $\frac{1+\tan^2(\ln x)}{x}$ C) $\frac{\tan^2(\ln x)}{x}$ D) $\frac{1+\tan(\ln^2 x)}{x}$ E) $\frac{1+\tan(\ln x)}{x^2}$

11. $0<x<\frac{\pi}{2}$,

$f(\sin x)=\cos 2x \Rightarrow f'\left(\frac{\sqrt{3}}{2}\right)=?$

A) $-2\sqrt{3}$ B) $-\sqrt{3}$ C) $-\frac{\sqrt{3}}{2}$ D) $\sqrt{3}$ E) $2\sqrt{3}$

12. $y=\cos^2 4x \Rightarrow \frac{d^2y}{dx^2}\left(x=\frac{\pi}{8}\right)=?$

A) 4 B) 8 C) 16 D) 24 E) 32

13. $f(x)=1-\cos 2x \Rightarrow f'\left(\frac{\pi}{2}\right)=?$

A) -4 B) -2 C) 0 D) 2 E) 4

14. $f(x)=\cos^4 x-\sin^4 x \Rightarrow f'\left(\frac{\pi}{6}\right)=?$

A) $-\sqrt{3}$ B) $-\frac{\sqrt{3}}{2}$ C) 0 D) $\frac{\sqrt{3}}{2}$ E) $\sqrt{3}$

15. $\left.\begin{array}{l} f(x)=\sin^2 x \\ g(x)=\frac{\pi}{2} \end{array}\right\} \Rightarrow (fog)'(x)=?$

A) $-\frac{\sqrt{2}}{2}$ B) $-\sqrt{3}$ C) 0 D) $\frac{\sqrt{2}}{2}$ E) $\sqrt{3}$

16. $\left.\begin{array}{l} f(x)=\sin 2x \\ g(x)=\cos x \end{array}\right\} \Rightarrow \left(\frac{f(x)}{g(x)}\right)'=?$

A) $\tan^2 x$ B) $-\cos x$ C) $\sin x \cdot \cos x$ D) $2\cdot\cos x$ E) $\sin x$

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1	2	3	4	5	6	7	8
D	A	B	B	A	A	D	B
9	10	11	12	13	14	15	16
A	B	A	E	C	A	C	D

1. $f(x) = \arcsin(x^2) \Rightarrow f'(x) = ?$

A) $\frac{2x}{\sqrt{1-x^2}}$ B) $\frac{2x}{\sqrt{1-x^4}}$ C) $\frac{x^2}{\sqrt{1-x^2}}$ D) $\frac{x^2}{\sqrt{1-x^4}}$ E) $\frac{x}{\sqrt{1-x^2}}$

2. $0 < x < \frac{\pi}{2}$,
$f(x) = \arcsin(\cos x) \Rightarrow f'(x) = ?$

A) -1 B) 0 C) 1 D) $\tan x$ E) $\cot x$

3. $f(x) = \arccos(x^2 + 3) \Rightarrow f'(x) = ?$

A) $\frac{-2x}{\sqrt{x^2+3}}$ B) $\frac{-2x}{\sqrt{1-(x^2+3)^2}}$ C) $\frac{-2x^2}{\sqrt{1-(x^2+3)}}$ D) $\frac{-2x^2}{\sqrt{1-(x^2+3)^2}}$ E) $\frac{-2x}{\sqrt{(x^2+3)^2-2}}$

4. $f(x) = \arccos(\tan x) \Rightarrow f'(x) = ?$

A) $\frac{-1-\tan^2 x}{\sqrt{1-\tan^2 x}}$ B) $\frac{1+\tan^2 x}{\sqrt{1-\tan^2 x}}$ C) $\frac{1-\tan^2 x}{\sqrt{1-\tan 2x}}$ D) $\frac{1-\tan^2 x}{\sqrt{1-\tan^2 x}}$ E) $\frac{-1-\tan^2 x}{\sqrt{1-\tan x}}$

5. $f(x) = \arctan(2x^3) \Rightarrow f'(x) = ?$

A) $\frac{6x^2}{1-4x^6}$ B) $\frac{-6x^2}{1+4x^6}$ C) $\frac{6x^2}{1+4x^6}$ D) $\frac{-6x^2}{1+2x^6}$ E) $\frac{6x^2}{1-2x^6}$

6. $f(x) = \arctan e^x \Rightarrow f'(\ln 2) = ?$

A) $\frac{e}{5}$ B) $\frac{2e}{5}$ C) $\frac{3e}{5}$ D) $\frac{1}{5}$ E) $\frac{2}{5}$

7. $f(x) = \arccos(4x) \Rightarrow f'\left(\frac{1}{5}\right) = ?$

A) $-\frac{20}{3}$ B) $-\frac{16}{3}$ C) $-\frac{8}{3}$ D) $\frac{16}{3}$ E) $\frac{20}{3}$

8. $\frac{\pi}{2} < x < \pi$,
$f(x) = \arccos(\sin x) \Rightarrow f'(x) = ?$

A) -1 B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) 1

9. $f(x) = \arctan(\cos x) \Rightarrow f'\left(\frac{\pi}{6}\right) = ?$

A) $-\frac{1}{7}$ B) $-\frac{2}{7}$ C) $\frac{7}{2}$ D) $\frac{3}{7}$ E) $\frac{5}{7}$

10. $f(x) = \arcsin\sqrt{x} \Rightarrow f'\left(\frac{1}{2}\right) = ?$

A) -1 B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) 1 E) $\frac{3}{2}$

11. $f(x) = \arcsin(\tan x) \Rightarrow f'\left(\frac{\pi}{6}\right) = ?$

A) $\frac{\sqrt{6}}{2}$ B) $\frac{\sqrt{6}}{3}$ C) $\frac{2\sqrt{6}}{3}$ D) $\frac{\sqrt{3}}{2}$ E) $\frac{\sqrt{3}}{3}$

12. $f(x) = \operatorname{arccot}\sqrt{x} \Rightarrow f'\left(\frac{1}{9}\right) = ?$

A) $-\frac{18}{5}$ B) $-\frac{27}{20}$ C) $-\frac{5}{3}$ D) $-\frac{3}{5}$ E) $-\frac{1}{3}$

13. $f(x) = \arctan(\sin \pi x) \Rightarrow f'(1) = ?$

A) $-\pi$ B) π C) 1 D) -1 E) 0

14. $f(x) = \arctan(\cos x) \Rightarrow f'\left(\frac{\pi}{2}\right) = ?$

A) -1 B) 0 C) 1 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

15. $f(x) = \operatorname{arccot}(\ln x) \Rightarrow f'\left(\frac{1}{e}\right) = ?$

A) $-\frac{e}{2}$ B) $-e$ C) $\frac{e}{2}$ D) e E) $2e$

16. $f(x) = \arccos(\cos x) \Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

A) 0 B) $\frac{\sqrt{2}}{2}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{1}{2}$ E) 1

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1	2	3	4	5	6	7	8
B	A	B	A	C	E	A	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	D	C	B	A	A	A	E

1. $f(x) = e^{\sin x} \Rightarrow f'(0) = ?$

A) 2 B) 1 C) $\frac{1}{2}$ D) $\frac{\sqrt{3}}{2}$ E) $-e$

2. $f(x) = 2^{x^2 - 3x + 3} \Rightarrow f'(1) = ?$

A) $-4\ln 2$ B) $-2\ln 2$ C) $-\ln 2$ D) $2\ln 2$ E) $3\ln 2$

3. $f(x) = 3^{x^3 + 2x} \Rightarrow f'(0) = ?$

A) $-3\ln 3$ B) $-2\ln 3$ C) $-\ln 3$ D) $2\ln 3$ E) $3\ln 3$

4. $f(x) = 5^{x + 3} \Rightarrow f'(-2) = ?$

A) $\ln 5$ B) $2\ln 5$ C) $3\ln 5$ D) $4\ln 5$ E) $5\ln 5$

5. $f(x) = \log_3 (x^2 + 3) \Rightarrow f'(1) = ?$

A) $\frac{1}{2}\log_3 e$ B) $\frac{2}{3}\log_3 e$ C) $\frac{1}{4}\log_3 e$ D) $\frac{1}{2}\ln 3$ E) $\frac{1}{4}\ln 3$

6. $f(x) = \log_5 (x^2 - 2x - 5) \Rightarrow f'(-2) = ?$

A) $-\frac{11}{3}\log_5 e$ B) $-3\log_5 e$ C) $-2\log_5 e$ D) $3\ln 5$ E) $-2\ln 5$

7. $f(x) = \log_2 (x^3 - 4x^2 + 4) \Rightarrow f'(-1) = ?$

A) $-9\log_2 e$ B) $-7\log_2 e$ C) $-11\log_2 e$ D) $11\ln 2$ E) $-7\ln 2$

8. $f(x) = \ln(2x^2 - 3x + 4) \Rightarrow f'(2) = ?$

A) $-\frac{3}{2}$ B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) $\frac{3}{2}$ E) $\frac{5}{6}$

9. $f(x) = \ln(x^2 + 4x + 5) \Rightarrow f'(1) = ?$

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) 1

10. $f(x) = \ln\left(\frac{x^3}{x-2}\right) \Rightarrow f'(1) = ?$

A) -6 B) -4 C) 4 D) 6 E) 8

11. $f(x) = x \cdot \ln x + e^x + 2 \Rightarrow f'(x) = ?$

A) $\ln x + 1 + e^x$

B) $\ln x + e^x$

C) $\ln x + e^x + 2x$

D) $\ln x + 1 + x \cdot e^{x-1}$

E) $\ln x + 1 + x \cdot e^x$

12. $f(x) = 3^{\ln x} + \ln 9^x \Rightarrow f'(1) = ?$

A) ln27 B) ln9 C) ln3

D) 1 + ln9 E) 1 + ln3

13. $f(x) = \ln\left(\frac{e^x}{e^x + 1}\right) \Rightarrow f'(\ln 2) = ?$

A) $\frac{1}{6}$ B) $\frac{1}{4}$ C) $\frac{1}{3}$ D) 2 E) 4

14. $f(x) = x^3 \cdot \ln 2x \Rightarrow f'\left(\frac{e}{2}\right) = ?$

A) e^3 B) e^2 C) $\frac{e^2}{2}$ D) $3e^2$ E) $\frac{e^2}{4}$

15. $f(x) = \ln(\sin x) \Rightarrow f'\left(\frac{\pi}{6}\right) = ?$

A) $-\sqrt{3}$ B) $-\frac{1}{\sqrt{3}}$ C) 1 D) $\frac{1}{\sqrt{3}}$ E) $\sqrt{3}$

16. $f(x) = \ln\left[(x^2 + 1)^2 \cdot (x^2 + x - 1)\right] \Rightarrow f'(2) = ?$

A) $\frac{5}{13}$ B) $\frac{13}{5}$ C) $\frac{17}{5}$ D) $-\frac{13}{5}$ E) $\frac{18}{5}$

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1	2	3	4	5	6	7	8
B	B	D	E	A	C	C	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	C	A	A	C	B	E	B

1. $f(x) = x^3 \cdot \ln x^2 \Rightarrow f'(e) = ?$

A) $5e^2$ B) $6e^2$ C) $7e^2$ D) $8e^2$ E) $10e^2$

2. $f(x) = \frac{\ln x}{x} + x \cdot \ln^2 x \Rightarrow f'(e) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

3. $f(x) = 5^{x^3} + 5^{2x-1} \Rightarrow f'(1) = ?$

A) $5\ln 5$ B) $8\ln 5$ C) $10\ln 5$ D) $15\ln 5$ E) $25\ln 5$

4. $f(x) = 3^{\cos x} \Rightarrow f'\left(\frac{\pi}{2}\right) = ?$

A) $-3\ln 3$ B) $-\ln 3$ C) 0 D) $\ln 3$ E) $3\ln 3$

5. $f(x) = 2^{\sin x} \cdot e^{\cos x} \Rightarrow f'(0) = ?$

A) $e \cdot \ln 2$ B) $3 \cdot \ln 2$ C) $2e \cdot \ln 2$ D) $e^2 \cdot \ln 2$ E) $\ln 2 - e$

6. $f(x) = x^3 \cdot e^{2x} \Rightarrow f'(2) = ?$

A) $16e^4$ B) $18e^4$ C) $24e^4$ D) $28e^4$ E) $32e^4$

7. $f(x) = x^{\ln x} \Rightarrow f'(x) = ?$

A) $\frac{\ln x}{x} \cdot x^{\ln x}$ B) $\frac{\ln x}{2x} \cdot x^{\ln x}$ C) $\frac{2 \cdot \ln x}{x} \cdot x^{\ln x}$ D) $\frac{\ln x}{x}$ E) $\frac{\ln x}{x} + x$

8. $f(x) = \ln x^3 + \ln^3 x \Rightarrow \left.\frac{dy}{dx}\right|_{x=1} = ?$

A) 1 B) 3 C) 5 D) 7 E) 9

9. $f(x) = \ln(x^2 + 4) - x \cdot \arctan\frac{x}{2} \Rightarrow f'(2) = ?$

A) $\frac{\pi}{2}$ B) $-\frac{\pi}{4}$ C) $-\frac{\pi}{2}$ D) -1 E) $\frac{1}{4}$

10. $f(x) = \ln e^x + \log_e x^2 \Rightarrow f'(1) + f(e) = ?$

A) 1 B) 2 C) e D) e + 2 E) e + 3

11. $f(x) = \log_3(x^2 + 1) \Rightarrow f'(1) = ?$

A) $\frac{1}{\ln 3}$ B) $\frac{2}{\ln 3}$ C) $\frac{1}{2\ln 3}$ D) $\frac{1}{3\ln 3}$ E) $\frac{\ln 3}{2}$

12. $f(x) = \frac{x-3}{\ln x} \Rightarrow f'(e) = ?$

A) $\frac{1}{e}$ B) $\frac{2}{e}$ C) $\frac{3}{e}$ D) $\frac{e-3}{e}$ E) $\frac{2e-3}{e}$

13. $f(x) = e^{\arctan x} \cdot (x^2 + 1) \Rightarrow f'(x) = ?$

A) $x \cdot e^{\arctan x}$ B) $2x \cdot e^{\arctan x}$
C) $(x + 1) \cdot e^{\arctan x}$ D) $(x + 2) \cdot e^{\arctan x}$
E) $(2x + 1) \cdot e^{\arctan x}$

14. $f(x) = x^{2x} \Rightarrow f'(x) = ?$

A) $x^{2x} \cdot (1 + \ln x)$ B) $x^{2x} \cdot (2 + \ln x)$
C) $x^{2x} \cdot (1 + 2\ln x)$ D) $x^{2x} \cdot (2 + 2\ln x)$
E) $x^{2x} \cdot (2 + \ln 2)$

15. $f(x) = x^{\ln x} \Rightarrow f'(e) = ?$

A) 1 B) 2 C) e D) e^2 E) 2e

16. $f(x) = (4x - 3)^{3x+2} \Rightarrow f'(1) = ?$

A) 7 B) 9 C) 12 D) 15 E) 20

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1	2	3	4	5	6	7	8
D	D	E	B	A	D	C	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	E	A	C	E	D	B	E

1. $f(x) = 3x^4 - 2x^3 + x^2 - x - 5 \Rightarrow f''(-1) = ?$

A) 24 B) 26 C) 36 D) 48 E) 50

2. $f(x) = \cos 2x \Rightarrow f''\left(\frac{\pi}{2}\right) = ?$

A) −26 B) −8 C) 4 D) 8 E) 16

3. $y = (\sin x)^{\cos x} \Rightarrow f'\left(\frac{\pi}{2}\right) = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

4. $x^2 + y^2 - \ln(x+y) = 0 \Rightarrow \frac{dy}{dx}(1,2) = ?$

A) $-\frac{5}{11}$ B) $-\frac{6}{11}$ C) $-\frac{8}{11}$ D) $-\frac{7}{12}$ E) $-\frac{11}{12}$

5. $\left.\begin{array}{l} x = t^2 \cdot \ln t \\ y = \frac{\ln t}{t^2} \end{array}\right\} \Rightarrow \frac{dy}{dx}(t=1) = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

6. $y = f(x) = (e)^{x^2} \Rightarrow f''(2) = ?$

A) $6e^2$ B) $8e^2$ C) $10e^2$ D) $8e^4$ E) $18e^4$

7. $\arctan x + \ln\left(\frac{x}{y}\right) + 3 = 0 \Rightarrow \frac{dy}{dx}(1,2) = ?$

A) $\frac{5}{6}$ B) $\frac{5}{3}$ C) $\frac{5}{2}$ D) 3 E) 6

8. $y = \sin 2x \Rightarrow \frac{d^{16}y}{dx^{16}} = ?$

A) $-2^{16} \cdot \sin 2x$ B) $-2^8 \cdot \sin 2x$

C) $-2^{16} \cdot \cos 2x$ D) $-2^8 \cdot \cos 2x$

E) $2^{16} \cdot \sin 2x$

9. $\left.\begin{array}{l} x = t^3 - t \\ y = 3t^2 + 2 \end{array}\right\} \Rightarrow \left.\dfrac{d^2y}{dx^2}\right|_{t=-1} = ?$

A) -3 B) -2 C) $-\frac{3}{2}$ D) -1 E) $-\frac{1}{2}$

10. $y = x^9 + \sin 2x \Rightarrow \left.\dfrac{d^{18}y}{dx^{18}}\right|_{x=\pi/4} = ?$

A) 0 B) $\frac{2^{18}}{\sqrt{2}}$ C) $-\frac{2^{19}}{\sqrt{2}}$ D) -2^{18} E) $2^{18}+9$

11. $y = \ln x \Rightarrow \left.\dfrac{d^{20}y}{dx^{20}}\right|_{x=1} = ?$

A) 20! B) 19! C) $-(19!)$ D) $-(20!)$ E) 21!

12. $f(x) = x^5 - 5x + 1 \Rightarrow f^{(5)}(x) = ?$

A) 60 B) 80 C) 100 D) 120 E) 140

13. $f(x) = x^{89} + e^{2x} + 1 \Rightarrow f^{(100)}(x) = ?$

A) $2^{100} \cdot e^{2x}$ B) $100! + e^{2x}$ C) $\frac{3}{e}$ D) $99! + e^{2x}$ E) 0

14. $y = e^{2x} \Rightarrow \dfrac{d^6y}{dx^6} = ?$

A) $12e^{2x}$ B) $24e^{2x}$ C) $32e^{2x}$ D) $48e^{2x}$ E) $64e^{2x}$

15. $f(x) = (\tan x)^x \Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

A) π B) $\frac{\pi}{2}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{6}$ E) $\frac{\pi}{12}$

16. $y = \ln(x-2) \Rightarrow \dfrac{d^5y}{dx^5} = ?$

A) $-120\cdot(x-2)^{-5}$ B) $-24\cdot(x-2)^{-5}$ C) $24\cdot(x-2)^{-5}$ D) $64\cdot(x-2)^{-5}$ E) $120\cdot(x-2)^{-5}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	C	C	A	D	E	D	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	D	C	D	A	E	B	C

1. $f(x) = (3x-4)^3 \cdot (-2x+1) \Rightarrow f'(2) = ?$

A) -124 B) -92 C) -64 D) 92 E) 124

2. $y^3 - y^2 + 3x^2 - 2x + 5 = 0$
$\Rightarrow \frac{dy}{dx}(1,2) = ?$

A) $-\frac{4}{13}$ B) $-\frac{4}{9}$ C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) $\frac{4}{9}$

3. $f(x) = \frac{e^x}{e^{-x}+1} \Rightarrow f'(0) = ?$

A) $-\frac{3}{4}$ B) $-\frac{1}{2}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) $\frac{3}{4}$

4. $f(x) = (x+m)^2 \cdot (x-1)$,
$f'(1) = 16 \Rightarrow m = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

5. $\left.\begin{array}{l} x = t^3 - 1 \\ y = t^2 + 2t + 1 \end{array}\right\} \Rightarrow \frac{dy}{dx}(x=7) = ?$

A) $-\frac{3}{2}$ B) -1 C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) 1

6. $f(x) = \log_2(x^2 + 6x + 10)$,
$f'(a) = 0 \Rightarrow f(a) = ?$

A) 0 B) $\frac{1}{2}$ C) 1 D) $\frac{3}{2}$ E) 2

7. $f\left(\frac{x}{x+1}\right) = x^4 \Rightarrow (f^{-1})'(1) = ?$

A) $-\frac{1}{2}$ B) $-\frac{1}{4}$ C) $\frac{1}{4}$ D) $\frac{1}{16}$ E) $\frac{1}{8}$

8. $t > 0$,
$\left.\begin{array}{l} x = t^2 - 1 \\ y = t^3 + 1 \end{array}\right\} \Rightarrow \frac{d^2y}{dx^2}(x=3) = ?$

A) $\frac{3}{2}$ B) $\frac{3}{4}$ C) $\frac{3}{8}$ D) $\frac{4}{3}$ E) $\frac{8}{3}$

9. $f(x) = 8^{x-1} \Rightarrow (f^{-1})'(64) \cdot f'(2) = ?$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{8}$ D) $\frac{1}{16}$ E) $\frac{1}{32}$

10. $f(x) = 10^{(\sin x + \cos x)} \Rightarrow f'\left(\frac{\pi}{2}\right) = ?$

A) $-10\ln 10$ B) $-2\ln 10$ C) $-\ln 10$ D) 1 E) 10

11. $f(x) = \ln\left[e^{\sin^2 x} + e^{\cos^2 2x}\right] \Rightarrow f'\left(\frac{\pi}{6}\right) = ?$

A) $-\frac{3\sqrt{3}}{4}$ B) $-\frac{2\sqrt{3}}{3}$ C) $-\frac{\sqrt{3}}{4}$ D) $\frac{\sqrt{3}}{4}$ E) $\frac{2\sqrt{3}}{3}$

12. $(f \cdot g)'(x) = 3x^2$

$g'(1) = 1$

$f(x) = x^2 \Rightarrow g(1) = ?$

A) -2 B) 0 C) 1 D) 2 E) 3

13. $f(x) = \log_5 \tan x + \log_5 \cot x + e^{\sin x} \Rightarrow f'\left(\frac{\pi}{2}\right) = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

14. $f(x) = \arcsin x \Rightarrow (f^{-1})'(\pi) = ?$

A) -1 B) 0 C) 1 D) 2 E) 3

15. $f(x) = e^{(e^x)} \Rightarrow f'(\ln 2) = ?$

A) e B) e^2 C) $2e^2$ D) $4e^2$ E) e^4

16. $f(x) = (\ln x + 1) \cdot (e^x + 1) \Rightarrow f'(1) = ?$

A) e B) $e - 1$ C) $2e$ D) $2e + 1$ E) $e + 1$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	C	E	B	D	A	D	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	C	C	C	A	C	D

1. $\left.\begin{array}{l} y = f(x) \\ 3xy + 2x - y + 7 = 0 \end{array}\right\} \Rightarrow f'(2) = ?$

A) 1 B) $\frac{23}{25}$ C) $-\frac{43}{25}$ D) $\frac{43}{25}$ E) $-\frac{23}{25}$

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2019]

2. $f(x) = \frac{1}{x} + \frac{1}{2x^3} - \frac{1}{2x^2}$ olduğuna göre $-2x^4 \cdot f'(x)$ **aşağıdakilerden hangisidir?**

If $f(x) = \frac{1}{x} + \frac{1}{2x^3} - \frac{1}{2x^2}$, which of the following is $-2x^4 \cdot f'(x)$?

A) $x^2 - x + 3$ B) $2x^2 + 2x + 3$ C) $2x^2 - 2x + 3$ D) $2x^2 + 2x - 3$ E) $x^2 + x + 3$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

3. $f(x) = 2x^2 + 5x + 1$

$g(x) = x^2 + 2x - 3$

$\Rightarrow (fog)'(2) = ?$

A) 50 B) 100 C) 150 D) 200 E) 250

[YÜZÜNCÜ YIL ÜNİVERSİTESİ – YÖS 2019]

4. $x = 3 + \sqrt{y+1}$

$\Rightarrow \frac{dy}{dx} = ?$

A) $x^2 - 6x + 2$ B) $2x + 6$ C) $2x + 4$ D) $x - 6$ E) $2x - 6$

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

5. $f(x) = x + \sin x \cdot \cos x$

$\Rightarrow f'\left(\frac{\pi}{4}\right) = ?$

A) 1 B) 2 C) 0 D) $1 + \sqrt{2}$ E) $1 + \frac{\sqrt{2}}{2}$

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

6. $f(x) = \frac{x^2}{\sin x}$

$\Rightarrow f'(0^+) = ?$

A) ∞ B) 3 C) 0 D) 1 E) 2

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

7. $f(x) = k\sqrt{x}$, $f'(9) = 5 \Rightarrow k = ?$

A) 15 B) 20 C) 25 D) 30 E) 40

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

8. $\frac{d^2}{dx^2}(\cos^2 5x) = ?$

A) $5 \cdot \sin 10x$ B) $-20 \cdot \cos 5x$ C) $2 \cdot \sin 5x$ D) $-50 \cdot \cos 10x$ E) $100 \cdot \cos 5x$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

9. $f(3x-4)=3x^2+3x-1$

$\Rightarrow f'(-1)=?$

A) -3 B) 3 C) 1 D) 0 E) -1

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

10. $f(x)=\dfrac{\sin x}{x^2+1} \Rightarrow f'(0)=?$

A) 0 B) 1 C) 3 D) 5 E) 7

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

11. $x^2+\cos x+y^2+4=0$

$\Rightarrow \left.\dfrac{dy}{dx}\right|_{\substack{x=\frac{\pi}{2}\\ y=1}}=?$

A) $\dfrac{1-\pi}{2}$ B) $\dfrac{1+\pi}{2}$ C) $\dfrac{3-\pi}{2}$ D) π E) 0

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

12. $y=f(x),\ f(1)=-1,$

$x^3+y^2+xy+3x-2y-6=0$

$\Rightarrow \dfrac{df}{dx}(1)=f'(1)=?$

A) $-\dfrac{5}{3}$ B) $-\dfrac{3}{5}$ C) $-\dfrac{1}{2}$ D) $\dfrac{2}{3}$ E) $\dfrac{5}{3}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2018]

13. $f:[3,\infty)\to[-4,\infty)$

$f(x)=x^2-5x+2 \Rightarrow (f^{-1})'(-4)=?$

A) -2 B) -1 C) 0 D) 1 E) 2

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2018]

14. $y=\cos(2x-1) \Rightarrow \dfrac{d^{48}y}{dx^{48}}=?$

A) $-2^{48}\cdot\sin(2x-1)$ B) $-2^{48}\cdot\cos(2x-1)$
C) $2^{48}\cdot\cos(2x-1)$ D) $2^{48}\cdot\sin(2x-1)$
E) $\sin(2x-1)$

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

15. $f(x)=x\cdot\ln(xe^x)\cdot e^x$

$\Rightarrow f'(1)=?$

A) e^2 B) $2e$ C) $3e$ D) $4e$ E) $6e$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

16. $x>0$

$f(x^2)=(x^2+3)^3 \Rightarrow f'(1)=?$

A) 35 B) 40 C) 45 D) 48 E) 52

[EGE ÜNİVERSİTESİ – YÖS 2014]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	C	C	E	A	D	D	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	B	A	E	D	C	D	D

BÖLÜM CHAPTER 14

TARİHSEL NOT / HISTORICAL NOTE

EMMY AMALIE NOETHER [1882 - 1935]

Soyut cebir ve kuramsal fiziğe çığır açıcı katkılarıyla bilinen bir Alman matematikçidir. Yaşamı boyunca ve hatta bugün bile Noether; Pavel Alexandrov, Hermann Weyl ve Jean Dieudonné gibi matematikçiler tarafından tarihteki en iyi kadın matematikçi olarak gösterildi.

She was a German mathematician known for her groundbreaking contributions to abstract algebra and theoretical physics. Noether throughout her life and even today;was known by Pavel Alexandrov, Hermann Weyl and Jean Dieudonné as the best female mathematician in history.

TÜREVİN UYGULAMALARI
APPLICATIONS of DERIVATIVE

Bu bölüm 32 alıştırma sorusu, 58 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 32 exercise questions, 58 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 14

TÜREVİN UYGULAMALARI / APPLICATIONS of DERIVATIVE

1. $\lim\limits_{x \to 2} \dfrac{x^3-2x-4}{x-2} = ?$

Yanıt / The Answer is 10

2. $\lim\limits_{x \to 2} \dfrac{x^3-x-6}{x-2} = ?$

Yanıt / The Answer is 11

3. $\lim\limits_{x \to y} \dfrac{x^3-2x^2y+y^3}{x^2-xy} = ?$

Yanıt / The Answer is $-y$

4. $\lim\limits_{a \to 1} \dfrac{\sqrt[3]{a^2}-1}{a-1} = ?$

Yanıt / The Answer is $\dfrac{2}{3}$

5. $\lim\limits_{x \to 1} \dfrac{x-1}{\ln x} = ?$

Yanıt / The Answer is 1

6. $\lim\limits_{x \to 1} \dfrac{e^{2x}-e^2}{1-e^{x-1}} = ?$

Yanıt / The Answer is $-2e^2$

7. $f(x) = 2x^2-10x \Rightarrow \lim\limits_{h \to 0} \dfrac{f(3+h)-f(3)}{h} = ?$

Yanıt / The Answer is 2

8. $f(3x-5) = 2x^3-2 \Rightarrow \lim\limits_{x \to 4} \dfrac{f(x)-f(4)}{x-4} = ?$

Yanıt / The Answer is 18

9. $\lim\limits_{x \to \frac{\pi}{4}} \dfrac{\frac{1}{2} - \sin^2 x}{\sin 4x} = ?$

Yanıt / The Answer is $\frac{1}{4}$

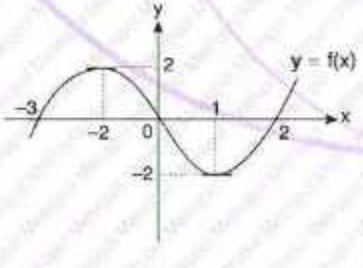
10. $\lim\limits_{x \to \infty} \dfrac{\ln x}{x^3 + x^2} = ?$

Yanıt / The Answer is 0

11. $\lim\limits_{x \to 1} \dfrac{\ln x}{x^2 - 1} = ?$

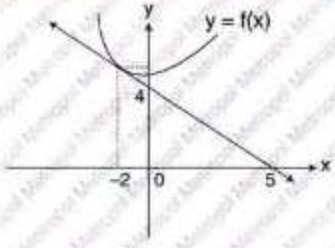
Yanıt / The Answer is $\frac{1}{2}$

12. $\dfrac{f(-2) - f'(-2)}{f(1) - f'(1)} = ?$



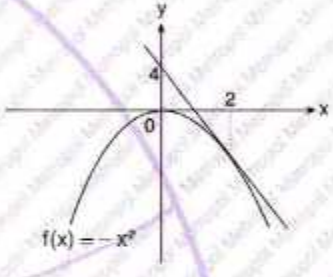
Yanıt / The Answer is –1

13. $f'(-2) = ?$



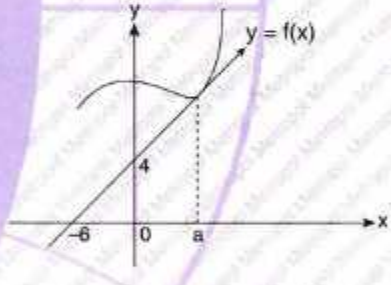
Yanıt / The Answer is $-\frac{4}{5}$

14. $f'(2) = ?$



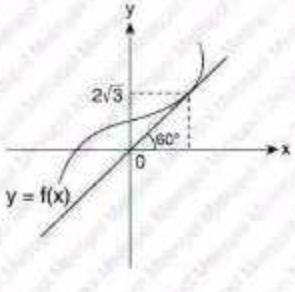
Yanıt / The Answer is –4

15. $f'(a) = ?$



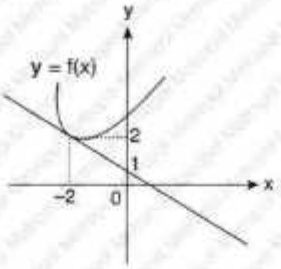
Yanıt / The Answer is $\frac{2}{3}$

16. $g(x) = x^2 \cdot f(x) \Rightarrow g'(2) = ?$



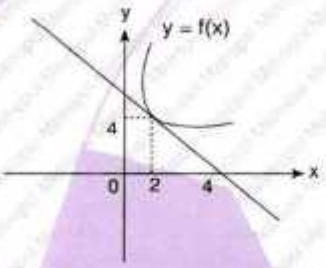
Yanıt / The Answer is $12\sqrt{3}$

17. $h(x) = \dfrac{x}{f(x)} \Rightarrow h'(-2) = ?$



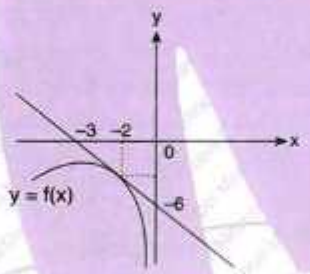
Yanıt / The Answer is $\dfrac{1}{4}$

18. $\dfrac{f'(2)}{f(2)} = ?$



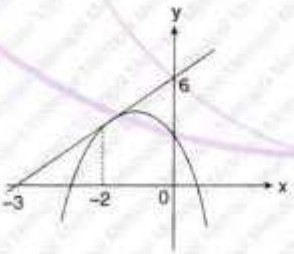
Yanıt / The Answer is $-\dfrac{1}{2}$

19. $f'(-2) + f(-2) = ?$



Yanıt / The Answer is -4

20. $h(x^3) = f(x) \cdot x \Rightarrow h'(-8) = ?$



Yanıt / The Answer is $-\dfrac{1}{6}$

21. $f(x) = 2x^3 - 3x^2 - 12x + 1,$
$f'(x) < 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $(-1, 2)$

22. $f(x) = \dfrac{3x^2}{4} - \dfrac{x^3}{3} + 10,$
$f'(x) > 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\left(0, \dfrac{3}{2}\right)$

23. $f:[-1, 3] \to R,\ f(x) = 2x^3 - 6x + 9$
$\Rightarrow$ **yerel / local min(f(x)) = ?**

Yanıt / The Answer is 5

24. $y = 2x^3 - 3x^2 - 12x + 1$
$\Rightarrow$ **yerel / local max(y) = ?**

Yanıt / The Answer is 8

25. $y = x^2 + 2x + 1$

$\Rightarrow$ **yerel** / local **min(y) = ?**

Yanıt / The Answer is 0

26. $x - y = 8 \Rightarrow \min(x \cdot y) = ?$

Yanıt / The Answer is -16

27. $3x + y = 40 \Rightarrow \max(x \cdot y) = ?$

Yanıt / The Answer is $\frac{400}{3}$

28. $2x + y = 12 \Rightarrow \max(x \cdot y) = ?$

Yanıt / The Answer is 18

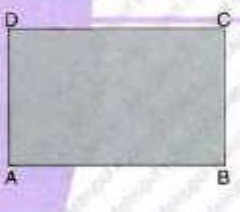
29. $a \cdot b = 16 \Rightarrow \min(a^2 + b^2) = ?$

Yanıt / The Answer is 32

30. $x + y = 5 \Rightarrow \min(2x^2 + 3y^2) = ?$

Yanıt / The Answer is 30

31.



ABCD bir dikdörtgendir.

ABCD is a rectangle.

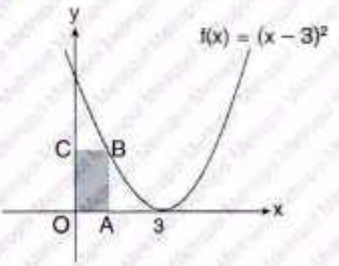
Çevre / The perimeter (ABCD) = 40 br / u

$\Rightarrow$ **max(Alan / Area(ABCD)) = ? br² / u²**

Yanıt / The Answer is 100

32. OABC bir dikdörtgendir.

OABC is a rectangle.



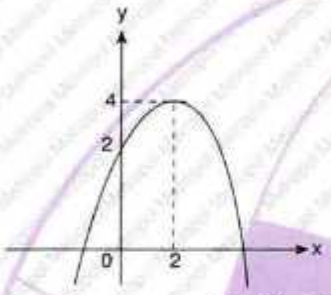
$\Rightarrow$ **max(Alan / Area(OABC)) = ? br² / u²**

Yanıt / The Answer is 4

1. $\lim\limits_{x \to \frac{\pi}{6}} \dfrac{1-2\sin x}{\pi - 6x} = ?$

A) $\sqrt{3}$ B) $\dfrac{\sqrt{3}}{4}$ C) $\dfrac{\sqrt{3}}{6}$ D) $\dfrac{1}{2}$ E) 1

2.

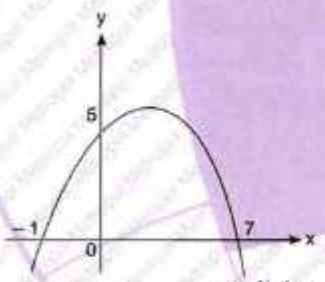


$y = f(x) = ax^2 + bx + c$

$\Rightarrow f'(2) = ?$

A) 0 B) 1 C) $\dfrac{1}{2}$ D) $\dfrac{3}{2}$ E) $\dfrac{2}{3}$

3.



$y = f(x) = ax^2 + bx + c$

$\Rightarrow f'(3) = ?$

A) $\dfrac{1}{2}$ B) $-\dfrac{1}{2}$ C) 0 D) $\dfrac{\sqrt{3}}{2}$ E) $-\dfrac{\sqrt{3}}{2}$

4. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{\cos^2 x}{1 - \sin x} = ?$

A) 0 B) −1 C) 1 D) $-\dfrac{1}{2}$ E) 2

5. $\lim\limits_{x \to \infty} \dfrac{6x^2 + 3e^x}{3x^2 + e^x} = ?$

A) ∞ B) 1 C) 2 D) 3 E) 6

6. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{1 - \sin x}{x \cdot \cos x} = ?$

A) $\dfrac{2}{\pi}$ B) $-\dfrac{2}{\pi}$ C) $\dfrac{1}{2}$ D) $-\dfrac{\pi}{2}$ E) 0

7. $\lim\limits_{x \to 0^+} \dfrac{\ln(1 - \cos x)}{\cos x} = ?$

A) $-\infty$ B) −1 C) 0 D) 1 E) ∞

8. $\lim\limits_{x \to y} \dfrac{\cos 3y - \cos 3x}{\sin 3y - \sin 3x} = ?$

A) −3 B) 0 C) cot3x D) cot3y E) −tan3y

9. $\lim\limits_{x \to 1} \dfrac{\cos\frac{\pi x}{2}}{1-\sqrt{x}} = ?$

A) 0 B) 1 C) $\frac{1}{\pi}$ D) π E) $\frac{\pi}{2}$

10. $\lim\limits_{x \to 0} \dfrac{e^{2x}-1}{x^2+x} = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

11. $\lim\limits_{x \to 0} \dfrac{\ln(x+1)}{2x} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 0 D) 1 E) $\frac{3}{2}$

12. $\lim\limits_{x \to 1} \dfrac{(x+2)^3-27}{1-x} = ?$

A) −81 B) −54 C) −36 D) −27 E) −18

13. $\lim\limits_{x \to 0} \dfrac{x-\sin x}{x\cdot(e^x-1)} = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

14. $\lim\limits_{x \to 0} \dfrac{1-\cos(x^2)}{x^4} = ?$

A) $\frac{1}{12}$ B) $\frac{1}{8}$ C) $\frac{1}{6}$ D) $\frac{1}{3}$ E) $\frac{1}{2}$

15. $\lim\limits_{x \to 0} \dfrac{1-\cos x}{x^2+x^3} = ?$

A) 0 B) $\frac{1}{2}$ C) $\frac{1}{3}$ D) $\frac{1}{4}$ E) $\frac{1}{6}$

16. $\lim\limits_{x \to 0} \dfrac{3^{\sin x}-1}{x} = ?$

A) ∞ B) 0 C) 1 D) e E) ln3

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	A	C	E	D	E	A	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	C	B	D	C	E	B	E

1. $\lim\limits_{x \to 0} \dfrac{\cos 2x - \cos 6x}{4x^2} = ?$

A) −8 B) −4 C) 4 D) 8 E) 12

2. $\lim\limits_{x \to 0} \dfrac{\sin^2 6x}{9x^2} = ?$

A) 0 B) $\frac{1}{2}$ C) 4 D) $\frac{2}{3}$ E) $\frac{3}{4}$

3. $\lim\limits_{x \to -y} \dfrac{\cos x - \cos y}{x + y} = ?$

A) 0 B) cosy C) siny D) −siny E) sinx

4. $\lim\limits_{x \to \pi} (2\pi - 2x) \cdot \cot x = ?$

A) 0 B) 1 C) −2 D) $-\infty$ E) 2π

5. $\lim\limits_{x \to 3\pi} \dfrac{\tan \frac{2x}{3}}{\sin(x - 3\pi)} = ?$

A) $-\frac{3}{2}$ B) $-\frac{2}{3}$ C) $-\frac{1}{2}$ D) $\frac{1}{3}$ E) $\frac{2}{3}$

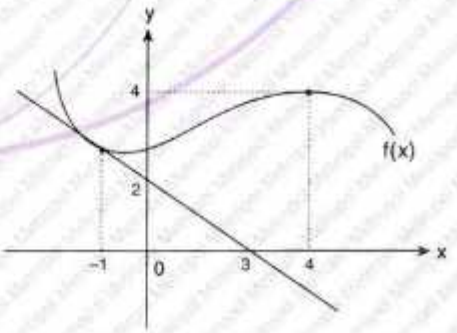
6. $\lim\limits_{x \to 1} (2 - x)^{\frac{1}{x-1}} = ?$

A) $\frac{1}{\sqrt{e}}$ B) 1 C) $\frac{1}{e}$ D) e E) e^2

7. $\lim\limits_{x \to 2} (2 - x) \cdot \tan \frac{\pi x}{4} = ?$

A) $\frac{4}{\pi}$ B) $\frac{3}{\pi}$ C) $\frac{2}{\pi}$ D) $\frac{\pi}{2}$ E) $\frac{\pi}{4}$

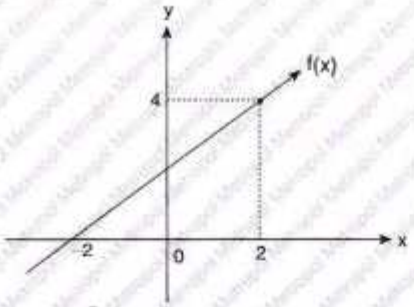
8.



$\Rightarrow f'(-1) = ?$

A) $-\frac{2}{3}$ B) $-\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{8}{3}$ E) $\frac{10}{3}$

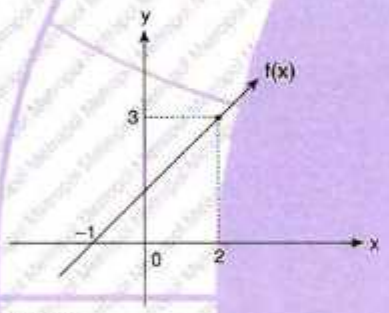
9.



$g(x) = 2x + f(2x^2) \Rightarrow g'(1) = ?$

A) 3 B) 4 C) 6 D) 8 E) 10

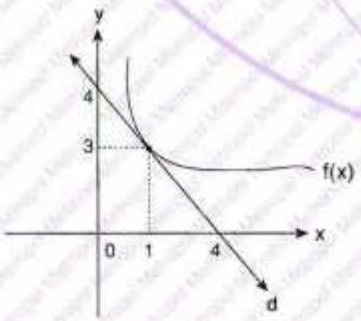
10.



$g(x) = \dfrac{f(x)+2}{x} \Rightarrow g'(2) = ?$

A) $-\frac{3}{4}$ B) $-\frac{1}{2}$ C) $-\frac{1}{4}$ D) $\frac{1}{2}$ E) $\frac{1}{4}$

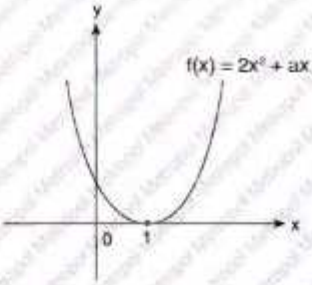
11.



$g(x) = x^2 \cdot f(x) \Rightarrow g'(1) = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

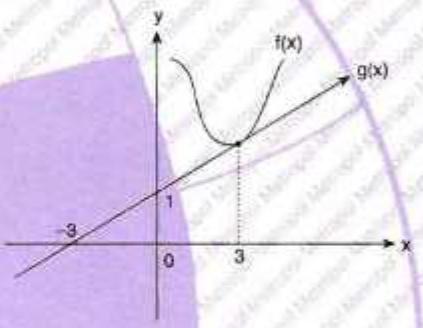
12.



$\Rightarrow a + b = ?$

A) −6 B) −4 C) −2 D) 2 E) 4

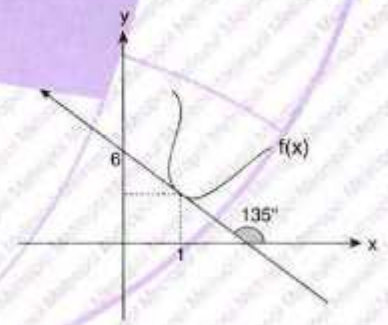
13.



$g(x) = \dfrac{2x^2}{f(x)} \Rightarrow g'(3) = ?$

A) $\frac{9}{4}$ B) $\frac{9}{2}$ C) $\frac{7}{4}$ D) $\frac{7}{2}$ E) $\frac{5}{4}$

14.



$h(x) = (x^2 + 1) \cdot f(x) \Rightarrow h'(1) = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

YANITLAR / ANSWERS

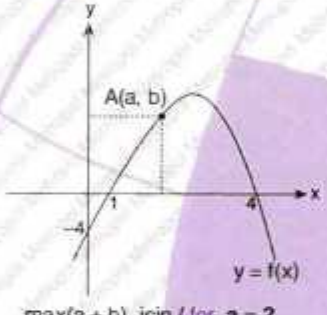
1	2	3	4	5	6	7
C	C	C	C	E	C	A
8	**9**	**10**	**11**	**12**	**13**	**14**
A	C	A	B	A	B	D

1. $x^2 + (p-1)x - (p-2) = 0,$

$ÇK(SS) = \{x_1, x_2\} \Rightarrow \min(x_1^2 + x_2^2) = ?$

A) -3 B) -2 C) -1 D) 0 E) 3

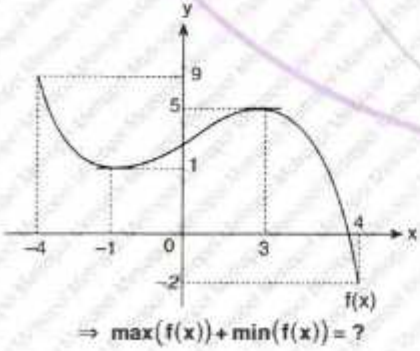
2.



$\max(a+b)$ için / for $a = ?$

A) $\frac{3}{2}$ B) 2 C) 3 D) $\frac{7}{2}$ E) $\frac{9}{2}$

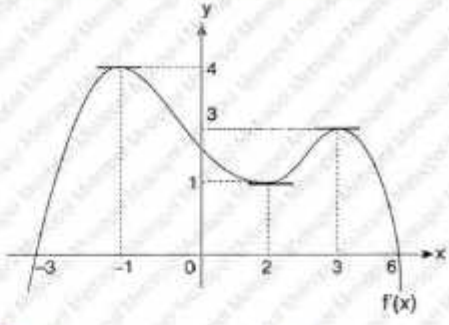
3.



$\Rightarrow \max(f(x)) + \min(f(x)) = ?$

A) 14 B) 10 C) 8 D) 7 E) 5

4.



$\Rightarrow \max(f(x))$ için / for $x = ?$

A) -3 B) -1 C) 2 D) 3 E) 6

5. $f(x) = x^3 - 12x^2 + 45x - 1,$

$f'(x) = 0 \Rightarrow \sum x = ?$

A) 4 B) -4 C) -8 D) 8 E) 0

6. $f(x) = x^3 - 3x + 7,$

$f'(x) < 0 \Rightarrow ÇK(SS) = ?$

A) $(-\infty, -1)$ B) $(-1, 1)$ C) $(1, \infty)$ D) $(-\infty, 1)$ E) $\mathbb{R}$

7. $f(x) = -4x^3 + 3x^2 - 11,$

$f'(x) > 0 \Rightarrow ÇK(SS) = ?$

A) $\left(0, \frac{1}{2}\right)$ B) $\left(\frac{1}{2}, \infty\right)$ C) $(-\infty, 0)$ D) $\varnothing$ E) $\left(-\infty, \frac{1}{2}\right)$

8. $f(x) = \frac{x^4}{4} + x^3 - 12,$

$f'(x) = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{0\}$ B) $\{-1\}$ C) $\{-3\}$ D) $\{0, 1\}$ E) $\{-3, 0\}$

9. $y = x^2 - 5x + 6 \Rightarrow$ **yerel / local min(y)=?**

A) $\frac{25}{4}$ B) $-\frac{1}{4}$ C) $\frac{1}{4}$ D) $-\frac{25}{4}$ E) 6

10. $y = -x^2 - 7x - 12 \Rightarrow$ **yerel / local max(y)=?**

A) 49 B) $\frac{49}{4}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) $\frac{1}{16}$

11. $y = -x^3 - 9x^2$

$\Rightarrow$ **yerel / local min (y) + yerel / local max(y)=?**

A) −36 B) −72 C) −108 D) −144 E) 324

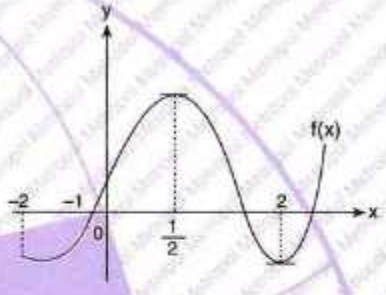
12. $k \in R,$

$f(x) = x^3 - \frac{15}{2} \cdot x^2 + 18x + k,$

yerel / local $\max(f(x)) = 12 \Rightarrow$ **k = ?**

A) −4 B) −3 C) −1 D) 0 E) −2

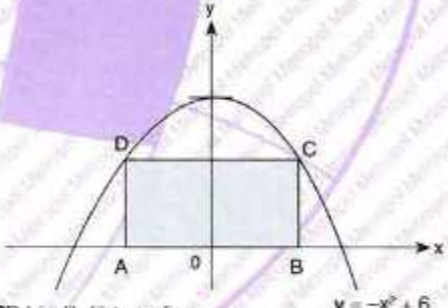
13.



$\Rightarrow f'\left(\frac{1}{2}\right) + f'(2) = ?$

A) −2 B) −1 C) 0 D) 4 E) 5

14.



ABCD bir dikdörtgendir.

ABCD is a rectangle.

$\Rightarrow$ **max (Alan / Area(ABCD)) = ? br² / u²**

A) $2\sqrt{2}$ B) $3\sqrt{2}$ C) $4\sqrt{2}$ D) $6\sqrt{2}$ E) $8\sqrt{2}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
A	C	D	E	D	B	A
8	**9**	**10**	**11**	**12**	**13**	**14**
E	B	C	C	E	C	E

1. $f:\left[-\frac{1}{2},\infty\right) \to R,\ f(x)=\sqrt{2x+1}$

$\Rightarrow \lim\limits_{x\to 4}\frac{f(x)-f(4)}{x-4}=?$

A) $\frac{1}{6}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$ D) $\frac{2}{3}$ E) $\frac{3}{4}$

2. $a \in R \Rightarrow \left.\frac{d(x^2+a^2)}{dx}\right|_{x=1}=?$

A) $2+2a$ B) $3+a^2$ C) $2a+1$ D) $2a$ E) 2

3. $f(x)=e^{\pi}+x^{e}+e^{x}+\pi^{x} \Rightarrow f'(1)=?$

A) $\pi+2e+\pi\cdot\ln\pi$

B) $\pi+2e+\ln\pi$

C) $2e+\pi\cdot\ln\pi$

D) $e^{\pi}+e+\pi$

E) $e^{\pi}+e+\pi\cdot\ln\pi$

4. $y=f(x)=e^{\pi x}$,

$y''-5y'+4y=0 \Rightarrow m\in Z,\ \sum m=?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $y=f(x)=x\cdot e^{3x}$

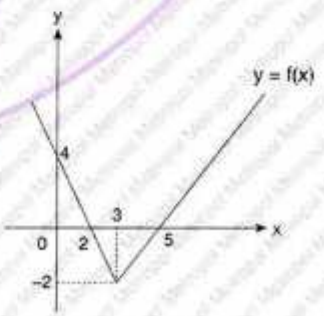
$\Rightarrow e^{-3x}\cdot\frac{d^2y}{dx^2}=?$

A) $9x+6$ B) $9x+3$ C) $9x$ D) $9x-3$ E) $9x-6$

6. $\left.\frac{d\left((\ln x)^{\ln x}\right)}{dx}\right|_{x=e}=?$

A) e B) $\frac{1}{e}$ C) $\frac{\ln 2}{e}$ D) $\frac{2}{e}$ E) $\frac{1}{e^2}$

7.



$\Rightarrow f'(3^-)+f'(3^+)=?$

A) -2 B) -1 C) 0 D) 1 E) 2

8. $f(x)=\begin{cases} x^2+3x-1 & , x<1 \\ 2\sqrt{x}+x & , x\geq 1 \end{cases}$

$\Rightarrow f'(1^-)+f'(1^+)=?$

A) 7 B) 6 C) 5 D) 4 E) 3

9. $f:R\to R,\ f(x)=\begin{cases} 2x+5 & , x<-1 \\ 2x^2+1 & , x\geq -1 \end{cases}$

$\Rightarrow \lim\limits_{x\to(-1)^+} \dfrac{f(x)-f(-1)}{x+1}=?$

A) −4 B) −3 C) −2 D) −1 E) 0

10. $f(x)=1-x+x^{\frac{2}{3}}$

$\Rightarrow f'(0^+)=?$

A) $-\infty$ B) −1 C) $-\frac{2}{3}$ D) $\frac{2}{3}$ E) ∞

11. $f(x)=|x^2+|2x-x^3||\ \Rightarrow f'(2)=?$

A) 10 B) 12 C) 14 D) 16 E) 18

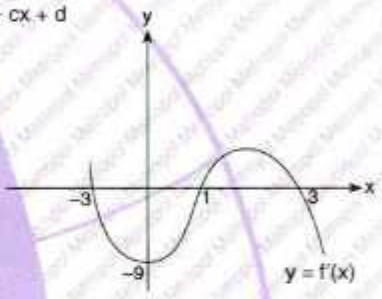
12. $P(x)=x^{12}-5x^{10}+7x^5+3$

$\Rightarrow p^{(13)}(x)+p^{(12)}(x)=?$

A) 0 B) 13! C) 12! D) 13!·12 E) 12!·14

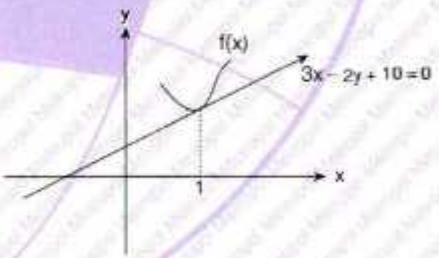
13. $y=f'(x)=ax^3+bx^2+cx+d$

$\Rightarrow f'(2)=?$



A) 1 B) 2 C) 3 D) 4 E) 5

14.



$g(x)=(x^2-3)\cdot f(x+1)\ \Rightarrow g'(0)=?$

A) $-\frac{1}{2}$ B) $-\frac{3}{2}$ C) $-\frac{5}{2}$ D) $-\frac{7}{2}$ E) $-\frac{9}{2}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
B	E	C	E	A	B	B
8	**9**	**10**	**11**	**12**	**13**	**14**
A	A	E	C	C	E	E

1. $f(x) = x^2 + ax + 4$ fonksiyonunun kritik noktası $x = 2$ ise **a = ?**

If $x = 2$ is a critical point of the function $f(x) = x^2 + ax + 4$, a = ?

A) −4 B) −2 C) 0 D) 2 E) 4

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2. f(x) fonksiyonu (−5, −1) aralığında pozitif tanımlı ve artandır. **Buna göre aşağıdaki fonksiyonların hangisi (−5, −1) aralığında daima azalandır?**

Function f(x) is positive defined and increasing in the interval (−5, −1). Accordingly, which of the following functions is strictly decreasing in interval (−5, −1)?

A) $x^2 + f^2(x)$ B) $\frac{f(x)}{x^2}$ C) $3x^4 - f(x)$ D) $x \cdot f(x)$ E) $x^2 + f(x)$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

3. $f(x) = \sin^2 x - e^{2x}$ ise,

$\lim\limits_{h \to 0} \frac{f\left(\frac{\pi}{2} + h\right) - f\left(\frac{\pi}{2}\right)}{h}$ **limitinin değeri kaçtır?**

If $f(x) = \sin^2 x - e^{2x}$, then what is the value of the limit

$\lim\limits_{h \to 0} \frac{f\left(\frac{\pi}{2} + h\right) - f\left(\frac{\pi}{2}\right)}{h} = ?$

A) $2e^{\pi}$ B) $e^{-\pi}$ C) $e^{-2\pi}$ D) $-2e^{\pi}$ E) e^{π}

[HARRAN ÜNİVERSİTESİ – YÖS 2019]

4. $\lim\limits_{x \to 2} \frac{x^2 + ax + b}{x - 2} = 5 \Rightarrow$ **a + b = ?**

A) −10 B) −7 C) −5 D) 5 E) 10

[YÜZÜNCÜ YIL ÜNİVERSİTESİ – YÖS 2019]

5. $\lim\limits_{x \to 0} \frac{\sin x}{e^x - 1} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

[YÜZÜNCÜ YIL ÜNİVERSİTESİ – YÖS 2019]

6. $\lim\limits_{x \to 1} \frac{\ln x}{1 - x} = ?$

A) 1 B) −1 C) 2 D) −2 E) 0

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

7. $f(x) = \frac{3x^2}{4} - \frac{x^3}{3} + 4$

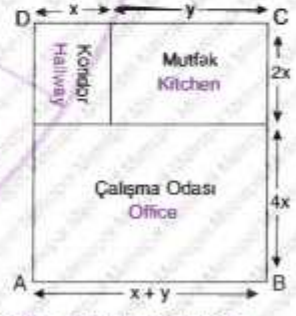
aşağıdaki aralıklardan hangisinde f(x) fonksiyonu azalandır?

In which of the following intervals is the function f(x) decreasing?

A) $\left(0, \frac{3}{2}\right)$ B) $(0, \infty)$ C) $(-\infty, 0)$ D) $(-\infty, \infty)$ E) $\left(\frac{3}{2}, \infty\right)$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

8. Koridor, mutfak ve çalışma odasından oluşan bir iş yerinin yanda verilen modeli ABCD dikdörtgenidir. Dikdörtgenin çevresinin uzunluğu 96 metredir. Bu iş yerindeki çalışma odasının en geniş alanlı olması için **y kaç metre olmalıdır?**

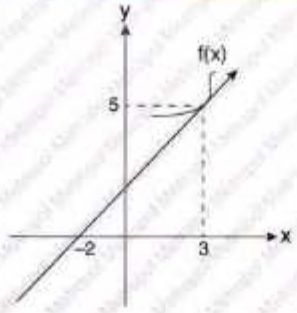


The plan of a work place consisting of hallway, kitchen and office given besides is the rectangle ABCD. The perimeter of the rectangle is 96 meters. In order for the office in this work place to have maximum area, how many meters should the value of y by?

A) 12 B) 16 C) 20 D) 22 E) 24

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

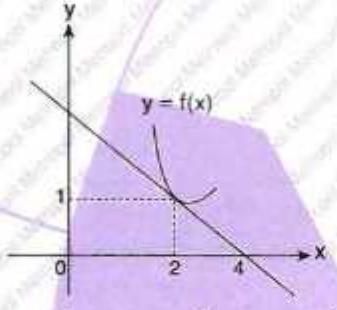
9. $h(x) = x^2 \cdot f(x)$
$\Rightarrow h'(3) = ?$



A) 31 B) 33 C) 35 D) 37 E) 39

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

10. $\lim\limits_{x \to 1} \dfrac{f(x+1) - x}{x^2 - 1} = ?$



A) $\frac{3}{4}$ B) $\frac{3}{8}$ C) $\frac{1}{8}$ D) $-\frac{1}{2}$ E) $-\frac{3}{4}$

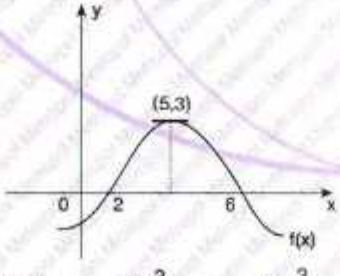
[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

11. $\lim\limits_{x \to -1} \dfrac{3^x - \frac{1}{3}}{\ln(x+2)} = ?$

A) -1 B) 0 C) $\ln 3$ D) $-\ln\sqrt[3]{3}$ E) $\ln\sqrt[3]{3}$

[SELÇUK ÜNİVERSİTESİ – YÖS 2017]

12. $g(x) = \dfrac{f(x)}{x} \Rightarrow g'(5) = ?$



A) $-\frac{3}{25}$ B) $-\frac{3}{5}$ C) 0 D) $\frac{3}{5}$ E) $\frac{3}{25}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2016]

13. $\lim\limits_{x \to -2} \dfrac{x^2 - 2x - 8}{x^2 + 8x + 12} = ?$

A) 4 B) $\frac{1}{2}$ C) $-\frac{1}{2}$ D) -1 E) $-\frac{3}{2}$

[ANKARA ÜNİVERSİTESİ – YÖS 2016]

14. $\lim\limits_{x \to 0} \dfrac{x \cdot e^{\cos x}}{\sin 2x} = ?$

A) $\frac{1}{2}$ B) $-e$ C) e D) $\frac{1}{e}$ E) $\frac{e}{2}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

15. $f(x) = x^3 + x$
$\Rightarrow \lim\limits_{x \to 1} \dfrac{f(x) - f(1)}{1 - x} = ?$

A) -4 B) -3 C) -2 D) -1 E) 0

[AKDENİZ ÜNİVERSİTESİ – YÖS 2013]

16. $\lim\limits_{x \to \infty} \dfrac{\ln x}{x^2 + 1} = ?$

A) ∞ B) 0 C) 1 D) -1 E) $-\infty$

[AKDENİZ ÜNİVERSİTESİ – YÖS 2013]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	C	D	C	A	B	E	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E	E	E	A	E	E	A	B

BÖLÜM CHAPTER 15

TARİHSEL NOT / HISTORICAL NOTE

DAVID HILBERT [1862 - 1943]

Alman matematikçi. Geometriyi bir dizi aksiyoma indirgeyen ve matematiğin biçimsel temellerinin oluşturulmasına önemli katkıda bulunan Alman matematikçi David HILBERT integralli denklemlere ilişkin çalışmalarıyla fonksiyonel analizin 20. yüzyıldaki gelişmesine öncülük etmiştir.

German mathematician. The German mathematician David HILBERT, who reduced geometry to a number of axioms and contributed significantly to the formal foundations of mathematics, pioneered the development of functional analysis in the 20th century through his work on integral equations.

BELİRSİZ İNTEGRAL
INDEFINITE INTEGRAL

Bu bölüm 64 alıştırma sorusu, 160 test sorusu, 16 YÖS sorusu içermektedir.
This chapter includes 64 exercise questions, 160 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 15

BELİRSİZ İNTEGRAL / INDEFINITE INTEGRAL

BELİRSİZ İNTEGRAL
INDEFINITE INTEGRAL

1. $\int dx = ?$

Yanıt / The Answer is $x + C$

2. $\int 5dx = ?$

Yanıt / The Answer is $5x + C$

3. $\int 4dy = ?$

Yanıt / The Answer is $4y + C$

4. $\int xdx = ?$

Yanıt / The Answer is $\frac{x^2}{2} + C$

5. $\int 3xdx = ?$

Yanıt / The Answer is $\frac{3x^2}{2} + C$

6. $\int xdy = ?$

Yanıt / The Answer is $x \cdot y + C$

7. $\int x^3 dy = ?$

Yanıt / The Answer is $x^3 \cdot y + C$

8. $\int x^4 dx = ?$

Yanıt / The Answer is $\frac{x^5}{5} + C$

9. $\int (x^2+x)dx = ?$

Yanıt / The Answer is $\frac{x^3}{3}+\frac{x^2}{2}+C$

10. $\int 3x^8 dx = ?$

Yanıt / The Answer is $\frac{x^9}{3}+C$

11. $\int e^x dx = ?$

Yanıt / The Answer is $e^x + C$

12. $\int \sin x dx = ?$

Yanıt / The Answer is $-\cos x + C$

13. $\int \cos x dx = ?$

Yanıt / The Answer is $\sin x + C$

14. $\int \frac{1}{\cos^2 x} dx = ?$

Yanıt / The Answer is $\tan x + C$

15. $\int \sec^2 x dx = ?$

Yanıt / The Answer is $\tan x + C$

16. $\int -\operatorname{cosec}^2 x dx = ?$

Yanıt / The Answer is $\cot x + C$

17. $\int \frac{1}{\sin^2 x} dx = ?$

Yanıt / The Answer is $-\cot x + C$

18. $\int \frac{2}{1+x^2} dx = ?$

Yanıt / The Answer is $2 \cdot \arctan x + C$

19. $\int \frac{4}{1+x^2} dx = ?$

Yanıt / The Answer is $-4 \cdot \text{arccot} x + C$

20. $\int \frac{5}{\sqrt{1-x^2}} dx = ?$

Yanıt / The Answer is $5 \cdot \arcsin x + C$

21. $\int \frac{dx}{x} = ?$

Yanıt / The Answer is $\ln|x| + C$

22. $\int \frac{4}{x} dx = ?$

Yanıt / The Answer is $4 \cdot \ln|x| + C$

23. $\int 5^x dx = ?$

Yanıt / The Answer is $\frac{5^x}{\ln 5} + C$

24. $\int \frac{12^x}{\log_{12} e} = ?$

Yanıt / The Answer is $12^x + C$

25. $\int \left(x^2+\frac{1}{x^2}+e^x\right)dx = ?$

Yanıt / The Answer is $\frac{x^3}{3}-\frac{1}{x}+e^x+C$

26. $\int (x+3)^2 dx = ?$

Yanıt / The Answer is $\frac{x^3}{3}+3x^2+9x+C$

27. $\int (x-2)^5 dx = ?$

Yanıt / The Answer is $\frac{(x-2)^6}{6}+C$

28. $\int (x^2+x)\cdot(2x+1)dx = ?$

Yanıt / The Answer is $\frac{(x^2+x)^2}{2}+C$

29. $\int (x^3+2x^2)\cdot(3x^2+4x)dx = ?$

Yanıt / The Answer is $\frac{(x^3+2x)^2}{2}+C$

30. $\int \frac{dx}{ax+b} = \frac{1}{a}\ln|ax+b|$

$\Rightarrow \int \frac{dx}{2x+5} = ?$

Yanıt / The Answer is $\frac{1}{2}\ln|2x+5|+C$

31. $\int \frac{dx}{4x} = ?$

Yanıt / The Answer is $\frac{1}{4}\ln|x|+C$

32. $\int \cos(ax+b)dx = \frac{1}{a}\sin(ax+b)$

$\Rightarrow \int \cos(3x+5)dx = ?$

Yanıt / The Answer is $\frac{1}{3}\sin(3x+5)+C$

33. $\int \cos(4x)dx = ?$

Yanıt / The Answer is $\frac{1}{4}\sin(4x)+C$

34. $\int \sin(7x+12)dx = ?$

Yanıt / The Answer is $-\frac{1}{7}\cos(7x+12)+C$

35. $\int e^{ax+b}dx = \frac{1}{a}\cdot e^{ax+b}+C$

$\Rightarrow \int e^{3x+4}dx = ?$

Yanıt / The Answer is $\frac{1}{3}\cdot e^{3x+4}+C$

36. $\int e^{5x}dx = ?$

Yanıt / The Answer is $\frac{1}{5}e^{5x}+C$

37. $\int e^{x^2}\cdot 2x\,dx = ?$

Yanıt / The Answer is $(e)^{x^2}+C$

38. $\int e^{\tan x}(1+\tan^2 x)dx = ?$

Yanıt / The Answer is $e^{\tan x}+C$

39. $\int \sin^4 x\cdot\cos x\,dx = ?$

Yanıt / The Answer is $\frac{\sin^5 x}{5}+C$

40. $\int \ln x\cdot\frac{1}{x}dx = ?$

Yanıt / The Answer is $\frac{\ln^2|x|}{2}+C$

41. $\int \frac{\arctan x}{1+x^2}dx = ?$

Yanıt / The Answer is $\frac{\arctan^2 x}{2} + C$

42. $\int \frac{\arcsin x}{\sqrt{1-x^2}}dx = ?$

Yanıt / The Answer is $\frac{\arcsin^2 x}{2} + C$

43. $\int \frac{x+1}{x^2-1}dx = ?$

Yanıt / The Answer is $\ln|x-1| + C$

44. $\int \frac{2x^2+5x+4}{x} = ?$

Yanıt / The Answer is $x^2 + 5x + 4\ln|x| + C$

45. $\int \frac{x^2+x+1}{x^3-1}dx = ?$

Yanıt / The Answer is $\ln|x-1| + C$

46. $\int \frac{\sin x}{\cos x}dx = ?$

Yanıt / The Answer is $-\ln|\cos x| + C$

47. $\int \frac{e^x}{e^x+5}dx = ?$

Yanıt / The Answer is $\ln(e^x+5) + C$

48. $\int \frac{dx}{(x+4)\cdot\ln(x+4)} = ?$

Yanıt / The Answer is $\ln|\ln|x+4|| + C$

49. $\int e^{\tan x} \cdot \sec^2 x dx = ?$

Yanıt / The Answer is $e^{\tan x} + C$

50. $\int e^{4\ln x} dx = ?$

Yanıt / The Answer is $\frac{x^5}{5} + C$

51. $\int \frac{dx}{a^2 + b^2x^2} = \frac{1}{a \cdot b} \cdot \arctan \frac{bx}{a} + C$

$\Rightarrow \int \frac{dx}{1 + 9x^2} = ?$

Yanıt / The Answer is $\frac{1}{3} \arctan 3x + C$

52. $\int \frac{dx}{16 + 4x^2} = ?$

Yanıt / The Answer is $\frac{1}{8} \arctan \frac{x}{2} + C$

53. $\int \frac{3^x}{1 + 3^{2x}} dx = ?$

Yanıt / The Answer is $\frac{1}{\ln 3} \arctan 3^x + C$

54. $\int \frac{\sin x}{1 + \cos^2 x} dx = ?$

Yanıt / The Answer is $-\arctan(\cos x) + C$

55. $\int \frac{dx}{x^2 + 4x + 5} = ?$

Yanıt / The Answer is $\arctan(x + 2) + C$

56. $\int \frac{dx}{x^2 + 6x + 10} = ?$

Yanıt / The Answer is $\arctan(x + 3) + C$

57. $\int \frac{dx}{\sqrt{1-9x^2}} = ?$

Yanıt / The Answer is $\frac{1}{3}\arcsin 3x + C$

58. $\int \frac{dx}{\sqrt{16-x^2}} = ?$

Yanıt / The Answer is $\arcsin \frac{x}{4} + C$

59. $\int \frac{dx}{\sqrt{16-9x^2}} = ?$

Yanıt / The Answer is $\frac{1}{3}\arcsin \frac{3x}{4} + C$

60. $\int \frac{xdx}{\sqrt{1-x^4}} = ?$

Yanıt / The Answer is $\frac{1}{2}\arcsin x^2 + C$

61. $\int \frac{1+\tan^2 x}{\sqrt{1-\tan^2 x}} dx = ?$

Yanıt / The Answer is $\arcsin(\tan x) + C$

62. $\int \frac{dx}{x^2-9} = ?$

Yanıt / The Answer is $\frac{1}{6}\ln\left|\frac{x-3}{x+3}\right| + C$

63. $\int \frac{dx}{x^2-16} = ?$

Yanıt / The Answer is $\frac{1}{8}\ln\left|\frac{x-4}{x+4}\right| + C$

64. $\int \frac{dx}{x^2-25} = ?$

Yanıt / The Answer is $\frac{1}{10}\ln\left|\frac{x-5}{x+5}\right| + C$

1. $\left.\begin{array}{l} f'(x) = x + 1 \\ f(2) = -1 \end{array}\right\} \Rightarrow \mathbf{f(0) = ?}$

A) -5 B) -4 C) -2 D) -1 E) 0

2. $\left.\begin{array}{l} f'(x) = 3x^2 + 2x \\ f(1) = 3 \end{array}\right\} \Rightarrow \mathbf{f(-1) = ?}$

A) 4 B) 3 C) 2 D) 1 E) 0

3. $f'(x) = 3x^2 - 2x + 1,$
$f(0) = 4 \Rightarrow \mathbf{f(-2) = ?}$

A) -4 B) -8 C) -10 D) -12 E) -16

4. $f(x) = \int (x^2 - 2x)dx,$
$f(3) = 6 \Rightarrow \mathbf{f(6) = ?}$

A) 36 B) 38 C) 39 D) 42 E) 45

5. $\int x \cdot f(x)dx = 2x^3 + 5x^2 + 9$
$\Rightarrow \mathbf{f(x) = ?}$

A) $6x + 10$ B) $6x + 9$ C) $6x^2 + 10x$ D) $x^2 + x + 6$ E) $3x^2 + 6x + 9$

6. $\int x^2 \cdot f(x)dx = 5x^4 + 1 \Rightarrow \mathbf{f(1) = ?}$

A) 20 B) 12 C) 8 D) $\frac{7}{5}$ E) $\frac{6}{5}$

7. $\left.\begin{array}{l} f'(x) = 6x - 2 \\ f(0) = 4 \\ f(0) = 1 \end{array}\right\} \Rightarrow \mathbf{f(1) = ?}$

A) 4 B) 5 C) 6 D) 7 E) 8

8. $\int 4x^4 dx = ?$

A) $\frac{x^6}{6} + C$ B) $\frac{4x^3}{3} + C$ C) $\frac{3x^4}{4} + C$ D) $x^4 + C$ E) $\frac{4}{5}x^5 + C$

9. $\int (4x^2+6x+5)dx = ?$

A) $\frac{4x^3}{3}+3x^2+5x+C$

B) $4x^3+3x^2+5x+C$

C) $\frac{4x^2}{3}+3x+5+C$

D) $3x^3+2x^2+5x+C$

E) $\frac{3x^3}{2}+2x^2+5x+C$

10. $\int \left(x+2+\frac{1}{x^2}\right)dx = ?$

A) $\frac{x^2}{2}+2x-\frac{1}{x}+C$

B) $2x^2+\frac{x}{2}-\frac{1}{x}+C$

C) $\frac{x^2}{2}+x+\frac{1}{x}+C$

D) $2x^2+2x-\frac{1}{x}+C$

E) $\frac{x^2}{2}+2x+\frac{1}{x}+C$

11. $\int (x-1)\cdot(x+1)dx = ?$

A) $\frac{x^2}{2}-x+C$

B) $\frac{x^3}{3}-2x+C$

C) $\frac{x^2}{2}+x+\frac{1}{x}+C$

D) $\frac{x^3}{3}-x+C$

E) $\frac{x^3}{3}+2x+C$

12. $\int (x-2)\cdot(x^2+2x+4)dx = ?$

A) $\frac{x^4}{4}-\frac{x^3}{3}+C$

B) $\frac{x^4}{4}-4x+C$

C) $\frac{x^4}{4}-8x+C$

D) $\frac{x^4}{4}+\frac{x^3}{3}+C$

E) $\frac{x^4}{4}+8x+C$

13. $\int \left(x^2+3x+\frac{1}{x}\right)dx = ?$

A) $2x^2+3+C$

B) $x^3+3x^2+\frac{1}{x^2}+C$

C) $\frac{x^3}{3}+\frac{3x^2}{2}-\frac{1}{x^2}+C$

D) $\frac{x^3}{3}+\frac{3x^2}{2}+\ln|x|+C$

E) $3x^3+6x^2+\ln|x|+C$

14. $\int \frac{(x+1)^2}{x^3}dx = ?$

A) $\ln|x|-2x-\frac{x^2}{2}+C$

B) $\ln|x|-\frac{2}{x}-\frac{1}{2x^2}+C$

C) $\ln|x|-\frac{2}{x}-\frac{1}{x^2}+C$

D) $\ln|x|+\frac{2}{x}-\frac{1}{x^2}+C$

E) $\ln|x|-\frac{2}{x}-\frac{2}{x^2}+C$

15. $\int \frac{3x^3+4x^2+1}{x}dx = ?$

A) $x^3+4x^2+2\cdot\ln|x|+C$

B) $x+3\arctan x+C$

C) $x^2+2x+4\cdot\ln|x|+C$

D) $x^3+2x^2+\ln|x|+C$

E) $x+4\ln(x^2+1)+C$

16. $\int \frac{x^3}{x+1}dx+\int \frac{1}{x+1}dx = ?$

A) x^3-x^2+x+C

B) $\frac{x^3}{3}+x^2-x+C$

C) $\frac{x^3}{3}-\frac{x^2}{2}+x+C$

D) $\frac{x^3}{3}-x^2+x+C$

E) $\frac{x^3}{3}-2x^2+x+C$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	D	C	D	A	A	B	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	A	D	C	D	B	D	C

1. $\int (x+1)\cdot\sqrt{x}\,dx = ?$

A) $\frac{2x^{\frac{5}{2}}}{5}+C$ B) $\frac{5}{2}x^{\frac{6}{5}}+C$ C) $\left(\frac{x^2}{2}+x\right)\sqrt{x}+C$

D) $\left(\frac{x^2}{5}+x\right)+\sqrt{x}+C$ E) $\frac{2}{5}x^2\sqrt{x}+\frac{2}{3}x\sqrt{x}+C$

2. $\int\left(\frac{1}{\sqrt[5]{x^3}}-\frac{1}{5}\right)dx = ?$

A) $\frac{5\cdot\sqrt[5]{x^2}}{2}-\frac{\sqrt{x}}{5}+C$ B) $\frac{\sqrt[5]{x^2}}{5}-\frac{x}{5}+C$

C) $\frac{5}{2}\cdot\sqrt[5]{x^2}-\frac{x}{5}+C$ D) $\frac{2}{7}\sqrt{x}+\frac{2}{3}x^3+C$

E) $\frac{2}{5}\cdot\sqrt[5]{x^2}-\frac{5}{x}+C$

3. $\int\frac{(x^2-2)^2}{x}dx = ?$

A) $\frac{x^4}{4}-x^2+4\ln|x|+C$ B) $\frac{x^2}{4}-2x^2+2\ln|x|+C$

C) $\frac{x^4}{4}-2x^2+4\ln|x|+C$ D) $\frac{x^4}{2}-2x^2+4\ln|x|+C$

E) $\frac{x^4}{2}-x^2\ln|x|+C$

4. $\int\sqrt{x^2+3}\cdot x\,dx = ?$

A) $\frac{(x^2+3)^{\frac{1}{2}}}{3}+C$ B) $\frac{(x^2+3)^{\frac{1}{2}}}{2}+C$

C) $\frac{2(x+3)^{\frac{3}{2}}}{3}+C$ D) $\frac{(x^2+3)^{\frac{3}{2}}}{3}+C$

E) $\frac{(x^2+3)^{\frac{3}{2}}}{2}+C$

5. $\int x^2(x^3+1)^5dx = ?$

A) $\frac{(x^3+1)^6}{6}$ B) $\frac{(x^3+1)^6}{12}$ C) $\frac{(x^3+1)^6}{18}$

D) $\frac{x^3+1}{18}$ E) $\frac{x^3+1}{24}$

6. $\int e^{3x+2}dx = ?$

A) $\frac{1}{2}e^{3x+2}+C$ B) $\frac{1}{3}e^{3x+2}+C$ C) $\frac{1}{3}e^{3x}+C$

D) $e^{3x+2}+C$ E) $e^{3x}+C$

7. $\int(e^x+\sin x)dx = ?$

A) $e^x+\cos x+C$

B) $e^x-\cos x+C$

C) $\frac{1}{2}e^x+\cos x+C$

D) $2e^x+\cos x+C$

E) $\frac{1}{2}e^x-\cos x+C$

8. $\int\left(e^x+3^x-\frac{2}{x}\right)dx = ?$

A) $e^x+3^x-2\ln|x|+C$

B) $e^x+3^x\cdot\log_3 e-2\ln|x|+C$

C) $e^x+3^x\ln 3-2\ln|x|+C$

D) $e^x+3^x-\ln|x|+C$

E) $e^x+3^x\cdot\log_3 e+2\ln|x|+C$

9. $\int (\cos 2x - \sin 2x)dx = ?$

A) $\sin 2x + \cos 2x + C$

B) $\sin 2x - \cos 2x + C$

C) $\frac{\sin 2x}{2} - \frac{\cos 2x}{2} + C$

D) $\frac{\sin 2x}{2} + \frac{\cos 2x}{2} + C$

E) $\frac{\sin 2x}{4} + \frac{\cos 2x}{4} + C$

10. $\int \tan x dx = ?$

A) $-\ln|\cos x| + C$ B) $\ln|\cos x| + C$

C) $\ln|\sin x| + C$ D) $\tan^2 x + C$

E) $\cot x + C$

11. $\int \frac{1}{\sec x} dx = ?$

A) $\sin x + C$ B) $\cos x + C$ C) $\tan x + C$

D) $\cot x + C$ E) $\operatorname{cosec} x + C$

12. $\int (\sin^2 x + e^x + \cos^2 x)dx = ?$

A) $\frac{1}{x^2} + e^x + C$ B) $\frac{1}{x} + e^x + C$

C) $x^2 + e^x + C$ D) $x + e^x + C$

E) $\frac{2}{x^2} + e^x + C$

13. $\int (3 + \sin^2 x \cdot \operatorname{cosec} x)dx = ?$

A) $3x + \cos x + C$ B) $3x + \sin x + C$

C) $3x - \cos x + C$ D) $3x - \sin x + C$

E) $3x + \tan x + C$

14. $\int (e^x - e^{-x} + e^{2x})dx = ?$

A) $e^x - e^{-x} + e^{2x} + C$ B) $e^x + e^{-x} + \frac{1}{2}e^{2x} + C$

C) $e^x - e^{-x} - \frac{1}{2}e^{2x} + C$ D) $e^{2x} + e^{-2x} + \frac{e^{2x}}{2} + C$

E) $e^{-2x} - e^{2x} + e^{3x} + C$

15. $\int (3t^2 + 2) \cdot e^{t^3 + 2t} dt = ?$

A) $e^{t^3 + 2t} + C$ B) $e^{t^3 - 2t} + C$ C) $\frac{e^{t^3 + 2t}}{3} + C$

D) $3 \cdot e^{t^3 + 2t} + C$ E) $\frac{e^{t^3 + 2t}}{9} + C$

16. $\int \sec^2 3x \cdot e^{\tan 3x} dx = ?$

A) $e^{\tan x} + C$ B) $e^{\tan 3x} + C$

C) $\frac{e^{\tan 3x}}{3} + C$ D) $\frac{e^{\tan x}}{3} + C$

E) $e^{3\sin x} + C$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	C	C	D	C	B	B	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	A	A	D	C	B	A	C

1. $\int \frac{x^2+e^x}{x^2 \cdot e^x} dx = ?$

A) $e^{-x}+\frac{1}{x}+C$
B) $-e^{-x}-\frac{1}{x}+C$
C) $e^x+\frac{1}{x}+C$
D) $e^x-\frac{1}{x}+C$
E) $e^{-x}-x+C$

2. $\int \sin(2x-3)dx = ?$

A) $\frac{1}{2}\cos(2x+3)+C$
B) $-\frac{1}{2}\cos(2x-3)+C$
C) $-\cos(2x+3)+C$
D) $\cos(2x+3)+C$
E) $\cos(2x)+C$

3. $\int \cos(3x+5)dx = ?$

A) $\sin(3x+5)+C$
B) $\frac{\sin(3x+5)}{3}+C$
C) $\frac{\cos(3x+5)}{3}+C$
D) $-\cos(3x+5)+C$
E) $\sin^2(3x+5)+C$

4. $\int 3\cdot\cos(3x-2)dx = ?$

A) $\cos(3x-2)+C$
B) $\sin(3x-2)+C$
C) $\frac{1}{3}\cos(3x-2)+C$
D) $\frac{1}{3}\sin(3x-2)+C$
E) $\frac{1}{9}\sin(3x-2)+C$

5. $\int \left(6x^2-\frac{1}{\sqrt{1-x^2}}+\frac{1}{1+x^2}\right)dx = ?$

A) $2x^3 - \arcsin x + \arctan x + C$
B) $3x^2 - \sin x + \arctan x + C$
C) $2x^3 + \arcsin x + \tan x + C$
D) $3x^2 - \arcsin x + \operatorname{arccot} x + C$
E) $2x^3 + \arcsin x - \arctan x + C$

6. $\int \frac{dx}{4+x^2} = ?$

A) $\frac{1}{4}\arctan\frac{x}{2}+C$
B) $\frac{1}{2}\arctan\frac{x}{2}+C$
C) $-\frac{1}{2}\arctan x+C$
D) $-\frac{1}{4}\arctan\frac{x}{2}+C$
E) $\arctan x+C$

7. $\int \frac{1}{25+4x^2}dx = ?$

A) $-\frac{1}{10}\arctan\frac{2x}{5}+C$
B) $-\frac{1}{10}\arctan\frac{x}{5}+C$
C) $\frac{1}{10}\arctan\frac{2x}{5}+C$
D) $\frac{1}{10}\arctan\frac{x}{5}+C$
E) $\frac{4}{25}\arctan x+C$

8. $\int \frac{1}{\sqrt{4-x^2}}dx = ?$

A) $-\frac{1}{2}\arcsin\frac{x}{2}+C$
B) $-2\arcsin\frac{x}{2}+C$
C) $\frac{1}{2}\arcsin\frac{x}{2}+C$
D) $\arcsin\frac{x}{2}+C$
E) $2\arcsin\frac{x}{2}+C$

9. $\int \left(\frac{4}{1+x^2}+\frac{5}{\sqrt{1-x^2}}\right)dx = ?$

A) $\arctan x + \arcsin x + C$

B) $4\cdot\arctan x + 5\cdot\arcsin x + C$

C) $4\cdot\arcsin x + 5\cdot\arctan x + C$

D) $4\cdot\ln(1+x^2) - \frac{5}{2}\ln(1-x^2) + C$

E) $4\cdot\ln(1+x^2) + 5\cdot\ln(\sqrt{1-x^2}) + C$

10. $\int \frac{2^x}{5+2^x}dx = ?$

A) $\ln|5-2x| + C$

B) $\ln|5+2^x| + C$

C) $\frac{\ln|5+2x|}{\ln 2} + C$

D) $\frac{\ln|2^x+5|}{\ln 2} + C$

E) $2^x\cdot\ln|5+2^x| + C$

11. $\int \frac{x+4}{x-1}dx = ?$

A) $x + \ln|x-1| + C$

B) $\frac{x^2}{2} + \ln|x-1| + C$

C) $3x + \ln|x+1| + C$

D) $x + 5\cdot\ln|x-1| + C$

E) $x + \ln|x+1|^3 + C$

12. $\int \frac{3x+8}{x+2}dx = ?$

A) $3x + 2\ln|x+2| + C$

B) $2x + \ln|3x+8| + C$

C) $\arctan\left(\frac{x+1}{2}\right) + C$

D) $2\cdot\arctan\left(\frac{x+1}{2}\right) + C$

E) $\frac{1}{2}\arctan\left(\frac{x+1}{2}\right) + C$

13. $\int \frac{x^2+2x+3}{x+1}dx = ?$

A) $\frac{x^2}{2} + x + 2\ln|x+1| + C$

B) $\frac{x^2}{2} + x + 2\cdot\ln|x-1| + C$

C) $\frac{x^2}{2} + x + \ln(x+1)^2 + C$

D) $x + \ln(x+1)^2 + C$

E) $x + \arctan x + C$

14. $\int \frac{x^2}{x^2+1}dx = ?$

A) $x + \ln|x^2+1| + C$

B) $\frac{x^2}{2} + \ln|x^2+1| + C$

C) $x - \arctan(x^2+1) + C$

D) $x + \arctan x + C$

E) $x - \arctan x + C$

15. $\int \frac{1}{5+x^2+2x}dx = ?$

A) $\frac{1}{2}\arctan\left(\frac{x}{2}\right) + C$

B) $\frac{1}{2}\arctan x + C$

C) $\arctan\left(\frac{x+1}{2}\right) + C$

D) $2\cdot\arctan\left(\frac{x+1}{2}\right) + C$

E) $\frac{1}{2}\arctan\left(\frac{x+1}{2}\right) + C$

16. $\int \frac{dx}{x^2+6x+10} = ?$

A) $\arctan(x+3) + C$

B) $\operatorname{arccot}(x+3) + C$

C) $\arcsin(x^2+6x+10) + C$

D) $\arccos(x+3) + C$

E) $\arctan(x^2+6x+10) + C$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	B	B	B	A	B	C	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	D	D	A	A	E	E	A

1. $\int \frac{dx}{x^2-1} = ?$

A) $\frac{1}{2}\ln\left|\frac{x-1}{x+1}\right| + C$
B) $\arctan x + C$
C) $\frac{1}{2}\ln\left|\frac{x+1}{x-1}\right| + C$
D) $\frac{x}{x^2-1} + C$
E) $\ln\left|\frac{x+1}{x^2-1}\right| + C$

2. $\int \frac{4}{x^2-4}dx = ?$

A) $\ln\left|\frac{-2}{+2}\right| + C$
B) $\ln\left|\frac{+2}{-2}\right| + C$
C) $\ln|x^2-4| + C$
D) $\ln|x^2+4| + C$
E) $\ln\left|\frac{(x-2)^2}{x+2}\right| + C$

3. $\int \frac{5}{x^2+x-6}dx = ?$

A) $\ln\left|\frac{x-2}{x+3}\right| + C$
B) $5\ln\left|\frac{x-2}{x+3}\right| + C$
C) $\ln\left|\frac{+3}{-2}\right| + C$
D) $5\ln\left|\frac{+3}{-2}\right| + C$
E) $3\ln\left|\frac{-2}{+3}\right| + C$

4. $\int \frac{2x+3}{x^2-5x+6}dx = ?$

A) $7\ln|x-3| - 9\ln|x-2| + C$
B) $7\ln|x-3| + 9\ln|x-2| + C$
C) $9\ln|x-3| + 7\ln|x-2| + C$
D) $9\ln|x-3| - 7\ln|x-2| + C$
E) $9\ln|x-2| - 7\ln|x-3| + C$

5. $\int \frac{7dx}{x^2-x-12} = ?$

A) $\ln\left|\frac{x+4}{x+3}\right| + C$
B) $\ln\left|\frac{+3}{+4}\right| + C$
C) $\ln\left|\frac{x-3}{x+4}\right| + C$
D) $\ln\left|\frac{x-4}{x+3}\right| + C$
E) $\ln\left|\frac{x-4}{x-3}\right| + C$

6. $\int \frac{(x+10)dx}{x^2-x-2} = ?$

A) $4\ln|x-2| - 3\ln|x+1| + C$
B) $4\ln|x-2| + 3\ln|x+1| + C$
C) $4\ln|x+2| - 3\ln|x-1| + C$
D) $4\ln|x-1| + 3\ln|x-2| + C$
E) $4\ln|x-1| - 3\ln|x+2| + C$

7. $\int \frac{dx}{x^2+2x+2} = ?$

A) $\arctan x + C$
B) $2\arctan x + C$
C) $\arctan(x+1) + C$
D) $2\arctan(x+1) + C$
E) $\arctan(x+2) + C$

8. $\int \frac{2dx}{x^2-4x+5} = ?$

A) $\arctan(x-4) + C$
B) $\arctan(x+4) + C$
C) $2\arctan(x-4) + C$
D) $2\arctan(x+2) + C$
E) $2\arctan(x-2) + C$

9. $\int \frac{(x+1)dx}{x^2+4x-5} = ?$

A) $\frac{2}{3}\ln|x+5| + \frac{1}{3}\ln|x-1| + C$

B) $\frac{2}{3}\ln|x-5| + \frac{1}{3}\ln|x-1| + C$

C) $\frac{2}{3}\ln\left|\frac{x+5}{x-1}\right| + C$

D) $\frac{1}{3}\ln|(x-5)(x-1)| + C$

E) $\ln|x-5| + \ln|x-1| + C$

10. $\int \frac{xdx}{x^2+4x-5} = ?$

A) $\frac{1}{6}\ln|(x+5)^5 \cdot (x-1)| + C$

B) $\frac{1}{3}\ln|(x+5)^2 \cdot (x-1)| + C$

C) $\frac{1}{2}\ln|(x+5)(x-1)| + C$

D) $\ln|x+5| + C$

E) $\ln|x-1| + C$

11. $\int \frac{2x^2+4x-4}{x^2-2} dx = ?$

A) $2x - \ln|x^2-2| + C$

B) $2x + \ln|x^2-2| + C$

C) $2x + 2\ln|x^2-2| + C$

D) $\ln|x^2-2| - 2x + C$

E) $\ln|x^2-2| + x + C$

12. $\int \frac{3x^3+x^2-x}{x^2} dx = ?$

A) $\frac{3}{2}x^2 + x + \ln|x| + C$

B) $\frac{3}{2}x^2 + x - \ln|x| + C$

C) $3x^2 + \frac{x}{2} - \ln|x| + C$

D) $x^2 + x + \ln|x| + C$

E) $x^2 - x - \ln|x| + C$

13. $\int \frac{3x-12}{x^2-9} dx = ?$

A) $-\frac{1}{2}\ln|x-3| + \frac{7}{2}\ln|x+3| + C$

B) $-\frac{1}{2}\ln|x+3| + \frac{7}{2}\ln|x-3| + C$

C) $\frac{1}{2}\ln|x-3| + \frac{7}{2}\ln|x+3| + C$

D) $\frac{1}{3}\ln|x-3| + \frac{7}{2}\ln|x+3| + C$

E) $\frac{1}{3}\ln|x+3| - \frac{7}{3}\ln|x-3| + C$

14. $\int \frac{e^{\arctan 2x}}{1+4x^2} dx = ?$

A) $e^{\arctan 2x} + C$

B) $\frac{e^{\arctan 2x}}{2} + C$

C) $\frac{e^{\arctan x}}{2} + C$

D) $e^{\arctan x} + C$

E) $-e^{\arctan 2x} + C$

15. $\int \frac{x^2 \cdot \arctan x^3}{1+x^6} dx = ?$

A) $(\arctan x^3)^2 + C$

B) $\frac{(\arctan x^3)^2}{3} + C$

C) $\frac{(\arctan x^3)^2}{6} + C$

D) $\arctan x^3 + C$

E) $-\frac{\arctan x^3}{6} + C$

16. $\int \frac{1}{\sqrt{x}(\sqrt{x}+1)} dx = ?$

A) $\frac{2x^{\frac{2}{3}}}{3} + x + C$

B) $\ln|x+1| + C$

C) $\ln\sqrt{x} + C$

D) $2 \cdot \ln|\sqrt{x}+1| + C$

E) $\frac{1}{2}\ln(\sqrt{x}+1) + C$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	A	A	D	D	A	C	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	A	C	B	A	B	C	D

1. $\int (x+4)^3 \cdot dx = ?$

A) $\frac{(x+4)^3}{3}+C$ B) $\frac{(x+4)^4}{4}+C$ C) $(x+4)^4+C$

D) $3(x+4)^2+C$ E) $\frac{(x+4)^5}{5}+C$

2. $\int (2x+1)^{10} dx = ?$

A) $\frac{(2x+1)^{11}}{11}+C$ B) $\frac{(2x+1)^{11}}{22}+C$

C) $\frac{(2x+1)^{10}}{10}+C$ D) $\frac{(2x+4)^{11}}{20}+C$

E) $\frac{(2x+1)^{10}}{22}+C$

3. $\int (x^2+5)^6 \cdot 2x dx = ?$

A) $\frac{(x^2+5)^5}{5}+C$ B) $\frac{(x^2+5)^6}{6}+C$

C) $\frac{(x^2+5)^7}{7}+C$ D) $\frac{(x^2+5)^7}{2}+C$

E) $\frac{x(x^2+5)^6}{6}+C$

4. $\int (x^2+x)^5 \cdot (2x+1) dx = ?$

A) $\left(\frac{x^3}{3}+\frac{x^3}{2}\right)^5+C$ B) $(x^2+x)^5+C$

C) $\frac{(x^2+x)^6}{6}+C$ D) $\left(\frac{x^2+x}{5}\right)^5+C$

E) $\frac{5}{6}(x^2+x)+C$

5. $\int \frac{x dx}{3x^2+4} = ?$

A) $\frac{1}{3}\ln|3x^2+4|+C$

B) $\frac{1}{4}\ln|3x^2+4|+C$

C) $\frac{1}{3}\ln|3x^2|+C$

D) $\frac{1}{4}\ln|3x^2|+C$

E) $\frac{1}{6}\ln|3x^2+4|+C$

6. $\int \frac{6x^2+4}{\sqrt{x^3+2x+1}} dx = ?$

A) $\sqrt{x^3+2x+1}+C$ B) $2\sqrt{x^3+2x+1}+C$

C) $3\sqrt{x^3+2x+1}+C$ D) $4\sqrt{x^3+2x+1}+C$

E) $6\sqrt{x^3+2x+1}+C$

7. $\int 3 \cdot 2^{3x} dx = ?$

A) $\frac{3 \cdot 2^{3x}}{\ln 2}+C$ B) $\frac{2^{3x}}{3\ln 2}+C$

C) $\frac{2^{3x}}{\ln 2}+C$ D) $2^{3x} \cdot \ln 2 + c$

E) $x - \cos(\ln x)+C$

8. $\int f(x) \cdot f'(x) dx = ?$

A) $f(x)+C$ B) $f'(x)+C$

C) $\frac{f^2(x)}{2}+C$ D) $\frac{f'(x)}{2}+C$

E) $\frac{f(x)}{2}+C$

9. $\int f'(x)\cdot f'(x)dx = ?$

A) $\left(\frac{f(x)}{2}\right)^2 + C$
B) $\frac{f'(x)}{2} + C$
C) $\left(\frac{f'(x)}{2}\right)^2 + C$
D) $\frac{(f'(x))^2}{2} + C$
E) $\frac{(f'(x))^4}{2} + C$

10. $\int \frac{f'(x)}{f'(x)}dx = ?$

A) $\ln|f(x)| + C$
B) $\ln|f'(x)| + C$
C) $\ln|f''(x)| + C$
D) $f''(x) + C$
E) $f'(x) + C$

11. $\int \sin(\cos x)\cdot \sin x\, dx = ?$

A) $\sin(\cos x) + C$
B) $\cos(\cos x) + C$
C) $-\cos(\cos x) + C$
D) $-\sin(\cos x) + C$
E) $\cos(\sin x) + C$

12. $\int \cos(x^2+x)\cdot(2x+1)dx = ?$

A) $\sin(x^2+x) + C$
B) $\frac{\cos(x^2+x)}{4} + C$
C) $\cos(x^2+x) + C$
D) $\frac{\cos^2(x^2+x)}{2} + C$
E) $-\sin(x^2+x) + C$

13. $\int \cos^2 2x\cdot \sin 2x dx = ?$

A) $-\frac{\sin^3 2x}{3} + C$
B) $-\frac{\sin^4 2x}{4} + C$
C) $-\frac{\cos^3 2x}{6} + C$
D) $\frac{\sin^3 2x}{3} + C$
E) $-\frac{\cos^4 2x}{6} + C$

14. $\int \sin^3 x\cdot d(\sin x) = ?$

A) $\frac{\sin^2 x}{2} + C$
B) $\frac{\sin^3 x}{3} + C$
C) $\frac{\sin^4 x}{4} + C$
D) $\frac{-\cos^3 x}{3} + C$
E) $\frac{-\cos^4 x}{4} + C$

15. $\int \cos^3 x\cdot d(\cos x) = ?$

A) $\cos^4 x + C$
B) $\frac{\cos^4 x}{4} + C$
C) $-\frac{\cos^4 x}{4} + C$
D) $\cos^3 x\cdot \sin x + C$
E) $\frac{\sin^4 x}{4} + C$

16. $\int \sin^3 x\cdot \cos x\, dx = ?$

A) $\sin^3 x + C$
B) $\frac{\cos^4 x}{4} + C$
C) $\cos^3 x + C$
D) $\sin^3 x\cdot \cos x + C$
E) $\frac{\sin^4 x}{4} + C$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	B	C	C	E	D	C	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	B	B	A	C	C	B	E

1. $\int e^{f(x)} \cdot f'(x)dx = ?$

A) $e^{f(x)} + C$ B) $e^x + C$ C) $\ln(f(x)) + C$

D) $e^x + x + C$ E) $e^{f(x)} \cdot f(x) + C$

2. $\int 3^{\tan x} \cdot \sec^2 x dx = ?$

A) $\frac{3^{\tan x}}{\ln 3} + C$ B) $\frac{3^{\cot x}}{\ln 3} + C$ C) $-\frac{3^{\tan x}}{\ln 3} + C$

D) $-\frac{3^{\cot x}}{\ln 3} + C$ E) $\frac{3^{\tan x}}{\sec x} + C$

3. $\int 3x^3 \cdot e^{4x^4+1} dx = ?$

A) $e^{x^3} + C$ B) $-\frac{3}{16} e^{x^3+x} + C$

C) $\frac{3}{16} e^{x^3+x} + C$ D) $\frac{3}{16} e^{4x^4+1} + C$

E) $-\frac{3}{16} e^{4x^4+1} + C$

4. $\int e^{\cos x} \cdot \sin x dx = ?$

A) $-e^{\cos x} + C$ B) $-e^{\sin x} + C$ C) $e^{\cos x} + C$

D) $e^{\sin x} + C$ E) $e^{\tan x} + C$

5. $\int e^{\tan x} \cdot \sec^2 x dx = ?$

A) $-e^{\tan x} + C$ B) $-e^{\cot x} + C$ C) $e^{\tan x} + C$

D) $e^{\sec x} + C$ E) $e^{\sec^2 x} + C$

6. $\int e^{(e^{2x})} \cdot e^{2x} dx = ?$

A) $\frac{1}{2} e^{2x} + C$ B) $-e^{2x} + C$ C) $-\frac{1}{2} e^{2x} + C$

D) $\frac{1}{2} e^{(e^{2x})} + C$ E) $\frac{1}{2} e^{(e^{2x})} + C$

7. $\int e^x \cdot \cos e^x dx = ?$

A) $\sin e^x + C$ B) $\cos e^x + C$ C) $e^x \cdot \sin e^x + C$

D) $-\sin e^x + C$ E) $-\cos e^x + C$

8. $\int \frac{dx}{x \cdot \ln x} = ?$

A) $\ln|\ln x| + C$ B) $x \cdot \ln|x| + C$ C) $\ln|x| + C$

D) $\frac{1}{\ln|x|} + C$ E) $\frac{\ln|x|}{x} + C$

9. $\int \frac{dx}{x(\ln x)^3} = ?$

A) $-\frac{1}{\ln x} + C$ B) $-\frac{1}{\ln^2 x} + C$ C) $-\frac{1}{2\ln x^2 x} + C$

D) $\frac{2}{\ln^2 x} + C$ E) $\frac{2}{\ln x} + C$

10. $\int \frac{\sqrt{e^{2x-4}}}{e^{2x+2}} dx = ?$

A) $-e^{-x+4} + C$ B) $-e^{-x+2} + C$

C) $-e^{-x-2} + C$ D) $-e^{-x-4} + C$

E) $-e^{-x} + C$

11. $\int \cos^3 x \, d(\cos x) = ?$

A) $\cos^4 x + C$

B) $\frac{\cos^4 x}{4} + C$

C) $-\frac{\cos^4 x}{4} + C$

D) $\cos^3 x \cdot \sin x + C$

E) $\frac{\sin^4 x}{4} + C$

12. $\int \frac{e^x + 2}{e^x + 2x + 3} dx = ?$

A) $\ln e^x + 2x + C$

B) $\ln|e^x + 2x + 3| + C$

C) $-\ln|e^x + 2x + 3| + C$

D) $\frac{(e^x + 2x + 3)}{2} + C$

E) $\ln|e^x + 2| + C$

13. $\int \frac{\arcsin x}{\sqrt{1 - x^2}} dx = ?$

A) $\frac{\arcsin^2 x}{2} + C$ B) $-\frac{\arcsin^2 x}{2} + C$

C) $\frac{\arcsin x}{2} + C$ D) $\frac{\arcsin x}{4} + C$

E) $\frac{\arcsin^2 x}{4} + C$

14. $\int \cos^2 2x \cdot \sin 2x \, dx = ?$

A) $-\frac{\sin^3 2x}{3} + C$ B) $-\frac{\sin^4 2x}{4} + C$

C) $\frac{-\cos^3 2x}{3} + C$ D) $\frac{\sin^3 2x}{3} + C$

E) $\frac{-\cos^3 2x}{6} + C$

15. $\int \frac{dx}{\cos^2(2x+3)} = ?$

A) $-\frac{1}{2}\tan(2x+3) + C$ B) $-\frac{1}{3}\tan(2x+3) + C$

C) $\frac{1}{2}\tan(2x+3) + C$ D) $\frac{1}{3}\tan(2x+3) + C$

E) $\frac{1}{6}\tan(2x+3) + C$

16. $\int \frac{2x\,dx}{(1+x^4) \cdot \arctan x^2} = ?$

A) $x + \frac{x^5}{5} + C$ B) $\frac{\arctan x}{2} + C$

C) $\frac{\arctan x^2}{2} + C$ D) $\ln(\arctan x) + C$

E) $\ln \arctan x^2 + C$

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1	2	3	4	5	6	7	8
A	C	D	C	E	B	A	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	D	B	B	A	E	C	E

1. $\int \frac{\text{arccot}\,x}{x^2+1}dx = ?$

A) $\frac{1}{2}\text{arccot}x + C$
B) $\frac{1}{2}\cot x + C$
C) $\frac{1}{2}\cot^2 x + C$
D) $-\frac{1}{2}\text{arccot}^2 x + C$
E) $\text{arccot}^2 x + C$

2. $\int \frac{e^x}{\sqrt{1-e^{2x}}}dx = ?$

A) $\frac{1}{2}\text{arcsine}^x + C$
B) $\frac{1}{2}\text{arcsine}^{2x} + C$
C) $\text{arcsine}^x + C$
D) $\text{arcsine}^{2x} + C$
E) $2\text{arcsine}^x + C$

3. $\int \frac{e^{\text{arcsin}x}}{\sqrt{1-x^2}}dx = ?$

A) $e^x + C$
B) $e^{\sin x} + C$
C) $-e^{\sin x} + C$
D) $-e^{\text{arcsin}x} + C$
E) $e^{\text{arcsin}x} + C$

4. $\int \frac{2^x}{\sqrt{1-4^x}}dx = ?$

A) $\arcsin 2^x + C$
B) $\arcsin 4^x + C$
C) $\frac{(\arcsin 2^x)^2}{2} + C$
D) $\frac{1}{\ln 2}\arcsin 2^x + C$
E) $-\frac{1}{\ln 2}\arcsin 2^x + C$

5. $\int \frac{e^t}{1+e^{2t}}dt = ?$

A) $\text{arcsine}^t + C$
B) $\text{arccose}^t + C$
C) $\text{arctane}^t + C$
D) $\text{arccote}^t + C$
E) $\text{arcsine}^{2t} + C$

6. $\int (\sin x - \cos x)^2 dx = ?$

A) $-x - \frac{\cos 2x}{2} + C$
B) $x + \frac{\cos 2x}{2} + C$
C) $x - \frac{\sin 2x}{2} + C$
D) $-x - \frac{\sin 2x}{2} + C$
E) $x + \frac{\cos 2x}{2} + C$

7. $\int \frac{\sin 2x}{\sqrt{1+\sin^2 x}}dx = ?$

A) $2\cdot(1+\sin^2 x)^{\frac{1}{2}} + C$
B) $-2\cdot(1+\sin x^2) + C$
C) $2\cdot(1+\sin x^2) + C$
D) $-2\cdot(1+\sin x^2) + C$
E) $\frac{(1+\sin x^2)}{2} + C$

8. $\int \frac{x}{\sin^2(x^2-3)}dx = ?$

A) $\frac{1}{2}\cot(x^2-3) + C$
B) $-\frac{1}{2}\cot(x^2-3) + C$
C) $2\cdot\cot(x^2-3) + C$
D) $-2\cdot\cot(x^2-3) + C$
E) $\frac{1}{2}\tan(x^2-3) + C$

9. $\int\left(\frac{\cos 2x}{\cos^2 x-\frac{1}{2}}+\tan^2 x\right)dx = ?$

A) $2x+\tan x+C$

B) $x+\tan x+C$

C) $3x+\tan x+C$

D) $4x+\tan x+C$

E) $x+2\tan x+C$

10. $\int\left(\sin x+\frac{1+\cos 2x}{\cos x}\right)dx = ?$

A) $\cos x+2\sin x+C$

B) $-\sin x+\cos x+C$

C) $-\cos x-2\sin x+C$

D) $-\cos x+2\sin x+C$

E) $-\cos x-\sin x+C$

11. $\int \sin^2(2x-1)dx = ?$

A) $\frac{x}{2}-\frac{1}{8}\sin(4x-2)+C$

B) $\frac{x}{2}-\frac{1}{8}\sin(2x-1)+C$

C) $\frac{2x-1}{4}-\frac{1}{4}\sin(4x-2)+C$

D) $\frac{x}{2}-\frac{1}{4}\sin(4x-2)+C$

E) $\frac{x}{2}-\frac{1}{2}\sin(2x-1)+C$

12. $\int \frac{\tan x}{\sin(2x)}dx = ?$

A) $\frac{\sin x}{2}+C$

B) $\frac{\cos x}{2}+C$

C) $\frac{1}{\sec x}+C$

D) $\frac{1}{\operatorname{cosec} x}+C$

E) $\frac{\tan x}{2}+C$

13. $\int \sin^3 2x\cdot\sin 4x\,dx = ?$

A) $\frac{(\sin 2x)^5}{5}+C$

B) $\frac{\sin^4 6x}{4}+C$

C) $\frac{\sin 4x}{4}+C$

D) $\frac{4(\sin 2x)^3}{5}+C$

E) $\frac{5(\sin 2x)^5}{4}+C$

14. $\int(\cot^4 x+\cot^2 x)dx = ?$

A) $\frac{1}{2}\cot^2 x+C$

B) $-\frac{1}{3}\cot^3 x+C$

C) $\frac{1}{3}\cot^3 x+C$

D) $\cot^3 x+C$

E) $\cot^2 x+C$

15. $\int(\tan^4 x+\tan^2 x)dx = ?$

A) $\frac{1}{2}\tan^2 x+C$

B) $\frac{1}{3}\tan^3 x+C$

C) $\frac{1}{4}\tan^4 x+C$

D) $\tan^3 x+C$

E) $\tan^4 x+C$

16. $\int(\tan^5 x+\tan^3 x)dx = ?$

A) $\tan^2 x+C$

B) $\tan^3 x+C$

C) $\frac{\tan^2 x}{2}+C$

D) $\frac{\tan^2 x}{3}+C$

E) $\frac{\tan^4 x}{4}+C$

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1	2	3	4	5	6	7	8
D	C	E	D	C	E	A	B
9	10	11	12	13	14	15	16
B	D	A	E	A	B	B	E

1. $\int \sqrt[3]{x^2}\,dx = \frac{a\sqrt[3]{x^b}}{k} + C \Rightarrow$ **a + b + k = ?**

A) 5 B) 7 C) 13 D) 17 E) 19

2. $f'(x) = \frac{\ln x}{x}$, $f(e^4) = -4 \Rightarrow$ **f(x) = ?**

A) $\ln^2 x + 6$ B) $\ln^2 x + 1$

C) $\ln^2 x - 12$ D) $\frac{1}{2}\ln^2 x - 12$

E) $\ln^2 x + 12$

3. $f'(x) = \frac{\ln^3 x}{3x}$, $f(e^2) = 2 \Rightarrow$ **f(x) = ?**

A) $\ln^4 x$ B) $\frac{\ln^4 x}{12}$

C) $\ln^3 x + 3$ D) $\frac{\ln^4 x}{12} - 5$

E) $\frac{\ln^4 x}{12} + \frac{2}{3}$

4. $f'(x) = x^2 \cdot f(x)$,

$f(1) = 1 \Rightarrow$ **f(3) = ?**

A) $e^{\frac{1}{3}}$ B) $e^{\frac{1}{7}}$ C) $e^{\frac{3}{26}}$ D) $e^{\frac{26}{3}}$ E) $e^{\frac{29}{3}}$

5. $f'(x) = \frac{1}{e^x}$, $f(\ln 2) = 0 \Rightarrow$ **f(x) = ?**

A) $-e^{-x}$ B) $e^{-x} + 1$

C) $-e^{-x} + \frac{1}{2}$ D) $-e^{-x} - \frac{1}{2}$

E) $-e^{-x} - 1$

6. $\int x^3 \cdot e^{x^4}\,dx = ?$

A) $e^{x^4} + C$ B) $\frac{e^{x^4}}{4} + C$

C) $\frac{e^{x^4}}{8} + C$ D) $\frac{e^{x^4}}{4} + x + C$

E) $\frac{e^{x^4}}{32} + C$

7. $\int x \cdot e^{5x^2}\,dx = ?$

A) $e^{5x^2} + C$ B) $\frac{e^{5x^2}}{5} + C$ C) $\frac{e^{5x^2}}{10} + C$

D) $\frac{e^{5x^2}}{20} + C$ E) $\frac{e^{5x^2}}{25} + C$

8. $\int \frac{12}{1 + 9x^2}\,dx = ?$

A) 4arctan6x + C B) 4arctan2x + C

C) 4arctan3x + C D) arctan3x + C

E) 12arctan3x + C

9. $\int \frac{6}{\sqrt{9-4x^2}}dx = ?$

A) $\arcsin 2x + C$
B) $3\ \arcsin 2x + C$
C) $3\ \arcsin \frac{2x}{3} + C$
D) $\arccos 2x + C$
E) $\arccos \frac{2x}{3} + C$

10. $\int \sin^2 x\, dx = ?$

A) $\frac{x}{2} - \frac{\sin 2x}{4} + C$
B) $\frac{x}{2} + \frac{\sin 2x}{4} + C$
C) $\frac{x}{2} - \frac{\sin 2x}{2} + C$
D) $\frac{x}{2} + \frac{\sin 2x}{2} + C$
E) $\frac{x}{2} - \sin 2x + C$

11. $\int \cos^3 x\, dx = ?$

A) $\sin x - \frac{\sin^2 x}{2} + C$
B) $\sin x + \frac{\sin^2 x}{2} + C$
C) $\cos x - \frac{\cos^2 x}{2} + C$
D) $\cos x + \frac{\cos^2 x}{2} + C$
E) $\sin x - \frac{\sin^3 x}{3} + C$

12. $\int \frac{\sin(\ln x)}{x} dx = ?$

A) $-\cos(\ln x) + C$
B) $-\sin(\ln x) + C$
C) $\cos(\ln x) + C$
D) $\sin(\ln x) + C$
E) $x - \cos(\ln x) + C$

13. $\int \frac{2x}{1+x^4} dx = ?$

A) $\arctan x + C$
B) $\arctan x^2 + C$
C) $2\arctan x + C$
D) $2\arctan x^2 + C$
E) $\arctan 2x + C$

14. $\int \frac{3dx}{\sqrt{1-9x^2}} = ?$

A) $\frac{1}{3}\arcsin 3x + C$
B) $\arcsin \frac{x}{3} + C$
C) $\frac{1}{3}\arcsin \frac{x}{3} + C$
D) $\arcsin x + C$
E) $\arcsin 3x + C$

15. $\int \frac{x \cdot dx}{\sqrt{1-16x^4}} = ?$

A) $8\arcsin 4x^2 + C$
B) $4\arcsin 4x^2 + C$
C) $\frac{1}{8}\arcsin 4x^2 + C$
D) $\frac{1}{4}\arcsin 4x^2 + C$
E) $\frac{1}{16}\arcsin 4x^2 + C$

16. $\int \sin^5 x dx = ?$

A) $-\cos x + \frac{2}{3}\cos^3 x - \frac{\cos^5 x}{5} + C$
B) $\sin x - \frac{\sin^3 x}{3} + \frac{\sin^5 x}{5} + C$
C) $x - \frac{2}{3}\sin^3 x + \frac{\sin^5 x}{5} + C$
D) $x - \frac{\sin^3 x}{3} + \frac{\sin^5 x}{5} + C$
E) $x + \frac{\sin^3 x}{3} - \frac{\sin^5 x}{5} + C$

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1	2	3	4	5	6	7	8
C	D	E	D	C	B	C	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	E	A	B	E	C	A

1. $f(x)=\frac{d}{dx}\int \cos^2 x dx \rightarrow f'(x)=?$

A) $\sin 2x$ B) $2\cos 2x$ C) $-2\cos 2x$ D) $2\sin 2x$ E) $-2\sin 2x$

2. $\int \frac{\sin 2x}{\cos^2 x}dx=?$

A) $2\cos x+C$
B) $\ln|\cos x|+C$
C) $2\ln|\cos x|+C$
D) $-2\ln|\cos x|+C$
E) $\frac{\ln|\cos x|}{2}+C$

3. $\int \sin^2 x\cdot\cos^3 x dx=?$

A) $\frac{\cos^2 x}{2}-\frac{\cos^4 x}{4}+C$ B) $\frac{\sin^3 x}{3}-\frac{\sin^5 x}{5}+C$
C) $\sin x-\frac{\sin^2 x}{4}+C$ D) $\frac{\sin^3 x}{3}-\frac{\cos^4 x}{4}+C$
E) $\frac{\sin^2 x}{2}+\frac{\cos^3 x}{3}+C$

4. $\int \sin^3 x\cdot\cos^3 x\, dx=?$

A) $\frac{\cos^6 x}{6}-\frac{\cos^4 x}{4}+C$
B) $\frac{\sin^6 x}{6}-\frac{\sin^4 x}{4}+C$
C) $\frac{\cos^6 x}{6}+\frac{\cos^4 x}{4}+C$
D) $-\frac{\sin^6 x}{6}+\frac{\sin^4 x}{4}+C$
E) $\frac{\cos^6 x}{6}-\frac{\sin^4 x}{4}+C$

5. $\int \frac{\cos x}{1+\sin^2 x}=?$

A) $\ln(1+\sin^2 x)+C$
B) $\ln(\sin x)+C$
C) $\arctan(1+\sin x)+C$
D) $\arctan(\sin x)+C$
E) $\ln(\arctan x)+C$

6. $\int \frac{\cos x}{1+4\sin^2 x}dx=?$

A) $\arctan(\sin x)+C$
B) $\arctan(\sin 2x)+C$
C) $\frac{\arctan(2\sin x)}{2}+C$
D) $\arctan(2\sin x)+C$
E) $2\cdot\arctan(\sin 2x)+C$

7. $x\in\left(0,\frac{\pi}{4}\right) \rightarrow \int\sqrt{1-\sin 2x}\,dx=?$

A) $\sin x-\cos x+C$
B) $\sin x+\cos x+C$
C) $-\sin x-\cos x+C$
D) $\sin 2x+\cos 2x+C$
E) $\sin 2x-\cos 2x+C$

8. $0<x<\frac{\pi}{2} \rightarrow \int\sqrt{1+\sin 2x}\,dx=?$

A) $\cos x+\sin x+C$
B) $\cos x-\sin x+C$
C) $\sin x-\cos x+C$
D) $\frac{\sin^2 x}{2}-\frac{\cos^2 x}{2}+C$
E) $\frac{\sin 2x}{2}-\cos x+C$

9. $\int \sin 3a \cdot \cos 3a \, da = ?$

A) $-\frac{\cos 6a}{6} + C$
B) $-\frac{\cos 6a}{12} + C$
C) $\frac{\cos 6a}{12} + C$
D) $\frac{\sin 6a}{12} + C$
E) $-\frac{\sin 6a}{12} + C$

10. $\int \sin x \cdot \cos x \, dx = ?$

A) $\frac{1}{4} \cos 2x + C$
B) $\frac{1}{4} \sin 2x + C$
C) $\frac{1}{2} \cos 2x + C$
D) $\frac{-1}{4} \cos 2x + C$
E) $-\frac{1}{4} \sin 2x + C$

11. $\int \sin y \cdot \cos y \cdot \cos 2y \, dy = ?$

A) $\frac{\cos 4y}{16} + C$
B) $-\frac{\cos 4y}{16} + C$
C) $\frac{\sin 4y}{16} + C$
D) $-\frac{\sin 4y}{16} + C$
E) $\frac{\sin 4y}{8} + C$

12. $\int \cos 5x \cdot \cos x \, dx = ?$

A) $\frac{1}{12} \sin 6x - \frac{1}{8} \sin 4x + C$
B) $\frac{1}{12} \sin 6x + \frac{1}{8} \sin 4x + C$
C) $\frac{1}{12} \cos 6x - \frac{1}{8} \cos 4x + C$
D) $\frac{1}{12} \cos 6x + \frac{1}{8} \cos 4x + C$
E) $-\frac{1}{12} \sin 6x + \frac{1}{8} \sin 4x + C$

13. $\int \sin 3x \cdot \sin x \, dx = ?$

A) $\frac{1}{8} \cos 4x - \frac{1}{4} \cos 2x + C$
B) $\frac{1}{8} \cos 4x + \frac{1}{4} \cos 2x + C$
C) $\frac{1}{8} \sin 4x - \frac{1}{4} \sin 2x + C$
D) $\frac{1}{8} \sin 4x + \frac{1}{4} \sin 2x + C$
E) $-\frac{1}{8} \sin 4x + \frac{1}{4} \sin 2x + C$

14. $\int \sin 4x \cdot \cos 4x \, dx = ?$

A) $\frac{\cos 8x}{8} + C$
B) $\frac{\cos 8x}{16} + C$
C) $\frac{-\cos 8x}{16} + C$
D) $\frac{\sin 8x}{8} + C$
E) $\frac{\sin 8x}{16} + C$

15. $\int \sin 6x \cdot \cos 2x \, dx = ?$

A) $\frac{\sin 8x}{8} + \frac{\sin 4x}{4} + C$
B) $\frac{\sin 8x}{16} + \frac{\sin 4x}{8} + C$
C) $\frac{\cos 8x}{8} + \frac{\cos 4x}{4} + C$
D) $\frac{\cos 8x}{16} + \frac{\cos 4x}{8} + C$
E) $\frac{-\cos 8x}{16} - \frac{\cos 4x}{8} + C$

16. $\int \frac{\cos^3 u}{\sin^2 u} du = ?$

A) $-\sec u - \cos u + C$
B) $-\operatorname{cosec} u - \sin u + C$
C) $-\cot u + \tan u + C$
D) $-\cot u - \sec u + C$
E) $-\operatorname{cosec} u + \sin u + C$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	D	B	D	D	C	B	C
9	10	11	12	13	14	15	16
B	D	B	B	E	C	E	B

1. $\int \ln x\,dx = ?$

A) $x\cdot\ln x - x + C$
B) $x\cdot\ln x - x^2 + C$
C) $\frac{x^2}{2}\ln x - \frac{x^4}{4} + C$
D) $x\cdot\ln x + x + C$
E) $x\cdot\ln x + \frac{x^2}{2} + C$

2. $\int x\cdot e^x\,dx = ?$

A) $e^x\cdot(x+1)+C$
B) $e^x\cdot(x-1)+C$
C) $e^x(x-2)+C$
D) $e^x(x+2)+C$
E) $e^x(x+4)+C$

3. $\int x\cdot e^{2x}\,dx = ?$

A) $\frac{1}{2}e^{2x} - \frac{1}{2}e^{2x} + C$
B) $\frac{x}{2}e^{2x} - \frac{1}{2}e^{2x} + C$
C) $\frac{1}{2}e^{2x} + \frac{1}{2}e^{2x} + C$
D) $\frac{x}{2}e^{2x} + \frac{1}{2}e^{2x} + C$
E) $\frac{x}{2}e^{2x} - \frac{1}{4}e^{2x} + C$

4. $\int x\cdot\ln x\,dx = ?$

A) $\frac{x^2}{2}\left(\ln x - \frac{1}{2}\right)+C$
B) $\frac{x^2}{2}\left(\ln x + \frac{1}{2}\right)+C$
C) $\frac{x^2}{2}(\ln x - 1)+C$
D) $\frac{x^2}{2}(\ln x + 1)+C$
E) $x^2(\ln x - 1)+C$

5. $\int x^2\cdot\ln x\,dx = ?$

A) $x^2\ln x - x^2 + C$
B) $x^3\ln x - x^3 + C$
C) $\frac{x^3\ln x}{3} - \frac{x^3}{2} + C$
D) $\frac{x^3\ln x}{3} - \frac{x^3}{9} + C$
E) $x^2\ln x - \arctan x + C$

6. $\int e^x\cdot(x^2+x+1)\,dx = ?$

A) $e^x\cdot(x^2+x+1)+C$
B) $e^x\cdot(x^2-x+2)+C$
C) $e^x\cdot(2x+1)+C$
D) $e^x\cdot(x^2+x+2)+C$
E) $e^x\cdot(x^2+3x+4)+C$

7. $\int 7x^2\cdot\ln 4x\,dx = ?$

A) $\frac{x^3\cdot\ln 4x}{3} - \frac{x^3}{3} + C$
B) $\frac{x^2\cdot\ln 4x}{2} - \frac{x^2}{2} + C$
C) $\frac{x^3\ln 4x}{3} + \frac{x^3}{9} + C$
D) $7\left(\frac{x^3\ln 4x}{3} - \frac{x^3}{9}\right) + C$
E) $\frac{x^3\ln 4x}{3} - \frac{x^3}{9} + C$

8. $\int x\cdot 2^x\,dx = ?$

A) $2^x\left(\frac{x}{\ln 2} - \frac{1}{\ln^2 2}\right)+C$
B) $2^x\left(\frac{x-1}{\ln 2}\right)+C$
C) $2^x(\ln 2 - \ln^2 2)+C$
D) $2^x(\ln 2 - x)+C$
E) $2^x(\ln^2 2 - \ln 2)+C$

9. $\int e^x \sin x dx = ?$

A) $e^x(\sin x - \cos x) + C$
B) $e^x(\sin x + \cos x) + C$
C) $\frac{e^x}{2}(\sin x - \cos x) + C$
D) $\frac{e^x}{2}(\sin x + \cos x) + C$
E) $\frac{e^x}{2}(-\sin x + \cos x) + C$

10. $\int e^x \cos x dx = ?$

A) $\frac{e^x(\sin x + \cos x)}{2} + C$
B) $\frac{e^x(\sin x - \cos x)}{2} + C$
C) $e^x(\sin x + 2\cos x) + C$
D) $e^x(\sin x - \cos x) + C$
E) $e^x(\sin x + \cos x) + C$

11. $\int x^2 \sin x dx = ?$

A) $-x^2\cos x - 2x\sin x + 2\cos x + C$
B) $-x^2\cos x + 2x\sin x + 2\cos x + C$
C) $-x^2\cos x + 2x\sin x - 2\cos x + C$
D) $x^2\cos x - 2x\sin x + 2\cos x + C$
E) $x^2\cos x + 2x\sin x - 2\cos x + C$

12. $\int x^3 \cdot \cos x dx = ?$

A) $x^3\sin x + 2x^2\cos x - 6x\sin x - 6\cos x + C$
B) $x^3\sin x - 3x^2\cos x + 6x\sin x + 6\cos x + C$
C) $-x^3\sin x - 3x^2\cos x - 6x\sin x + 6\cos x + C$
D) $x^3\sin x - 3x^2\cos x + 6x\sin x - 6\cos x + C$
E) $x^3\sin x + 3x^2\cos x - 6x\sin x - 6\cos x + C$

13. $\int x \cdot \tan^2 x dx = ?$

A) $x \cdot \tan x + \frac{1}{2}x^2 + \ln|\cos x| + C$
B) $x \cdot \tan x - \frac{1}{2}x^2 - \ln|\cos x| + C$
C) $x \cdot \tan x - \frac{1}{2}x^2 + \ln|\cos x| + C$
D) $x \cdot \tan x + \frac{1}{2}x^2 - \ln|\sin x| + C$
E) $x \cdot \tan x - \frac{1}{2}x^2 - \ln|\sin x| + C$

14. $\int \arctan x \, dx = ?$

A) $x \cdot \arctan x - \ln|x^2 + 1| + C$
B) $x \cdot \arctan x + \ln|x^2 + 1| + C$
C) $x \cdot \arctan x - \frac{1}{2}\ln|x^2 + 1| + C$
D) $x \cdot \arctan x + \frac{1}{2}\ln|x^2 + 1| + C$
E) $\arctan x - \ln|x^2 + 1| + C$

15. $\int x \arctan x dx = ?$

A) $\frac{x^2+1}{2}\arctan x - \frac{x}{2} + C$
B) $\frac{x^2-1}{2}\arctan x + \frac{x}{2} + C$
C) $\arctan x + \frac{x}{2} + C$
D) $\frac{x^2+1}{2} + \frac{x}{3} + C$
E) $\frac{x^2-1}{2} + \arctan x + C$

16. $\int \log_2 x \, dx = ?$

A) $\log_2 x - x \cdot \log_2 e + C$
B) $x \cdot (\log_2 x - \log_2 e) + C$
C) $x \cdot \log_2 x - \log_2 e + C$
D) $\frac{x^2}{2} \cdot \log_2 x + \log_2 e + C$
E) $\frac{x^2}{2} \cdot \log_2 x - \log_2 e + C$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	B	E	A	D	B	D	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	B	E	C	C	A	B

1. $\int \sqrt{\cos 2x + 1}\, dx = ?$

A) $2\sin x + C$ B) $\sqrt{2}\tan x + C$ C) $\sqrt{2}\cos x + C$ D) $1 + C$ E) $\sqrt{2}\sin x + C$

[YÜZÜNCÜ YIL ÜNİVERSİTESİ – YÖS 2019]

2. $f''(x) = 5x + 3,$
$f'(0) = 5,$
$f(0) = -1 \Rightarrow f(1) = ?$

A) $\frac{13}{3}$ B) $\frac{1}{3}$ C) $-\frac{1}{3}$ D) $\frac{19}{3}$ E) -4

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

3. $\int \frac{\sqrt{x} + \ln x}{x} dx = ?$

A) $2\sqrt{x} + \frac{1}{2}(\ln x)^2 + C$
B) $2\sqrt{x} - \frac{1}{2}(\ln x)^2 + C$
C) $\sqrt{x} + \frac{1}{2}(\ln x)^2 + C$
D) $\sqrt{x} - \frac{1}{2}(\ln x)^2 + C$
E) $2\sqrt{x} + 2(\ln x)^2 + C$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

4. $\int x\cos x dx = ?$

A) $x\sin x + \cos x + C$
B) $x^2\sin x + C$
C) $\sin x + \cos x + C$
D) $\cos x + C$
E) $\cos^2 x + C$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

5. $f(x) = \int (5\sin x - \cos x)dx$
$\Rightarrow f(\pi) - f\left(\frac{\pi}{2}\right) = ?$

A) 6 B) 5 C) 4 D) 3 E) 2

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

6. $\int 4 \cdot e^{2x-1} dx = ?$

A) $e^{2x+1} + C$
B) $2e^{2x+1} + C$
C) $e^{2x-1} + C$
D) $2e^{2x-1} + C$
E) $4e^{2x-1} + C$

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

7. $\int (x+1)f(x)dx = \frac{x^4}{4} - \frac{x^2}{2} + C$
$\Rightarrow f(3) = ?$

A) 0 B) 3 C) $\frac{18}{4}$ D) 6 E) 18

[ERCİYES ÜNİVERSİTESİ – YÖS 2017]

8. $\int \frac{6x^3}{\sqrt[5]{x^4+1}} dx = ?$

A) $\frac{4}{9}\sqrt{x^4+1} + C$
B) $\frac{15}{8}\sqrt[5]{(x^4+1)^4} + C$
C) $\frac{2}{3}\sqrt[4]{(x^3+2)^3} + C$
D) $\frac{7}{22}\sqrt[6]{(x^5+1)^5} + C$
E) $\frac{3}{11}\sqrt[5]{(x^4+1)^3} + C$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

9. $\int \frac{dx}{x^2+x-6} = ?$

A) $\frac{1}{2}\ln|x-5| + C$

B) $\frac{1}{5}\ln\left|\frac{x-2}{x+3}\right| + C$

C) $\frac{1}{3}\ln\left|\frac{x+1}{x-1}\right| + C$

D) $\frac{1}{3}\ln\left|\frac{x-5}{x+1}\right| + C$

E) $\frac{1}{5}\ln\left|\frac{x-2}{x-1}\right| + C$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

10. $\left.\begin{array}{l} f'(x) = 3x-1 \\ f'(0) = 4 \\ f(0) = 1 \end{array}\right\} \Rightarrow f(1) = ?$

A) -1 B) 1 C) 2 D) 5 E) 6

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2014]

11. $\int \frac{\ln\left(\frac{1}{x}\right)}{x} dx = ?$

A) $-\ln x + C$ B) $-\ln\frac{1}{x} + C$ C) $\frac{\ln^2 x}{2} + C$

D) $\frac{\ln x}{x} + C$ E) $-\frac{\ln^2 x}{2} + C$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2014]

12. $\int \frac{\sin x}{1-\cos x} dx = ?$

A) $\ln|\sin x| + C$

B) $\ln|\cos x| + C$

C) $\ln|1 - \cos x| + C$

D) $\ln|1 - \sin x| + C$

E) 0

[SELÇUK ÜNİVERSİTESİ – YÖS 2014]

13. $\int \frac{\cos(e^{-x})}{e^x} dx = ?$

A) $\sin(e^{-x}) + C$

B) $\cos(e^{-x}) + C$

C) $-\cos(e^{-x}) + C$

D) $e^{-x}\cdot\cos(e^{-x}) + C$

E) $-\sin(e^{-x}) + C$

[AKDENİZ ÜNİVERSİTESİ – YÖS 2013]

14. $f'(x) = 2x + 1$

$f(1) = 4$

$\Rightarrow f(2) = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2013]

15. $\int \frac{dx}{9+4x^2} dx = ?$

A) $\frac{2}{3} + \ln x^2 + C$

B) $\sin\left(\frac{2x}{3}\right) + C$

C) $\frac{1}{6}\arctan\left(\frac{2x}{3}\right) + C$

D) $\frac{1}{3}\arcsin\left(\frac{2x}{3}\right) + C$

E) $\frac{1}{3}\arccos\left(\frac{3x}{5}\right) + C$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2013]

16. $\int \frac{3x^2}{(x^3+1)^5} dx = ?$

A) $\frac{-1}{4(x^3+1)^4} + C$ B) $\frac{1}{x^2+4} + C$ C) $\frac{x}{x^2+1} + C$

D) $\frac{1}{2(x^3+1)^2} + C$ E) $\frac{-1}{(x^3+1)^3} + C$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2012]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	D	A	A	A	D	D	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	D	E	C	E	D	C	A

BÖLÜM CHAPTER 16

TARİHSEL NOT / HISTORICAL NOTE

AUGUSTİN LOUIS CAUCHY [1789 - 1857]

Fransız matematikçi. Analizin temellerine kesinlik kazandıran çalışmaları, karmaşık değişkenli fonksiyonlar teorisine katkılarıyla tanınır. 27 yaşına geldiğinde Cauchy çağının en önde gelen matematikçilerinden biri sayılıyordu.1814'te belirli integrallere ilişkin teoremlerini yayımladı. Kendi adıyla anılan ünlü integral kuramını ortaya attı.

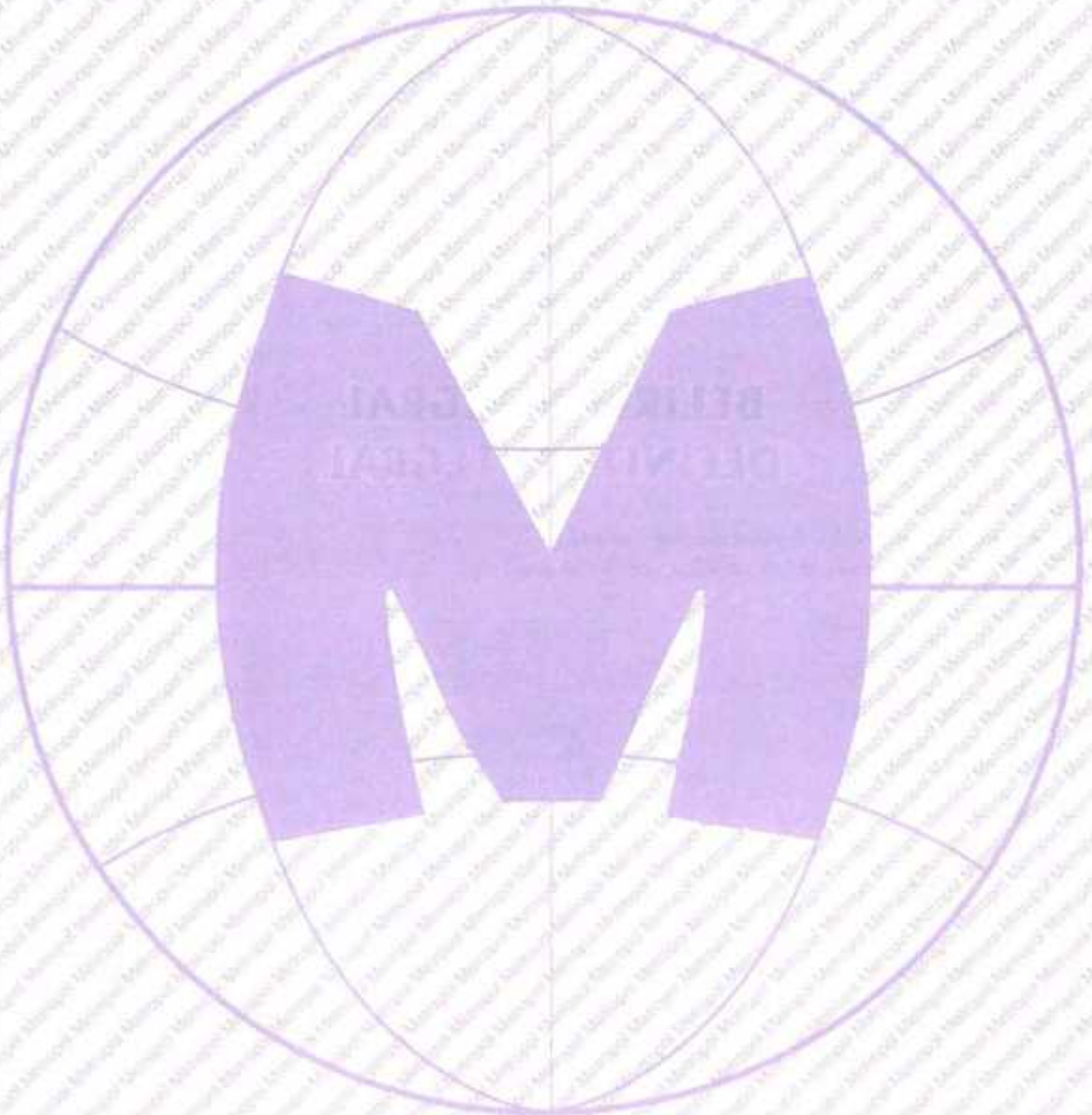
French mathematician. His work, which gives certainty to the fundamentals of analysis, is known for his contributions to the theory of functions of complex variables. At the age of 27, Cauchy was considered to be one of the leading mathematicians of his time. In 1814, he published his theorems on specific integrals. He also introduced the famous integral theory referred to in his name.

BELİRLİ İNTEGRAL
DEFINITE INTEGRAL

Bu bölüm 64 alıştırma sorusu, 80 test sorusu, 16 YÖS sorusu içermektedir.
This chapter includes 64 exercise questions, 80 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 16

BELİRLİ İNTEGRAL / DEFINITE INTEGRAL



BELİRLİ İNTEGRAL
DEFINITE INTEGRAL

1. $\int_{3}^{4} x\,dx = ?$

Yanıt / The Answer is $\frac{7}{2}$

2. $\int_{-1}^{2} x^2\,dx = ?$

Yanıt / The Answer is 3

3. $\int_{-2}^{3} 3x^2\,dx = ?$

Yanıt / The Answer is 35

4. $\int_{-1}^{4} \frac{x^2}{2}\,dx = ?$

Yanıt / The Answer is $\frac{65}{6}$

5. $\int_{0}^{2} (2x-1)\,dx = ?$

Yanıt / The Answer is 2

6. $\int_{1}^{\sqrt{3}} \frac{dx}{1+x^2} = ?$

Yanıt / The Answer is $\frac{\pi}{12}$

7. $\int_{e^{\frac{1}{2}}}^{e} \frac{1}{x}\,dx = ?$

Yanıt / The Answer is $\frac{1}{2}$

8. $\int_{\frac{\pi}{2}}^{\pi} 2\sin x\,dx = ?$

Yanıt / The Answer is 2

9. $\int_{e}^{e^2} \frac{3}{x} dx = ?$

Yanıt / The Answer is 3

10. $\int_{0}^{\frac{\sqrt{2}}{2}} \frac{dx}{\sqrt{1-x^2}} = ?$

Yanıt / The Answer is $\frac{\pi}{4}$

11. $\int_{0}^{\pi} 4 \sin x dx = ?$

Yanıt / The Answer is 8

12. $\int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} (1+\tan^2 x) dx = ?$

Yanıt / The Answer is -2

13. $\int_{\ln 4}^{\ln 7} e^x dx = ?$

Yanıt / The Answer is 3

14. $\int_{\frac{\pi}{6}}^{\frac{7\pi}{6}} 5 \cos x dx = ?$

Yanıt / The Answer is -5

15. $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{\sin^2 x} = ?$

Yanıt / The Answer is $\frac{2\sqrt{3}}{3}$

16. $\int_{0}^{\frac{\pi}{4}} \sec^2 x dx = ?$

Yanıt / The Answer is 1

17. $\int_0^1 e^{2x} \cdot 2dx = ?$

Yanıt / The Answer is $e^2 - 1$

18. $\int_0^1 x \cdot e^x dx = ?$

Yanıt / The Answer is 1

19. $\int_0^1 (6x - m)dx = 1 \Rightarrow m = ?$

Yanıt / The Answer is 2

20. $\int_1^a (2ax + 1)dx = 7 \Rightarrow a = ?$

Yanıt / The Answer is 2

21. $\int_m^n (2x - 1)dx = 24$

$n - m = 3 \Rightarrow m = ?$

Yanıt / The Answer is 3

22. $\int_0^1 (x^2 + m) = \frac{13}{3} \Rightarrow m = ?$

Yanıt / The Answer is 4

23. $\int_{-2}^0 (2x + a) = -2 \Rightarrow a = ?$

Yanıt / The Answer is 1

24. $\int_0^2 (3x^2 + mx)dx = 12 \Rightarrow m = ?$

Yanıt / The Answer is 2

25. $\int_a^b \frac{2x}{b-a}dx = 12 \Rightarrow a+b = ?$

Yanıt / The Answer is 12

26. $\int_0^3 d(x^2-2x) = ?$

Yanıt / The Answer is 3

27. $\int_1^2 d(2x^3-3x^2+1) = ?$

Yanıt / The Answer is 5

28. $f(x) = 2x-3$

$\Rightarrow \int_2^3 d(f^{-1}(x)) = ?$

Yanıt / The Answer is $\frac{1}{2}$

29. $\int_0^{\pi} d(\cos x) = ?$

Yanıt / The Answer is -2

30. $\int_0^{\frac{\pi}{6}} (2\cdot\cos^2 x-1)dx = ?$

Yanıt / The Answer is $\frac{\sqrt{3}}{4}$

31. $\frac{d}{dx}\int_2^5 (3x^2-4x+2)dx = ?$

Yanıt / The Answer is 0

32. $\frac{d}{dx}\int_3^7 (x^3+2x^2-5)dx = ?$

Yanıt / The Answer is 0

33. $\int_0^1 (x-1)^4 dx = ?$

Yanıt / The Answer is $\frac{1}{5}$

34. $\int_0^1 (2x+1)^3 dx = ?$

Yanıt / The Answer is 10

35. $\int_0^2 (x^2+2x-1)\,(x+1)dx = ?$

Yanıt / The Answer is 12

36. $\int_1^4 (2+\sqrt{x})dx = ?$

Yanıt / The Answer is $\frac{32}{3}$

37. $\int_0^5 \sqrt{3x+1}\,dx = ?$

Yanıt / The Answer is 14

38. $\int_0^4 \frac{dx}{\sqrt{4-x}} = ?$

Yanıt / The Answer is 4

39. $\int_0^3 \frac{xdx}{\sqrt{x^2+16}} = ?$

Yanıt / The Answer is 1

40. $\int_0^{\frac{\pi}{4}} \tan^2 x \cdot \sec^2 x dx = ?$

Yanıt / The Answer is $\frac{1}{3}$

41. $\int_1^4 (2x - \sin^2 x - \cos^2 x)dx = ?$

Yanıt / The Answer is 12

42. $\int_0^{\frac{\pi}{4}} (\sin^2 x - \cos^2 x)dx = ?$

Yanıt / The Answer is $-\frac{1}{2}$

43. $\int_3^4 2^{x-3}dx = ?$

Yanıt / The Answer is $\frac{1}{\ln 2}$

44. $\int_0^1 2x \cdot e^x dx = ?$

Yanıt / The Answer is 2

45. $F(x) = \int_4^{5x} e^{t^2}dt \Rightarrow F'(0) = ?$

Yanıt / The Answer is 5

46. $F(x) = \int_3^{\ln x} e^t dt \Rightarrow F'(3) = ?$

Yanıt / The Answer is 1

47. $F(x) = \int_{3x}^{x^2} \ln t \cdot dt \Rightarrow F'(e) = ?$

Yanıt / The Answer is $4e - 3 \cdot \ln 3e$

48. $F(x) = \int_{\frac{\pi}{3}}^{x} \sin 2t dt \Rightarrow F'(\pi) = ?$

Yanıt / The Answer is 0

49. $F(x)=\int_{x}^{x^2}\sqrt{t^2+3t}\,dt \Rightarrow F'(1)=?$

Yanıt / The Answer is 2

50. $F(x)=\int_{2x}^{x^2}\sqrt{t^2+2t}\,dt \Rightarrow F'(2)=?$

Yanıt / The Answer is $4\sqrt{6}$

51. $f(x)=\begin{cases}2x+1, & x>0\\ 4x-1, & x\le 0\end{cases}$

$\Rightarrow \int_{-1}^{1} f(x)dx=?$

Yanıt / The Answer is -1

52. $f(x)=\begin{cases}3, & x\ge 1\\ 6x, & x<1\end{cases}$

$\Rightarrow \int_{-1}^{2} f(x)dx=?$

Yanıt / The Answer is 3

53. $f(x)=\begin{cases}3x^2+1, & x>0\\ 2x-3, & x\le 0\end{cases}$

$\Rightarrow \int_{-1}^{3} f(x)dx=?$

Yanıt / The Answer is 26

54. $f(x)=\begin{cases}4x^3, & x>1\\ 3x^2, & x\le 1\end{cases}$

$\Rightarrow \int_{0}^{2} f(x)dx=?$

Yanıt / The Answer is 16

55. $\int_{-2}^{2} |x-1|dx=?$

Yanıt / The Answer is 5

56. $\int_{1}^{2} |x-3|dx=?$

Yanıt / The Answer is $\frac{3}{2}$

57. $\int_{1}^{4} |x-2|\,dx = ?$

Yanıt / The Answer is $\frac{5}{2}$

58. $\int_{\frac{2\pi}{3}}^{\frac{4\pi}{3}} |\sin x|\,dx = ?$

Yanıt / The Answer is 1

59. $\int_{0}^{6} |x-4|\,dx = ?$

Yanıt / The Answer is 10

60. $\int_{-3}^{3} |x|\,dx = ?$

Yanıt / The Answer is 9

61. $\int_{1}^{e} \ln x\,dx = ?$

Yanıt / The Answer is 1

62. $\int_{0}^{1} x^2 e^x\,dx = ?$

Yanıt / The Answer is $e-2$

63. $\int_{0}^{\frac{\pi}{2}} x \cdot \sin x\,dx = ?$

Yanıt / The Answer is 1

64. $\int_{0}^{\frac{\pi}{2}} \frac{\sin 2x}{3+\sin^2 x}\,dx = ?$

Yanıt / The Answer is $\ln\frac{4}{3}$

1. $\int_{-1}^{4} 3\,dx = ?$

A) −15 B) −10 C) 8 D) 10 E) 15

2. $\int_{-1}^{3} 6x^2\,dx = ?$

A) 56 B) 54 C) 52 D) 50 E) 48

3. $\int_{0}^{2} (4-x^2)\,dx = ?$

A) $\frac{16}{3}$ B) $-\frac{16}{3}$ C) 1 D) $-\frac{8}{3}$ E) $\frac{8}{3}$

4. $\int_{-2}^{1} x^3\,dx = ?$

A) $-\frac{14}{3}$ B) $-\frac{16}{3}$ C) $-\frac{15}{4}$ D) $\frac{16}{5}$ E) $\frac{15}{4}$

5. $\int_{1}^{2} (3x^2-2x+1)\,dx = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

6. $\int_{-1}^{3} (3x^2-x+6)\,dx = ?$

A) 36 B) 42 C) 48 D) 52 E) 61

7. $\int_{0}^{3} (x-3)^2\,dx = ?$

A) 1 B) 3 C) 5 D) 7 E) 9

8. $\int_{-3}^{2} (x+3)^4\,dx = ?$

A) 25 B) 75 C) 125 D) 225 E) 625

9. $\int_0^2 (t^2+t)dt = ?$

A) $\frac{11}{3}$ B) $\frac{13}{3}$ C) $\frac{14}{3}$ D) $\frac{16}{3}$ E) $\frac{17}{3}$

10. $\int_2^4 \frac{1}{x}dx = ?$

A) 1 B) 2 C) ln2 D) ln3 E) ln4

11. $\int_{-1}^2 d(x^3-2x) = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

12. $\int_e^{e^5} d(\ln x) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

13. $\int_0^1 e^{3x}dx = ?$

A) $\frac{e^3}{3}$ B) e^3 C) $-e^3$ D) e^3-1 E) $\frac{e^3-1}{3}$

14. $\int_1^3 2^x dx = ?$

A) $\frac{8}{\ln 2}$ B) $\frac{6}{\ln 2}$ C) $\frac{4}{\ln 2}$ D) $\frac{2}{\ln 2}$ E) $\frac{1}{\ln 2}$

15. $\int_2^m \frac{1}{x}dx = \ln 2 \Rightarrow m = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $\int_1^8 \frac{4}{y}dy = ?$

A) 3·ln2 B) 6·ln2 C) 9·ln2 D) 12·ln2 E) 15·ln2

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	A	A	C	E	C	E	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	C	A	C	E	B	D	D

1. $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sin x \, dx = ?$

A) $\frac{-1+\sqrt{3}}{2}$ B) $\frac{-1-\sqrt{3}}{2}$ C) $\frac{1-\sqrt{3}}{2}$ D) $\frac{\sqrt{3}-1}{4}$ E) $\frac{\sqrt{3}+1}{2}$

2. $\int_{0}^{\frac{2\pi}{3}} d(\cos x) = ?$

A) $-\frac{3}{2}$ B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) 1 E) $\frac{3}{2}$

3. $\int_{0}^{\frac{\pi}{2}} (\cos x - \sin x)dx = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

4. $\int_{0}^{\pi} \sin\left(\frac{x}{2}\right)dx = ?$

A) 2 B) $\frac{3}{2}$ C) 1 D) $-\frac{1}{2}$ E) -3

5. $\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} \sec^2 x \, dx = ?$

A) $-\sqrt{3}$ B) $-\sqrt{3}-1$ C) $-\sqrt{3}+1$ D) $\sqrt{3}$ E) $\sqrt{3}-1$

6. $\int_{0}^{\frac{\pi}{4}} (\tan^2 x + 3)dx = ?$

A) $\frac{\pi-1}{2}$ B) $\frac{\pi-2}{2}$ C) $\frac{\pi-2}{4}$ D) $\frac{\pi+2}{2}$ E) $\frac{\pi+2}{4}$

7. $\int_{0}^{\frac{\pi}{4}} \tan^2 x dx = ?$

A) 0 B) $\frac{\pi}{4}$ C) $1-\frac{\pi}{4}$ D) $\frac{\pi}{2}$ E) $\frac{3\pi}{5}$

8. $\int_{0}^{\frac{\pi}{3}} \frac{\sin x}{\cos^2 x} dx = ?$

A) 2 B) 1 C) 0 D) -1 E) -2

9. $\int_0^{\frac{\pi}{2}} \cos^3 x \cdot \sin x \, dx = ?$

A) $-\frac{1}{4}$ B) $-\frac{1}{2}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

10. $\int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \sin^3 x \cdot \cos x \, dx = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

11. $\int_0^{\frac{\pi}{4}} e^{\tan x} \cdot \sec^2 x \, dx = ?$

A) $-2e$ B) $-e$ C) e D) $e-1$ E) $2e$

12. $\int_{\frac{1}{\sqrt{3}}}^{1} \frac{1}{1+x^2} \, dx = ?$

A) $\frac{\pi}{18}$ B) $\frac{\pi}{16}$ C) $\frac{\pi}{14}$ D) $\frac{\pi}{12}$ E) $\frac{\pi}{8}$

13. $\int_0^{\frac{\sqrt{2}}{4}} \frac{1}{\sqrt{1-4x^2}} \, dx = ?$

A) $\frac{\pi}{2}$ B) $\frac{\pi}{3}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{8}$ E) $\frac{\pi}{16}$

14. $\int_0^{\frac{1}{3}} \frac{dx}{\sqrt{4-9x^2}} = ?$

A) $\frac{\pi}{18}$ B) $\frac{\pi}{12}$ C) $\frac{\pi}{9}$ D) $\frac{\pi}{6}$ E) $\frac{\pi}{3}$

15. $\int_0^{\frac{\pi}{12}} \cos^2 x \, dx - \int_0^{\frac{\pi}{12}} \sin^2 x \, dx = ?$

A) $-\frac{1}{4}$ B) $-\frac{1}{2}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

16. $\int_0^{\frac{\pi}{3}} \sqrt{1-\cos 2x} \, dx = ?$

A) $-\frac{\sqrt{6}}{2}$ B) $\frac{\sqrt{2}}{2}$ C) 1 D) $\sqrt{2}$ E) $\sqrt{6}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	A	C	A	E	D	C	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	C	D	D	D	A	C	B

1. $\int_{4}^{9} \frac{1}{\sqrt{x}}\,dx = ?$

A) 6 B) 4 C) 2 D) 1 E) 0

2. $\int_{-4}^{3} x \cdot d(3x^2+5) = ?$

A) 182 B) 183 C) 128 D) −183 E) −182

3. $\int_{1}^{e} \frac{\ln x}{x}\,dx = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) $\frac{3}{2}$ E) 2

4. $\int_{e}^{e^3} \frac{\ln x}{x}\,dx = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

5. $\int_{e}^{e^4} \frac{dx}{x \cdot \ln x} = ?$

A) ln4 B) ln2 C) 0 D) 1 E) 2

6. $\int_{-1905}^{1905} (x^5+3x^3+3)\,dx = ?$

A) −11430 B) −10120 C) 0 D) 10120 E) 11430

7. $\int_{-3}^{3} (4x^3-3x)\,dx = ?$

A) −175 B) −162 C) 0 D) 162 E) 175

8. $f^{-1}(x) = \frac{x-1}{2} \Rightarrow \int_{-1}^{1} f(x)\,dx = ?$

A) 4 B) 3 C) 2 D) 1 E) 0

9. $\int f(x)dx = x^2 + 3x + C \Rightarrow \int_1^2 f(x)dx = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

10. $\int_a^b (2x+1)dx = b - a,\ a \neq b \Rightarrow a + b = ?$

A) −2 B) 0 C) 1 D) 2 E) 3

11. $\int_a^b (4x-7)dx = 45,\ b - a = 5 \Rightarrow a + b = ?$

A) 2 B) 4 C) 6 D) 8 E) 12

12. $\int_3^7 \frac{x}{2x+4}dx = ?$

A) $2 - \ln\left(\frac{5}{9}\right)$ B) $\ln\left(\frac{9}{5}\right)$ C) $4 + \ln\left(\frac{5}{9}\right)$ D) $4 - \ln\left(\frac{5}{9}\right)$ E) $2 + \ln\left(\frac{5}{9}\right)$

13. $\int_0^{k+1} x^2dx + \int_{k+1}^{k+3} x^2dx + \int_{k+3}^{k+7} x^2dx = ak^3 + bk^2 + ck + d$

$\Rightarrow a + b + c + d = ?$

A) $\frac{8}{3}$ B) $\frac{64}{3}$ C) $\frac{128}{3}$ D) $\frac{256}{3}$ E) $\frac{512}{3}$

14. $\int_1^e \frac{x-1}{x^2}dx = ?$

A) −1 B) $-\frac{1}{e}$ C) 0 D) $\frac{1}{e}$ E) 1

15. $\int_0^1 \frac{x^2}{x+1}dx = ?$

A) $-\frac{1}{2} + \ln 2$ B) $-1 + \ln 2$ C) $\ln 2$ D) $\ln 4$ E) $1 + 2\ln 2$

16. $\int_4^9 \frac{3x-3}{\sqrt{x+1}}dx = ?$

A) 13 B) 18 C) 23 D) 28 E) 33

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	A	B	B	A	E	C	C
9	10	11	12	13	14	15	16
D	B	D	E	E	D	A	C

1. $f(x)=\int_{\ln 2}^{\ln 4} e^{2t}dt \Rightarrow f'(x)=?$

A) ln2 B) e^{2x} C) 0 D) 2x E) 1

2. $f(x)=\int_{0}^{\ln x} e^{t}dt \Rightarrow f'(x)=?$

A) x B) e^{x} C) lnx D) 0 E) 1

3. $f(x)=\int_{x}^{x^3} (2t^2-3)dt \Rightarrow f'(1)=?$

A) −4 B) −3 C) −2 D) −1 E) 0

4. $f(x)=\int_{0}^{\sin x} e^{t}dt \Rightarrow f'\left(\frac{\pi}{2}\right)=?$

A) 0 B) e C) e − 1 D) e + 1 E) 1 − e

5. $f(x)=\int_{-1}^{\ln x} \sqrt{6+3t^2}\,dt \Rightarrow f'(e)=?$

A) 3e B) 2e C) $\frac{3}{e}$ D) $\frac{2}{e}$ E) $\frac{1}{e}$

6. $F(x)=\int_{0}^{x^2+1} 3t^2dt \Rightarrow F'(1)=?$

A) 6 B) 12 C) 18 D) 24 E) 32

7. $\int_{2}^{3} \sum_{n=1}^{x} (6n-5)dx = ?$

A) 12 B) 14 C) 18 D) 24 E) 28

8. $\int_{-1}^{1} |x|\,dx = ?$

A) 0 B) 1 C) $\frac{1}{2}$ D) 1 + log2 E) 2

9. $\int_{-1}^{2} |x|\,dx = ?$

A) 1 B) $\frac{3}{2}$ C) 0 D) $\frac{5}{2}$ E) 3

10. $\int_{-1}^{3} |x+2|\,dx = ?$

A) 4 B) 6 C) 8 D) 10 E) 12

11. $\int_{2}^{3} |2x-6|\,dx = ?$

A) -2 B) -1 C) 1 D) 2 E) 3

12. $\int_{-3}^{2} |x-1|\,dx = ?$

A) $\frac{15}{2}$ B) $-\frac{13}{2}$ C) $-\frac{17}{2}$ D) $\frac{17}{2}$ E) $\frac{13}{2}$

13. $\int_{-1}^{3} |x-2|\,dx = ?$

A) 3 B) 4 C) 5 D) 6 E) 8

14. $\int_{-1}^{4} |x-3|\,dx = ?$

A) $\frac{13}{2}$ B) $\frac{15}{2}$ C) $\frac{17}{2}$ D) $\frac{19}{2}$ E) $\frac{21}{2}$

15. $\int_{-1}^{2} |x^2+x|\,dx = ?$

A) $\frac{23}{6}$ B) $\frac{25}{6}$ C) $\frac{29}{6}$ D) $\frac{37}{6}$ E) $\frac{41}{6}$

16. $\int_{-1}^{2} |x|\cdot 3x\,dx = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	E	C	A	C	D	B	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	E	C	D	C	C	C	C

1. $f(x)=\begin{cases}3x^2+1, & x\geq 1\\ 2x-3, & x<1\end{cases} \Rightarrow \int_0^3 f(x)dx = ?$

A) 24 B) 26 C) 28 D) 30 E) 32

2. $f(x)=\begin{cases}3x^2+1, & x\geq 2\\ 2x+3, & x<2\end{cases} \Rightarrow \int_{-1}^4 f(x)dx = ?$

A) 48 B) 54 C) 58 D) 64 E) 70

3. $f(x)=\begin{cases}x+3, & 0\leq x<2\\ 3x+3, & 2\leq x<3\end{cases} \Rightarrow \int_0^3 f(x)dx = ?$

A) 24 B) 28 C) 30 D) $\frac{35}{2}$ E) $\frac{37}{2}$

4. $f:(-1,1)\to R,$

$f(x)=\begin{cases}x+1, & -1<x<0\\ x^2+2, & 0<x<1\end{cases} \Rightarrow \int_{-1}^1 f(x)dx = ?$

A) 13 B) 6 C) $\frac{11}{4}$ D) $\frac{13}{6}$ E) $\frac{17}{6}$

5. $f(x)=\begin{cases}x^{-1}, & x<e\\ x, & x\geq e\end{cases} \Rightarrow \int_1^3 f(x)dx = ?$

A) $\ln 3$ B) $\ln 3+\frac{9}{2}$ C) $\frac{1}{2}-e$ D) $\frac{11-e^2}{2}$ E) $\frac{e^2-3}{2}$

6. $f(x)=\begin{cases}3x^2+1, & x<2\\ 4x-4, & x\geq 2\end{cases} \Rightarrow \int_{-1}^4 f(x)dx = ?$

A) 7 B) 14 C) 21 D) 28 E) 35

7. $\int_0^{\frac{\pi}{6}} 2\tan 2x dx = ?$

A) $\ln 2$ B) $\ln 3$ C) $\ln 4$ D) $\ln 5$ E) $\ln 6$

8. $\int_0^{\pi} x\cdot\sin x\, dx = ?$

A) $-\pi$ B) -2 C) -1 D) 0 E) π

9. $\int_1^e \ln x\,dx = ?$

A) -2 B) -1 C) 1 D) 2 E) 3

10. $\int_1^e \ln^2 x \cdot dx = ?$

A) e B) $e-1$ C) $e-2$ D) e^2-1 E) e^2-2

11. $\int_1^{\ln 3} x \cdot e^x dx = ?$

A) $3\ln 3$ B) $-3\ln 3$ C) $-3+\ln 27$ D) -3 E) $\ln 27+3$

12. $\int_0^2 e^{x^2+\ln x} dx = ?$

A) e^2+1 B) e^2-2 C) e^4+1 D) $\frac{e^4-1}{2}$ E) $\frac{e^4+1}{2}$

13. $\int_0^1 (x+1)\cdot e^x dx = ?$

A) e B) $e-1$ C) $e-2$ D) $2e$ E) $3e$

14. $\int_0^3 e^x \cdot x^2 dx = ?$

A) $5e^3-2$ B) $3e^3$ C) $2e^3+1$ D) e^3+1 E) e^3-3

15. $\int_0^{\frac{\pi}{2}} e^{\sin x} \cdot \sin 2x dx = ?$

A) -3 B) -2 C) 0 D) 2 E) 3

16. $\int_{\frac{1}{2}}^{\frac{e}{2}} x \cdot \ln(2x) dx = ?$

A) e^2 B) e^2-1 C) e^2+1 D) $\frac{e^2+1}{4}$ E) $\frac{e^2+1}{16}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
B	E	E	E	D	D	A	E
9	10	11	12	13	14	15	16
C	C	C	D	A	A	D	E

1. $\int_1^e \frac{\ln(xe^x)}{x}dx = ?$

A) $e-\frac{1}{2}$ B) $e+\frac{1}{2}$ C) e D) $e-1$ E) $e+2$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2. $f(x)=\begin{cases} x^2, & x<2 \\ x, & x\geq 2 \end{cases}$

fonksiyonu veriliyor. Buna göre, $\int_{-1}^{3} f(2x)dx$ integralinin değeri kaçtır?

The function is given. Accordingly, what is the value of the integral $\int_{-1}^{3} f(2x)dx$?

A) $\frac{32}{3}$ B) $\frac{35}{6}$ C) $\frac{16}{3}$ D) $\frac{29}{6}$ E) 12

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

3. $\int_a^{2b} 2xdx = 3$ ve / and $\int_0^4 (2b+a)dx = 8 \rightarrow a = ?$

A) 0 B) $\frac{1}{4}$ C) $\frac{5}{8}$ D) $\frac{7}{8}$ E) $\frac{3}{2}$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2019]

4. $\int_0^{\pi} \sin^2 x dx = ?$

A) 1 B) π C) $\frac{\pi}{4}$ D) $\frac{\pi}{3}$ E) $\frac{\pi}{2}$

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2019]

5. $\int_{\frac{\pi^2}{4}}^{\pi^2} \frac{\cos(\sqrt{x})}{\sqrt{x}}dx = ?$

A) 2 B) –1 C) –2 D) 0 E) 1

[AKDENİZ ÜNİVERSİTESİ – YÖS 2019]

6. $\int_1^e \ln x dx = ?$

A) 1 B) e C) 3 D) 4 E) e^2

[YÜZÜNCÜ YIL ÜNİVERSİTESİ – YÖS 2019]

7. $\int_1^{e^2} \frac{3\ln^2 x}{x}dx = ?$

A) 6 B) 8 C) 2e D) 4e E) e

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

8. $\int_0^{\frac{\pi}{2}} e^{\sin x}\cdot\cos x dx = ?$

A) e B) e^2 C) $\frac{\pi}{2}-1$ D) $e+\frac{\pi}{2}$ E) $e-1$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2018]

9. $\int_1^2 e^{\ln x^2} dx = ?$

A) $\frac{1}{3}$ B) $\frac{4}{3}$ C) $\frac{2}{3}$ D) $\frac{7}{3}$ E) $\frac{3}{2}$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

10. $\int_1^e (x \cdot \ln x + x \cdot \ln^2 x) dx = ?$

A) 0 B) $\frac{e}{2}$ C) $\frac{e^2}{2}$ D) e^2 E) 1

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

11. $\int_2^4 \frac{x^2 + 2x}{x} dx = ?$

A) 10 B) 8 C) 6 D) 4 E) 2

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

12. $\int_{-1}^1 x(x^2+1)^2 dx = ?$

A) −2 B) 0 C) 2 D) 3 E) 5

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

13. $\int_{-4}^4 |x-3| dx = ?$

A) 0 B) $\frac{1}{2}$ C) 25 D) 28 E) 32

[ERCİYES ÜNİVERSİTESİ – YÖS 2017]

14. $x > 0$

$\int_2^{x^2} xf(x)dx = 2x^5 - x^4 + 2 \Rightarrow f(9) = ?$

A) 10 B) 13 C) 18 D) 27 E) 39

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2017]

15. $\int_{-2}^2 (x^3 + 3x^2 + 7x + 1) dx = ?$

A) 15 B) 18 C) 25 D) 20 E) 26

[ÇUKUROVA ÜNİVERSİTESİ – YÖS 2016]

16. $\int_0^{\log_5 3} 5^x dx = ?$

A) $\frac{1}{2e}$ B) $\frac{2}{e^2}$ C) $\frac{1}{\ln 3}$ D) $\frac{5}{\ln 3}$ E) $\frac{2}{\ln 5}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2014]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	A	B	E	C	A	B	E
9	10	11	12	13	14	15	16
D	C	A	B	C	B	D	E

BÖLÜM CHAPTER 17

TARİHSEL NOT / HISTORICAL NOTE

GEORG FRİEDRİCH BERNHARD RİEMANN [1826 - 1866]

Alman matematikçi. Analiz, Sayı Teorisi ve Diferansiyel Geometriye katkıda bulunan, Gerçek Analiz alanında, integrallerin ilk titiz formülasyonu, Riemann integrali ve Fourier serileri üzerine çalışmaları bilinir. Riemann hipotezinin orijinal ifadesini içeren asal sayma işleviyle ilgili ünlü 1859 tarihli makalesi, Analitik Sayı Teorisindeki en etkili makalelerden biri olarak kabul edilmektedir. Geometriye öncülük eden katkılarıyla Riemann, genel göreliliğin matematiğinin temellerini attı.

German mathematician. He is known for his works in the fields of real analysis, which contributes to analysis, number theory and differential geometry, the first rigorous formulation of integrals, Riemann integral and Fourier series are. His famous 1859 paper on prime counting, which includes the original expression of the Riemann hypothesis, is considered one of the most effective papers in analytic number theory. With his contributions leading to geometry, Riemann laid the foundations of mathematics of general relativity.

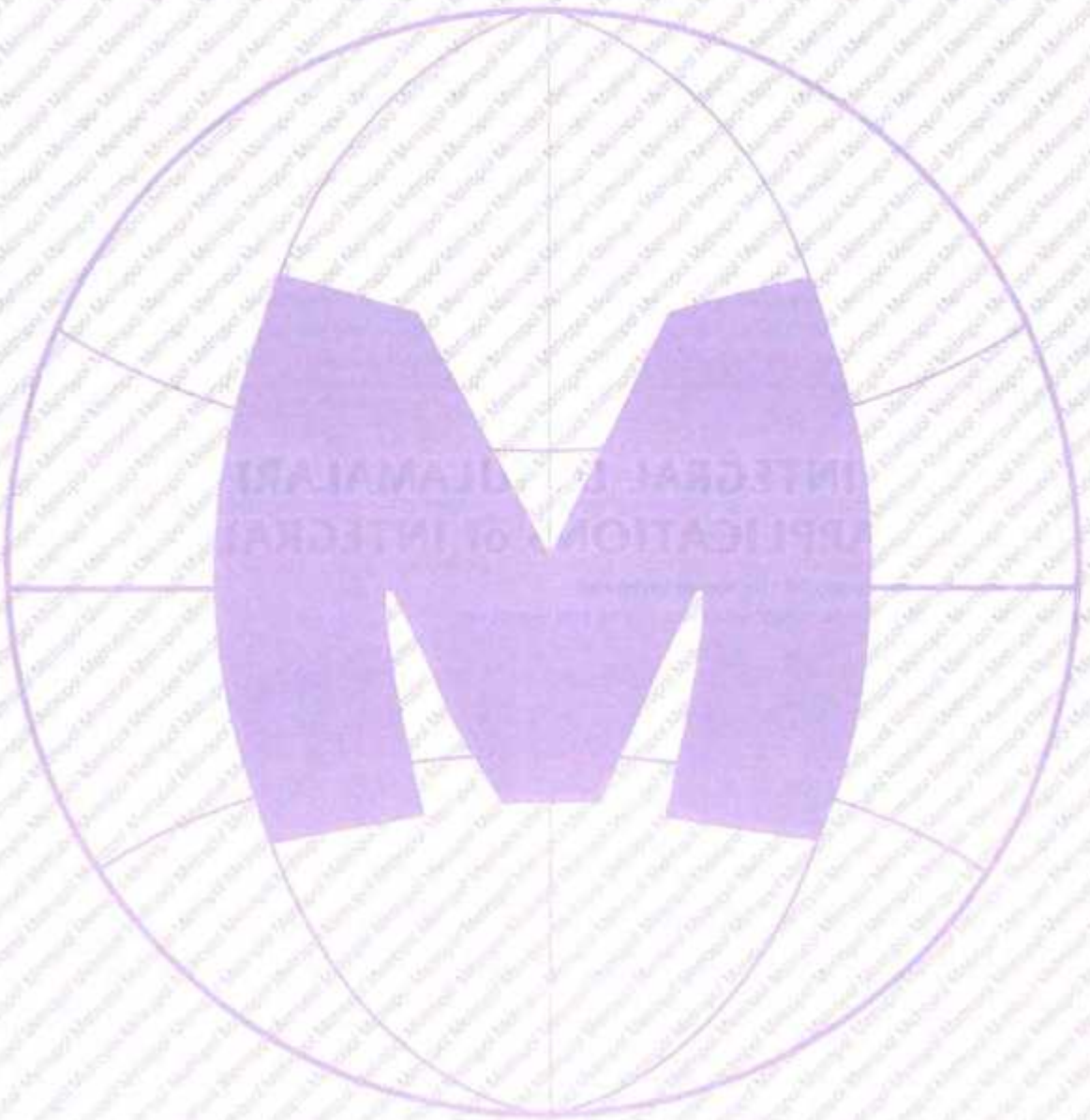
İNTEGRAL UYGULAMALARI
APPLICATIONS of INTEGRAL

Bu bölüm 26 alıştırma sorusu, 70 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 26 exercise questions, 70 test questions, and 16 YÖS questions.

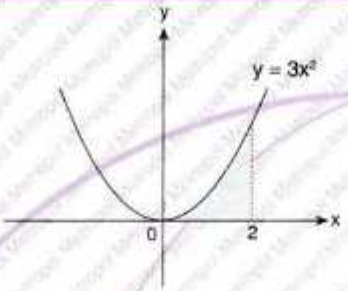
BÖLÜM / CHAPTER 17

İNTEGRAL UYGULAMALARI / APPLICATIONS of INTEGRAL



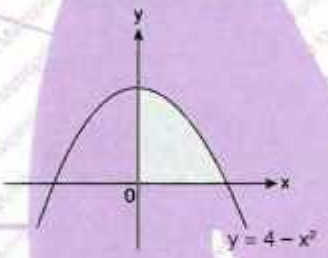
İNTEGRAL UYGULAMALARI
APPLICATIONS of INTEGRAL

1. TA / SA = ? br^2 / u^2



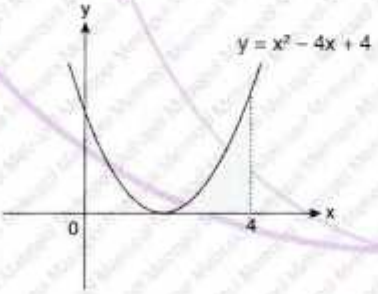
Yanıt / The Answer is 8

2. TA / SA = ? br^2 / u^2



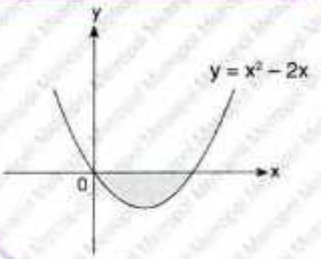
Yanıt / The Answer is $\frac{16}{3}$

3. TA / SA = ? br^2 / u^2



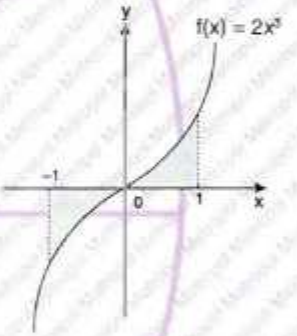
Yanıt / The Answer is $\frac{8}{3}$

4. TA / SA = ? br^2 / u^2



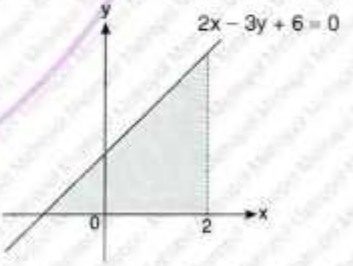
Yanıt / The Answer is $\frac{4}{3}$

5. TA / SA = ? br^2 / u^2



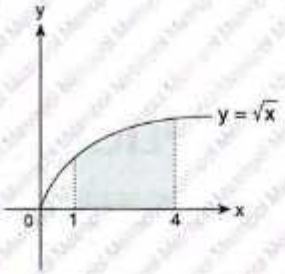
Yanıt / The Answer is 1

6. TA / SA = ? br^2 / u^2



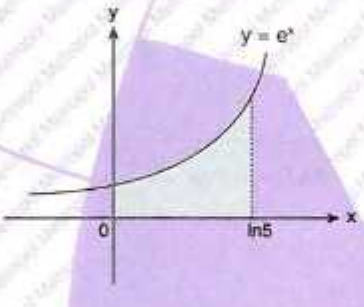
Yanıt / The Answer is $\frac{25}{3}$

7. TA / SA = ? br^2 / u^2



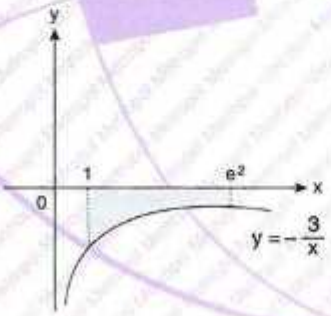
Yanıt / The Answer is $\frac{14}{3}$

8. TA / SA = ? br^2 / u^2



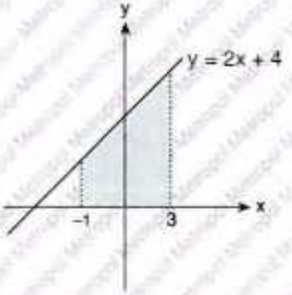
Yanıt / The Answer is 4

9. TA / SA = ? br^2 / u^2



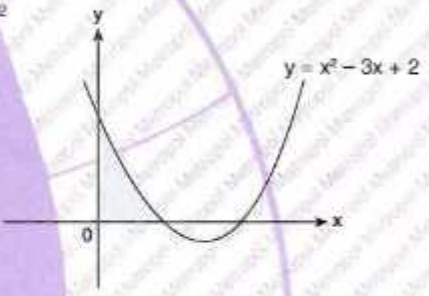
Yanıt / The Answer is 6

10. TA / SA = ? br^2 / u^2



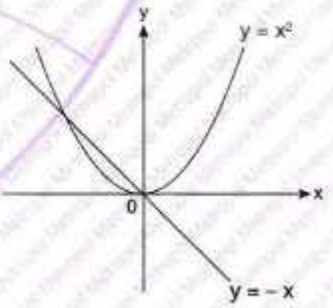
Yanıt / The Answer is 24

11. TA / SA = ? br^2 / u^2



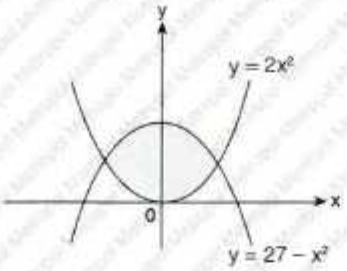
Yanıt / The Answer is $\frac{5}{6}$

12. TA / SA = ? br^2 / u^2



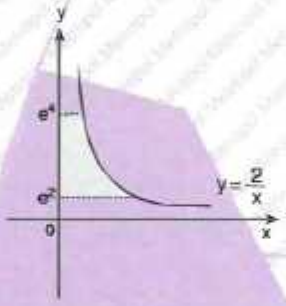
Yanıt / The Answer is $\frac{1}{6}$

13. TA / SA = ? br^2 / u^2



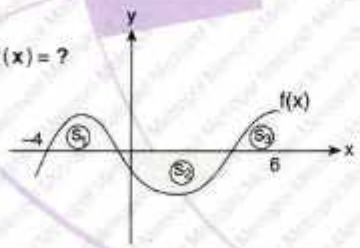
Yanıt / The Answer is **108**

14. TA / SA = ? br^2 / u^2



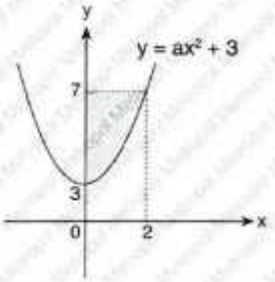
Yanıt / The Answer is **4**

15. $S_1 = 7\,br^2/u^2$, $S_2 = 13\,br^2/u^2$, $S_3 = 8\,br^2/u^2$ $\Rightarrow \int_{-4}^{6} f(x) = ?$



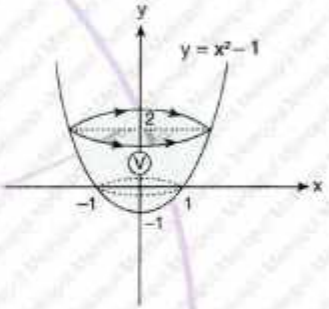
Yanıt / The Answer is **2**

16. TA / SA = ? br^2 / u^2



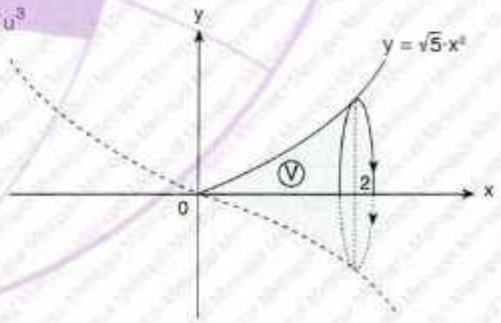
Yanıt / The Answer is $\frac{16}{3}$

17. V = ? br^3 / u^3



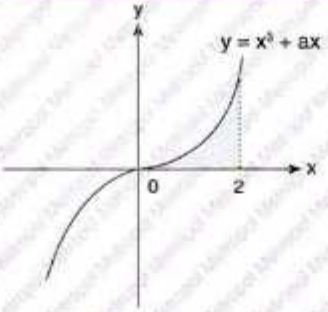
Yanıt / The Answer is $\frac{9\pi}{2}$

18. V = ? br^3 / u^3



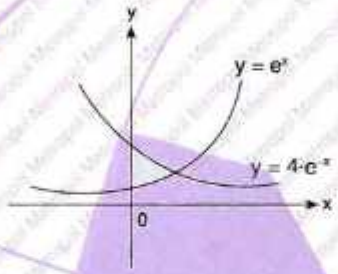
Yanıt / The Answer is 32π

19. TA / SA = 8 br^2 / u^2
→ a = ?



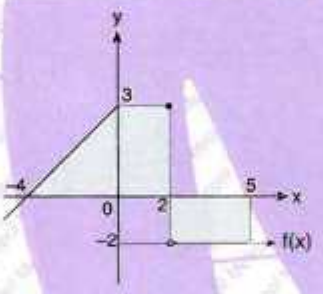
Yanıt / The Answer is 2

20. TA / SA = ? br^2 / u^2



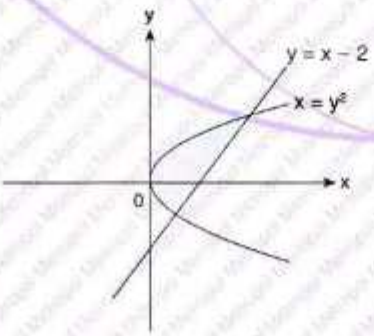
Yanıt / The Answer is 1

21. $\int_{-4}^{5} f(x)dx = ?$



Yanıt / The Answer is 6

22. TA / SA = ? br^2 / u^2



Yanıt / The Answer is $\frac{9}{2}$

23. $\int_{-2}^{2} \sqrt{4-x^2}\,dx = ?$

Yanıt / The Answer is 2π

24. $\int_{0}^{4} \sqrt{16-x^2}\,dx = ?$

Yanıt / The Answer is 4π

25. $\int_{0}^{3} \left(\sqrt{9-x^2}+x-3\right)dx = ?$

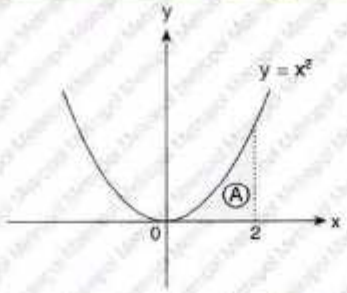
Yanıt / The Answer is $\frac{9\pi}{4}-\frac{9}{2}$

26. $\int_{0}^{\sqrt{2}} \left(\sqrt{4-x^2}-x\right)dx = ?$

Yanıt / The Answer is $\frac{\pi}{2}$

1. **Alan (A) =?**

Area (A) =?



A) $\frac{2}{3}$

B) $\frac{4}{3}$

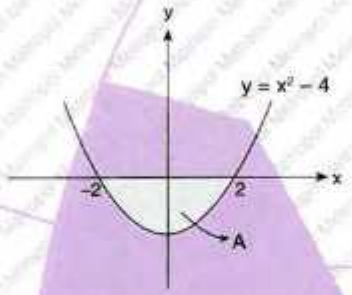
C) 2

D) $\frac{8}{3}$

E) $\frac{10}{3}$

2. **Alan (A) =?**

Area (A) =?



A) $\frac{8}{3}$

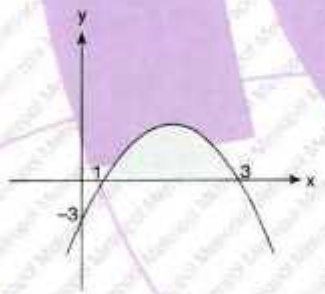
B) 4

C) $\frac{16}{3}$

D) 8

E) $\frac{32}{3}$

3. **TA / SA = ? br² / u²**



A) $\frac{1}{3}$

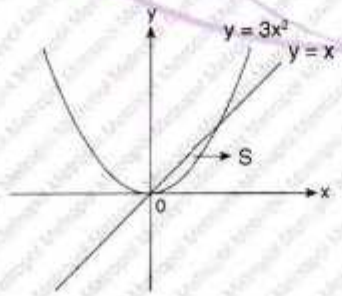
B) $\frac{2}{3}$

C) $\frac{4}{3}$

D) $\frac{5}{3}$

E) $\frac{7}{3}$

4. **S = ? br² / u²**



A) $\frac{1}{3}$

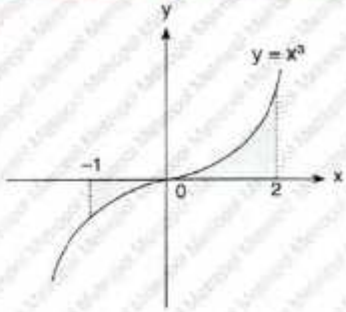
B) $\frac{1}{9}$

C) $\frac{1}{18}$

D) $\frac{1}{54}$

E) $\frac{1}{63}$

5. **TA / SA = ? br² / u²**



A) 2

B) $\frac{13}{4}$

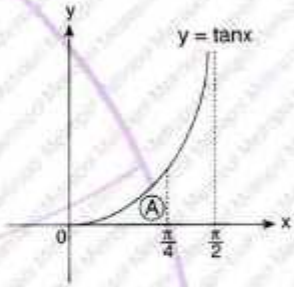
C) $\frac{15}{4}$

D) $\frac{17}{4}$

E) 5

6. **Alan(A) =?**

Area (A) =?



A) ln2

B) ln8

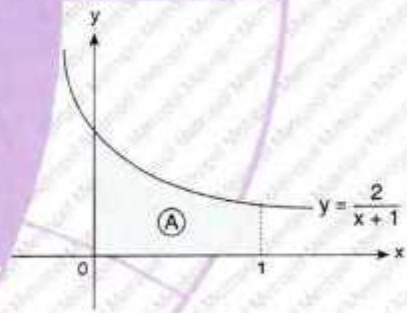
C) ln4

D) $\ln\sqrt{2}$

E) $\ln 2\sqrt{2}$

7. **Alan (A) =?**

Area (A) =?



A) ln2

B) ln4

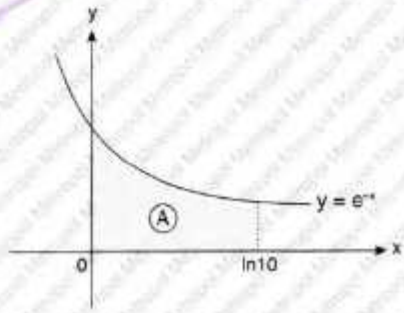
C) ln8

D) 2 − ln2

E) 4 − ln2

8. **Alan (A) =?**

Area (A) =?



A) 3

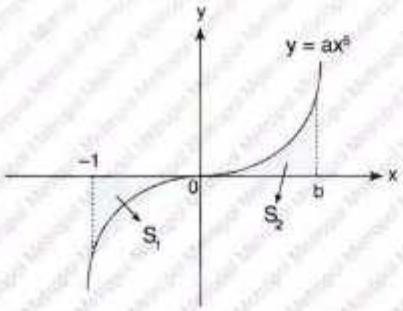
B) $\frac{5}{6}$

C) $\frac{7}{10}$

D) $\frac{9}{10}$

E) 11

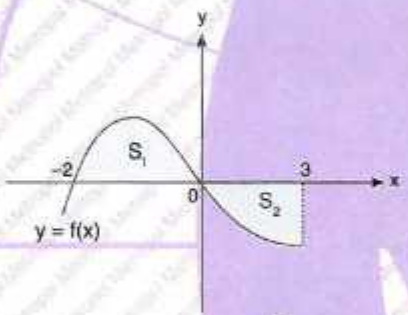
9.



$S_2 = 27 \cdot S_1 \Rightarrow$ **b = ?**

A) 3 B) $\sqrt[4]{3}$ C) $\sqrt[5]{27}$ D) $\sqrt{3}$ E) $\sqrt[3]{9}$

10.



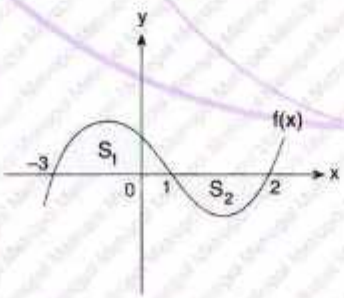
$S_1 = 6\ br^2/u^2$, $S_2 = 4\ br^2/u^2 \Rightarrow \int_{-2}^{3} f(x)dx = ?$

A) −2 B) 2 C) 4 D) 6 E) 10

11. $S_1 = 25\ br^2/u^2$,

$S_2 = 4\ br^2/u^2$

$\Rightarrow \int_{-3}^{2} f(x)dx = ?$



A) 14 B) 16 C) 21 D) 30 E) 36

12. Alan (A) =?

Area (A) =?

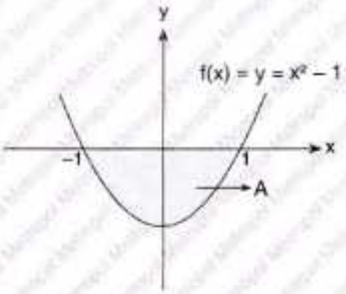
A) $\frac{2}{3}$

B) 1

C) $\frac{4}{3}$

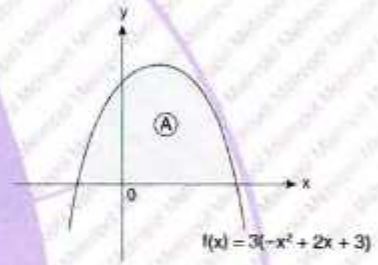
D) $\frac{5}{3}$

E) 2



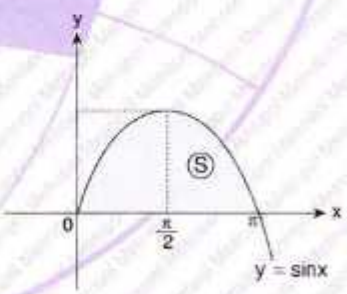
13. Alan (A) =?

Area (A) =?



A) 8 B) 16 C) 20 D) 30 E) 32

14.



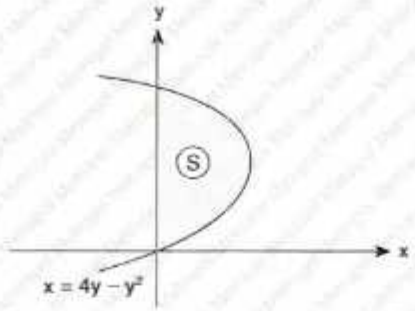
$\Rightarrow$ **S = ? br²/u²**

A) 4 B) 2 C) 1 D) 6 E) 8

YANITLAR / ANSWERS

1	2	3	4	5	6	7
D	E	C	C	D	D	B
8	**9**	**10**	**11**	**12**	**13**	**14**
D	D	B	C	C	E	B

1. **S = ? br² / u²**



A) $\frac{11}{3}$

B) 4

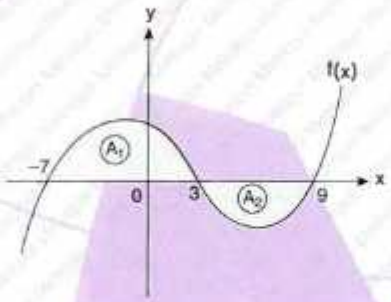
C) $\frac{22}{3}$

D) $\frac{32}{3}$

E) $\frac{64}{3}$

2. $A_1 = 15$ br² / u², $A_2 = 6$ br² / u²

$\Rightarrow \int_{-7}^{9} f(x)dx = ?$



A) 6

B) 9

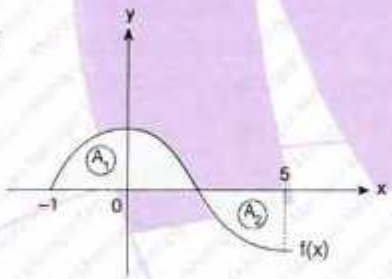
C) 12

D) 18

E) 21

3. $\int_{-1}^{5} f(x)dx = -6$, $A_1 = 4$

$\Rightarrow$ **A_2 = ?**



A) 2

B) 4

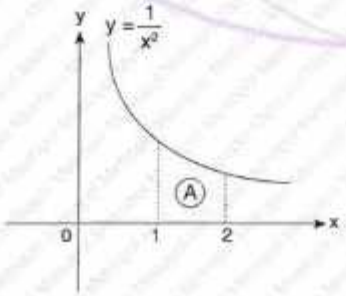
C) 6

D) 8

E) 10

4. **Alan (A) = ?**

Area (A) = ?



A) $\frac{1}{4}$

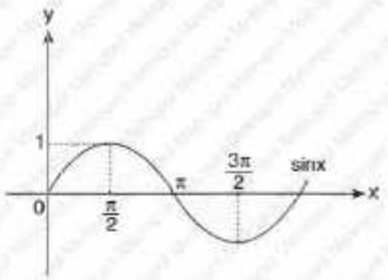
B) $\frac{1}{3}$

C) $\frac{1}{2}$

D) $\frac{2}{3}$

E) 1

5. **TA / SA = ?**



A) 1

B) $\frac{3}{2}$

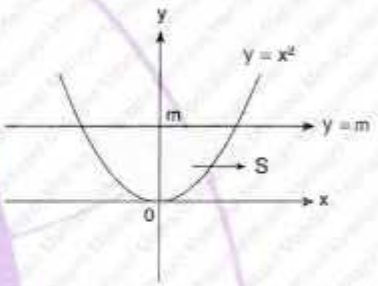
C) 2

D) $\frac{5}{2}$

E) 3

6. $S = \frac{4}{3}$ br² / u²

$\Rightarrow$ **m = ?**



A) 1

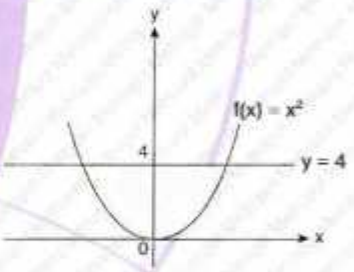
B) $\frac{3}{2}$

C) 2

D) $\frac{5}{2}$

E) 3

7. **TA / SA = ? cm²**



A) 16

B) $\frac{16}{3}$

C) 32

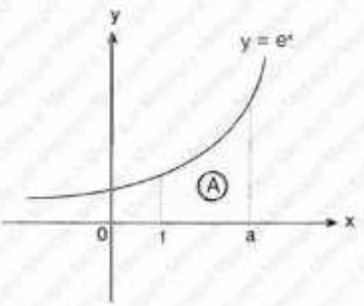
D) $\frac{32}{3}$

E) $\frac{17}{2}$

8. Alan (A) = $e^3 - e$ br²

Area (A) = $e^3 - e$ u²

$\Rightarrow$ **a = ?**



A) $\frac{3}{2}$

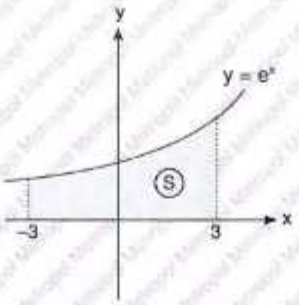
B) 2

C) 3

D) 4

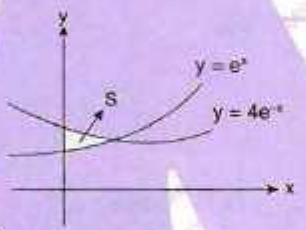
E) $\frac{9}{2}$

9. $S = ?\ br^2 / u^2$



A) $e^3 - e^{-3}$ B) $e^3 + e^{-3}$ C) $e^2 - e^{-2}$ D) $e^2 + e^{-2}$ E) $e^2 - e^{-3}$

10. $S = ?\ br^2 / u^2$

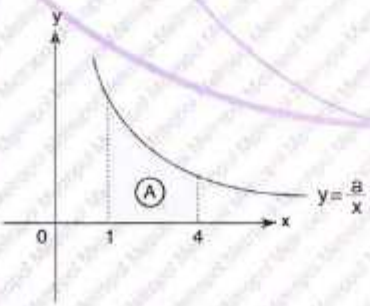


A) $\frac{e}{2}$ B) $\frac{e}{3}$ C) $\frac{1}{2}$ D) 2 E) 1

11. Alan (A) $= 2\,br^2$

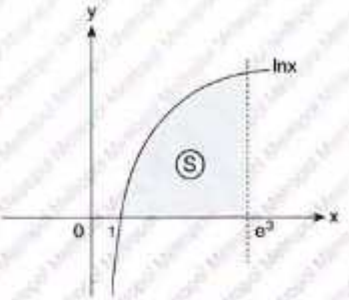
Area (A) $= 2u^2$

$\Rightarrow$ **a = ?**



A) $\frac{1}{\ln 2}$ B) $\frac{1}{\ln 4}$ C) ln2 D) ln4 E) $\ln^2 2$

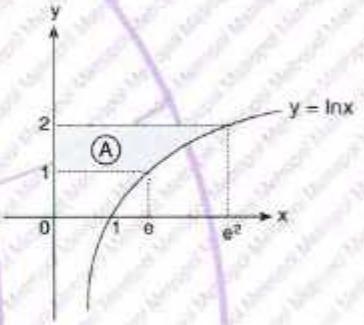
12. $S = ?\ br^2 / u^2$



A) e^3 B) $2e^3$ C) $2e^3 - 1$ D) $2e^3 + 1$ E) $4e^3$

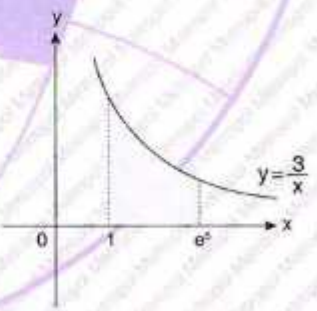
13. **Alan (A) = ?**

Area (A) = ?



A) e – 1 B) e – 2 C) e D) e(e – 1) E) $e^2(e - 1)$

14.



$\Rightarrow$ **TA / SA = ? cm²**

A) 10 B) 15 C) 20 D) 25 E) 30

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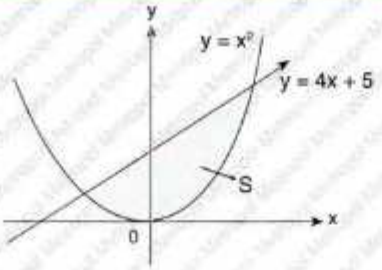
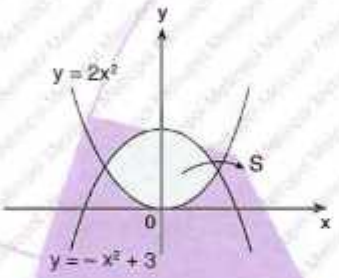
1	2	3	4	5	6	7
D	B	E	C	E	A	D
8	**9**	**10**	**11**	**12**	**13**	**14**
C	A	E	A	D	D	B

1. S = ? br^2/u^2



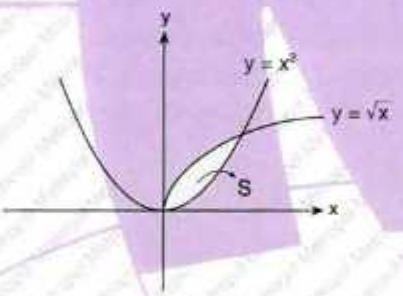
A) 6
B) 12
C) 18
D) 24
E) 36

2. S = ? br^2/u^2



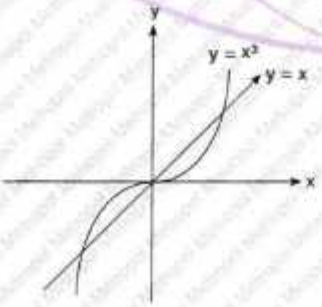
A) 3
B) 4
C) 5
D) 6
E) 8

3. S = ? br^2/u^2



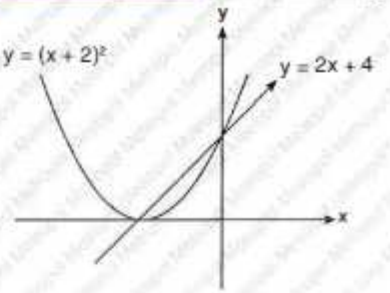
A) $\frac{1}{3}$
B) $\frac{2}{3}$
C) $\frac{3}{4}$
D) $\frac{4}{3}$
E) $\frac{5}{2}$

4. TA / SA = ? br^2/u^2



A) $\frac{1}{4}$
B) $\frac{1}{3}$
C) $\frac{1}{2}$
D) $\frac{2}{3}$
E) 1

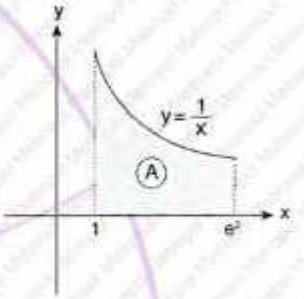
5. TA / SA = ? br^2/u^2



A) $\frac{4}{3}$
B) $\frac{5}{3}$
C) $\frac{10}{3}$
D) $\frac{20}{3}$
E) $\frac{40}{3}$

6. $y = \frac{1}{x}$, $x = 1$

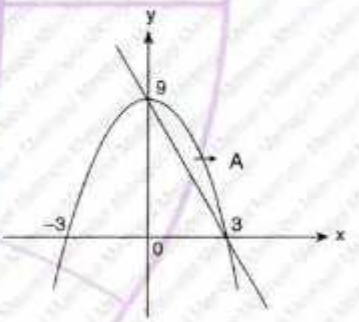
$x = e^2 \Rightarrow$ **A = ?**



A) 1
B) 2
C) 3
D) e^2
E) e^4

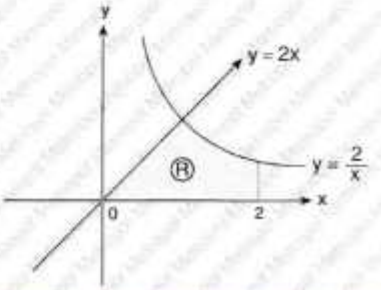
7. Alan(A) =? br^2

Area (A) =? u^2



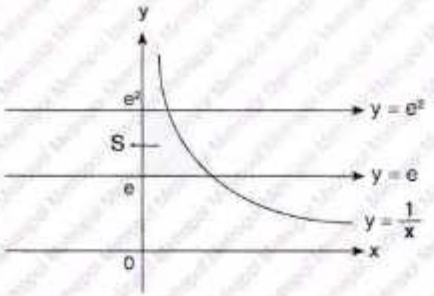
A) $\frac{5}{2}$
B) $\frac{8}{3}$
C) 3
D) $\frac{7}{2}$
E) $\frac{9}{2}$

8. R = ? br^2/u^2



A) 1 + ln2
B) 1 + ln4
C) 2 + ln2
D) 2 + ln4
E) 4 + ln4

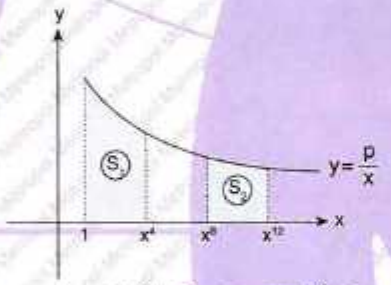
9.



$\Rightarrow$ **S = ? br^2/u^2**

A) $\frac{1}{2}$ B) 1 C) 2 D) ln2 E) ln4

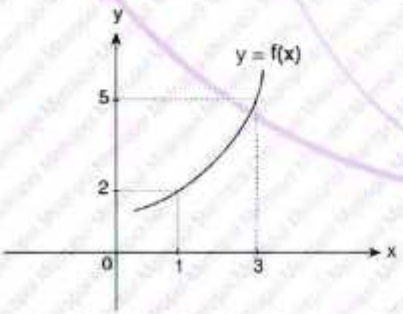
10.



$S_1 = 6\ br^2/u^2 \Rightarrow$ **S_2 = ? br^2/u^2**

A) 3 B) 6 C) 9 D) 12 E) 15

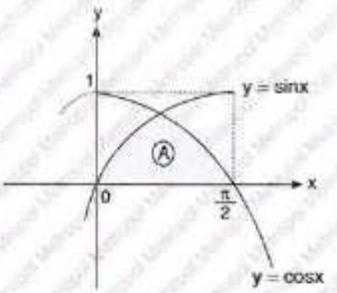
11.



$\Rightarrow \int_1^3 f(x)dx + \int_2^5 f^{-1}(x)dx = ?$

A) 11 B) 12 C) 13 D) 14 E) 15

12. **A = ? br^2/u^2**



A) $2 - \sqrt{2}$ B) $4 - \sqrt{2}$ C) $2 + \sqrt{2}$ D) $4 + \sqrt{2}$ E) $2\sqrt{2}$

13. $\int_0^2 \sqrt{4 - x^2}\,dx = ?$

A) $\frac{\pi}{3}$ B) $\frac{\pi}{2}$ C) $\frac{2\pi}{3}$ D) π E) $\frac{3\pi}{2}$

14. $\int_{-3}^3 \sqrt{9 - x^2}\,dx = ?$

A) 3π B) $\frac{7\pi}{2}$ C) 4π D) $\frac{9\pi}{2}$ E) 5π

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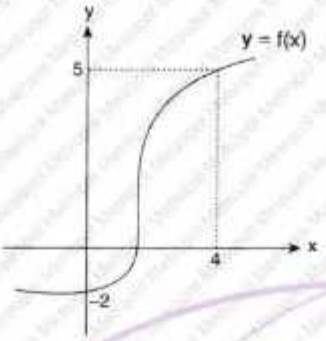
1	2	3	4	5	6	7
E	B	A	C	A	B	E
8	**9**	**10**	**11**	**12**	**13**	**14**
B	B	B	C	A	D	D

1. $\int_0^4 f(x)\cdot f'(x)dx = ?$



A) $\frac{7}{2}$

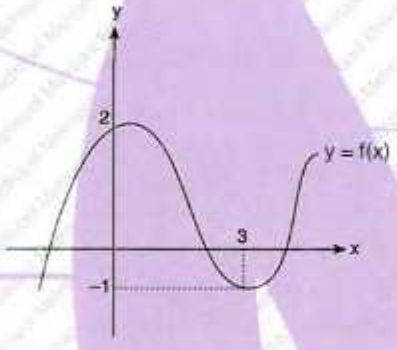
B) 7

C) $\frac{21}{2}$

D) 14

E) $\frac{35}{2}$

2. $\int_0^3 f(x)\cdot d(f(x)) = ?$



A) $-\frac{1}{2}$

B) -1

C) $-\frac{3}{2}$

D) -2

E) $-\frac{5}{2}$

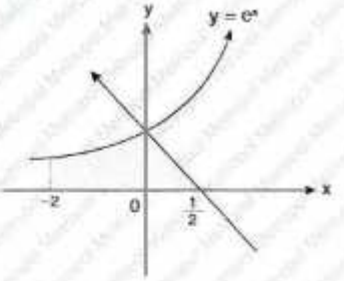
3. $\int_0^2 (\sqrt{4-x^2}+x-2)dx = ?$

A) π B) $\pi - 1$ C) $\pi - 2$ D) $2\pi - 1$ E) $2\pi - 2$

4. $\int_{-2\sqrt{2}}^0 (\sqrt{16-x^2}-x)dx = ?$

A) 2π B) $-\frac{\pi}{8}$ C) $\frac{\pi}{16}$ D) $\frac{\pi}{8}$ E) -2π

5. TA / SA = ? br^2 / u^2



A) $\frac{1}{4}+\frac{1}{e^2}$

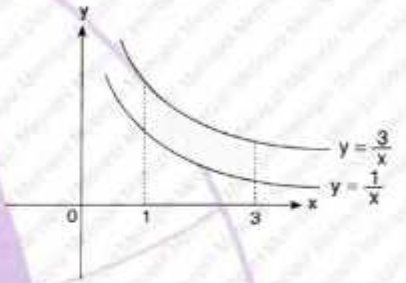
B) $\frac{3}{4}-\frac{1}{e^2}$

C) $1+\frac{1}{e^2}$

D) $\frac{3}{4}+\frac{1}{e^2}$

E) $\frac{5}{4}-\frac{1}{e^2}$

6. TA / SA = ? br^2 / u^2



A) ln3

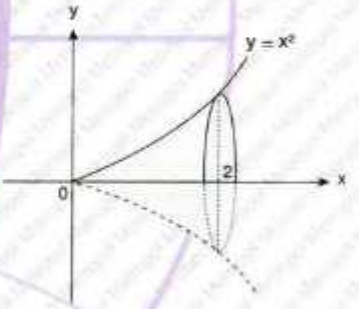
B) ln4

C) ln6

D) ln8

E) ln9

7. V = ? $\pi\, br^3 / u^3$



A) $\frac{32}{5}$

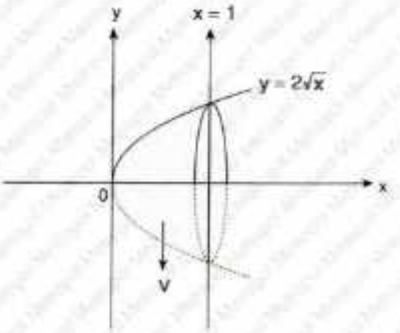
B) 6

C) $\frac{27}{5}$

D) $\frac{26}{5}$

E) 5

8. V = ? br^3 / u^3



A) 2π

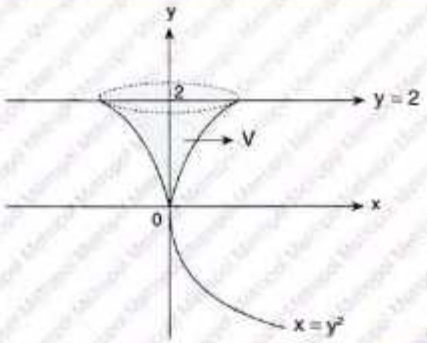
B) 3π

C) 4π

D) 6π

E) 8π

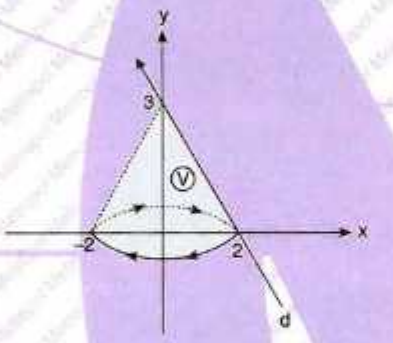
9.



→ **V = ? br³ / u³**

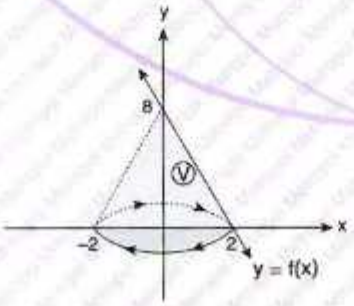
A) $\frac{22\pi}{5}$ B) 2π C) $\frac{28\pi}{5}$ D) 6π E) $\frac{32\pi}{5}$

10. **V = ? br³ / u³**



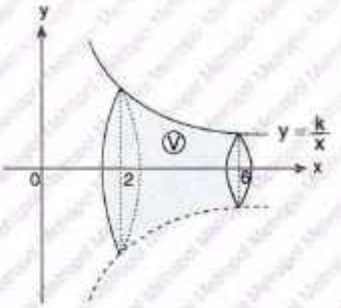
A) π B) 2π C) 3π D) 4π E) 6π

11. **V = ? br³ / u³**



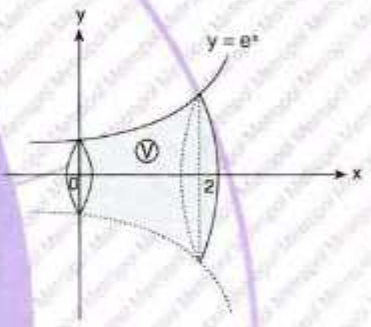
A) $\frac{16\pi}{3}$ B) 6π C) $\frac{32\pi}{3}$ D) $\frac{64\pi}{3}$ E) 24π

12. $V = 4\pi \Rightarrow$ **k = ?**



A) 1 B) $\sqrt{2}$ C) $\sqrt{3}$ D) 3 E) $2\sqrt{3}$

13. **V = ? br³ / u³**



A) $\frac{\pi}{4}(e^4 - 1)$ B) $\frac{\pi}{4}(e^4 + 1)$ C) $\frac{\pi}{2}(e^4 - 1)$ D) $\frac{\pi}{2}(e^4 + 1)$ E) $\frac{\pi}{2}(e^2 - 1)$

14. **V = ? br³ / u³**

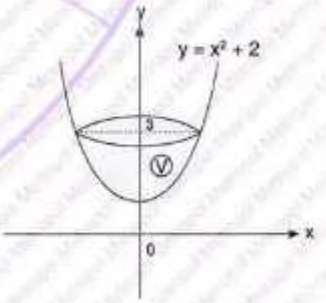
A) $\frac{\pi}{4}$

B) $\frac{\pi}{3}$

C) $\frac{\pi}{2}$

D) π

E) $\frac{3\pi}{2}$



YANITLAR / ANSWERS

1	2	3	4	5	6	7
C	C	C	E	E	E	A
8	**9**	**10**	**11**	**12**	**13**	**14**
A	E	D	C	E	C	C

1. $\int_0^1 x \cdot e^{(x^2)}dx = ?$

A) $\frac{e-2}{2}$ B) $\frac{e-1}{2}$ C) $\frac{e-3}{2}$ D) $\frac{e}{2}$ E) e

2. $F'(x) = f(x)$

$F(2) = 5$ ve / and $F(1) = 2$

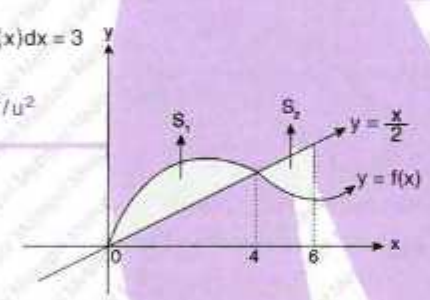
$\Rightarrow \int_1^2 F(x)f(x)dx = ?$

A) $\frac{7}{2}$ B) $\frac{21}{2}$ C) 21 D) 28 E) 29

3. $\int_0^4 f(x)dx = 8$, $\int_4^6 f(x)dx = 3$

$\Rightarrow S_1 + S_2 = ?\ br^2/u^2$

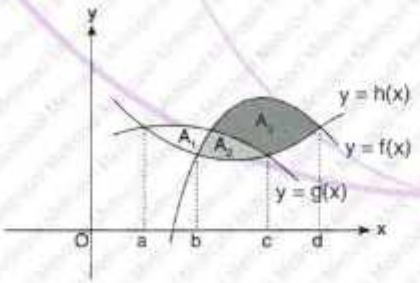
A) 3
B) 4
C) 5
D) 6
E) 8



4. $A_1 = 1\ br^2/u^2$

$A_2 = 3\ br^2/u^2$

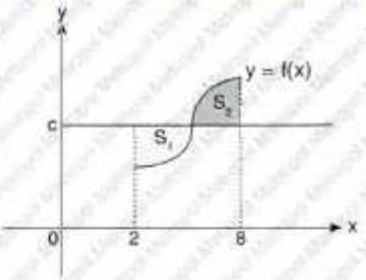
$A_3 = 9\ br^2/u^2$



$\Rightarrow \int_a^c (h(x) - g(x))dx + \int_b^d (f(x) - h(x))dx = ?$

A) 5 B) 8 C) 12 D) 13 E) 17

5. $c \in R^+$,



$S_2 = S_1 + 2$

$\int_1^4 f(2x)dx = 28 \Rightarrow c = ?$

A) 8 B) 9 C) 10 D) 11 E) 12

6. $f(x) = \begin{cases} 3-x, & x < 2 \\ 2x-3, & x \geq 2 \end{cases}$

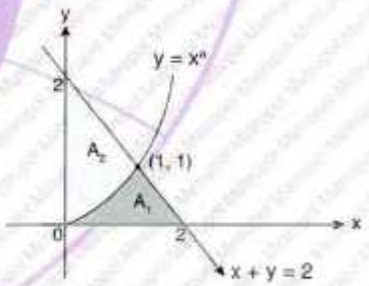
$\Rightarrow \int_1^3 f(x+1)dx = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

7. $A_2 = 2 \cdot A_1$

$\Rightarrow a = ?$

A) 2
B) 3
C) 4
D) 5
E) 6



8. $\int_0^{\pi} \sin 5x \cdot \cos 4x dx - \int_0^{\pi} \sin 4x \cdot \cos 5x dx = ?$

A) 0 B) 1 C) 2 D) −1 E) π

9. $\int_{-1}^{1} x^3 \cdot \cos x dx = ?$

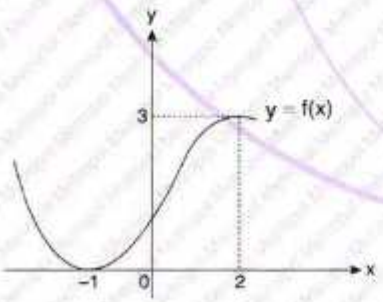
A) 0 B) 1 C) 2 D) 3 E) 4

10. $\int_a^b dx - \int_b^a x dx = 12,\ a + b = -8$

$\Rightarrow \int_a^b (3x^2 + 2x) dx = ?$

A) −178 B) −176 C) 0 D) 178 E) 176

11.



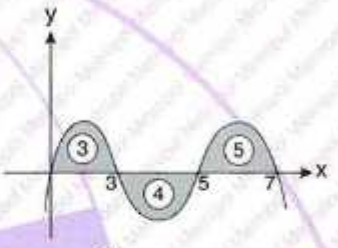
$\Rightarrow \int_{-1}^{2} f(x) \cdot f'(x) dx = ?$

A) $\frac{7}{2}$ B) 4 C) $\frac{9}{2}$ D) 5 E) $\frac{10}{3}$

12. $f(x) = \int_{x^2-1}^{\cos^2 x} \frac{x+1}{x+2} dx \Rightarrow f'(0) = ?$

A) $\frac{\pi}{\pi - 4}$ B) $\frac{\pi^3}{\pi - 2}$ C) $\frac{\pi^2}{\pi^2 - 4}$ D) $\frac{\pi^3}{\pi^2 - 8}$ E) 0

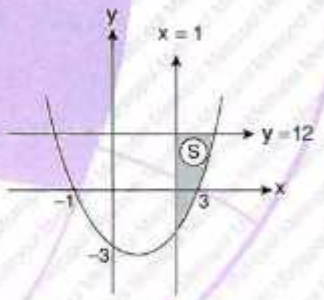
13.



$\Rightarrow \int_0^5 |f(x)| dx + \int_3^7 f(x) dx = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

14.



$\Rightarrow S = ?\ br^2 / u^2$

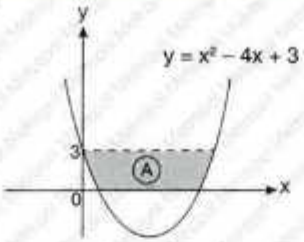
A) $\frac{128}{3}$ B) $\frac{130}{3}$ C) $\frac{132}{5}$ D) $\frac{134}{3}$ E) $\frac{136}{3}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7
B	B	D	B	B	C	D
8	**9**	**10**	**11**	**12**	**13**	**14**
C	A	B	C	E	D	A

1. **Alan(A) = ?**

Area(A) = ?

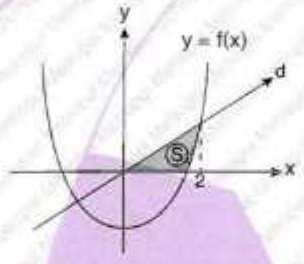


A) $\frac{128}{5}$ B) $\frac{77}{6}$ C) $\frac{64}{7}$ D) $\frac{53}{4}$ E) $\frac{28}{3}$

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2019]

2. $f(x) = x^2 - 1$

$\Rightarrow$ **S = ? br² / u²**

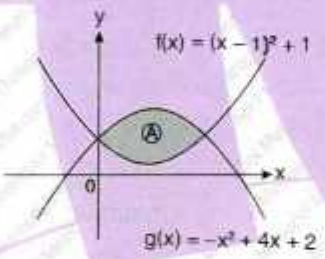


A) $\frac{11}{3}$ B) $\frac{7}{3}$ C) $\frac{5}{3}$ D) $\frac{4}{3}$ E) $\frac{10}{3}$

[ANKARA ÜNİVERSİTESİ – YÖS 2018]

3. **Alan(A) = ?**

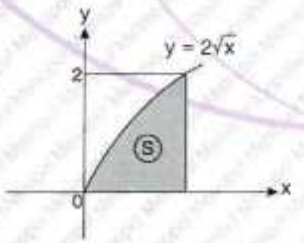
Area(A) = ?



A) 5 B) 6 C) 7 D) 8 E) 9

[İSTANBUL ÜNİVERSİTESİ – YÖS 2018]

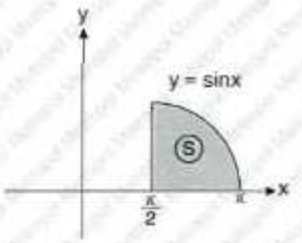
4. **S = ? br² / u²**



A) 1 B) $\frac{2}{3}$ C) $\frac{5}{3}$ D) $\frac{3}{2}$ E) $\frac{4}{3}$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

5. **S = ? br² / u²**



A) $\frac{1}{2}$ B) 1 C) $\frac{4}{3}$ D) 2 E) $\frac{5}{3}$

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

6. **S = ?**

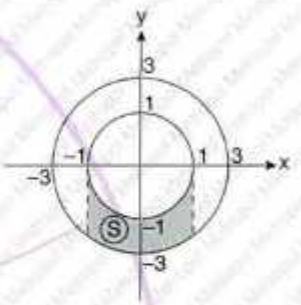
A) $S = \int_{-1}^{1} (\sqrt{9-x^2} - \sqrt{1-x^2})dx$

B) $S = \int_{-1}^{1} (\sqrt{9-x^2} + \sqrt{1-x^2})dx$

C) $S = \int_{-1}^{1} (\sqrt{1-x^2} - \sqrt{9-x^2})dx$

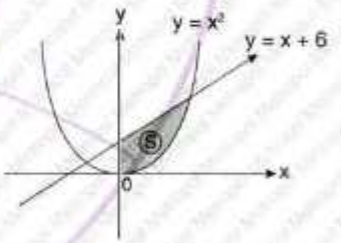
D) $S = \int_{-1}^{1} (\sqrt{1-x^2} + \sqrt{9-x^2})dx$

E) $S = \int_{-1}^{1} (\sqrt{1-x^2} - \sqrt{3-x^2})dx$



[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2018]

7. **S = ? br² / u²**



A) 3 B) $\frac{9}{2}$ C) 9 D) $\frac{27}{2}$ E) 27

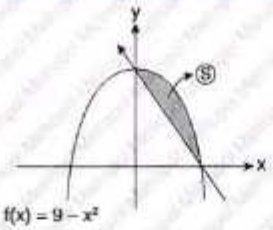
[İNÖNÜ ÜNİVERSİTESİ – YÖS 2018]

8. $\int_{0}^{6} \sqrt{36 - x^2}\,dx = ?$

A) 4π B) 5π C) 6π D) 9π E) 18π

[KARABÜK ÜNİVERSİTESİ – YÖS 2017]

9. **S = ?**



A) $\frac{19}{3}$ B) 6 C) $\frac{15}{4}$ D) $\frac{9}{2}$ E) 4

[ANADOLU ÜNİVERSİTESİ – YÖS 2017]

10. **$y = 6x^2 - 24$ eğrisi ile x ekseni arasında kalan alan kaç birim-karedir?**

How many unit squares is the area of the region bounded by the curve $y = 6x^2 - 24$ and x-axis?

A) 12 B) 20 C) 64 D) 60 E) 30

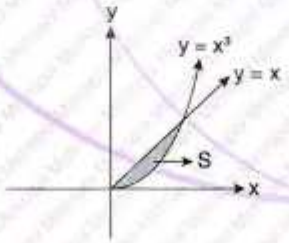
[ÇUKUROVA ÜNİVERSİTESİ – YÖS 2016]

11. $\int_0^{\sqrt{2}} \left(\sqrt{4-x^2} - x\right)dx = ?$

A) 2 B) π C) $\frac{2\pi}{3}$ D) $\frac{\pi}{2}$ E) 1

[KARADENİZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

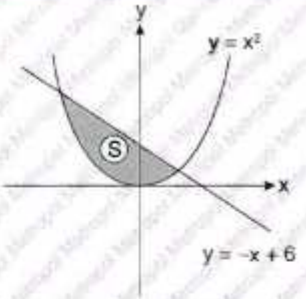
12. **S = ? br^2 / u^2**



A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) $\frac{3}{2}$ E) 2

[AKDENİZ ÜNİVERSİTESİ – YÖS 2013]

13. **S = ?**



A) $\frac{80}{7}$ B) $\frac{100}{7}$ C) $\frac{120}{7}$ D) $\frac{123}{6}$ E) $\frac{125}{6}$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2013]

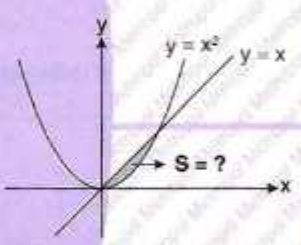
14. $f(x) = \sqrt{\frac{3x^2}{(x^3+1)^5}}$, $a < c < b$

$$\int_a^a f(x)dx + \int_a^c f(x)dx + \int_c^b f(x)dx + \int_b^a f(x)dx = ?$$

A) –2 B) –1 C) 0 D) 1 E) 2

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2013]

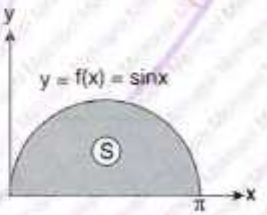
15.



A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2012]

16. **S = ?**



A) 1 B) 5 C) $\sqrt{2}$ D) $\sqrt{3}$ E) 2

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2012]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	B	E	E	B	A	D	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
D	C	D	A	E	C	E	E

BÖLÜM CHAPTER 18

TARİHSEL NOT / HISTORICAL NOTE

TERENCE TAO [1975 -]

Tao, 9 yaşında üniversite düzeyinde matematik derslerine devam eden, erken yaşlardan itibaren olağanüstü matematiksel yetenekler sergiledi. Tao, ilk on yaşında yarışan Uluslararası Matematik Olimpiyatları'nda bugüne kadarki en genç katılımcıydı; 1986, 1987 ve 1988'de bronz, gümüş ve altın madalya kazandı. Olympiat'ın tarihindeki üç madalyanın her birinin en genç kazananı oldu ve on üçüncü doğum gününden kısa bir süre sonra altın madalya kazandı. Tao tarafından 2016 yılında yaklaşık 300 araştırma yazısı ve 17 kitap yayınlanmıştır.

Tao exhibited extraordinary mathematical abilities from an early age, attending university-level mathematics courses at the age of 9. Tao was the youngest participant to date in the International Mathematical Olympiad, first competing at the age of ten; in 1986, 1987, and 1988, he won a bronze, silver, and gold medal. He remains the youngest winner of each of the three medals in the Olympiad's history, winning the gold medal shortly after his thirteenth birthday. Within the field of mathematics, Tao is known for his collaboration with Ben J. Green of Oxford University; together they proved the Green–Tao theorem. By 2016 Tao had published about 300 research papers and 17 books.

MATRİS VE DETERMİNANT
MATRIX and DETERMINANT

Bu bölüm 64 alıştırma sorusu, 144 test sorusu, 16 YÖS sorusu içermektedir.

This chapter includes 64 exercise questions, 144 test questions, and 16 YÖS questions.

BÖLÜM / CHAPTER 18

MATRİS VE DETERMİNANT / MATRIX and DETERMINANT

1. $\begin{bmatrix} 2 & -3 \\ 4 & 0 \end{bmatrix} + \begin{bmatrix} 5 & -2 \\ -2 & 1 \end{bmatrix} = ?$

Yanıt / The Answer is $\begin{bmatrix} 7 & -5 \\ 2 & 1 \end{bmatrix}$

2. $\begin{bmatrix} 3 & -2 \\ 4 & -1 \end{bmatrix} - 2 \cdot \begin{bmatrix} -1 & -1 \\ 0 & 2 \end{bmatrix} = ?$

Yanıt / The Answer is $\begin{bmatrix} 5 & 0 \\ 4 & -5 \end{bmatrix}$

3. $A = \begin{bmatrix} 1 & -1 \\ 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 4 \\ 1 & -6 \end{bmatrix}$

$\Rightarrow$ **2A − 3B = ?**

Yanıt / The Answer is $\begin{bmatrix} 11 & -14 \\ -3 & 26 \end{bmatrix}$

4. $A = \begin{bmatrix} c & -2 \\ 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} d & 0 \\ 1 & -c \end{bmatrix}$

$B - 3A = \begin{bmatrix} 6 & 6 \\ -8 & -2 \end{bmatrix}$

$\Rightarrow$ **c + d = ?**

Yanıt / The Answer is −10

5. $\begin{bmatrix} -1 & 3 & a & -2 \end{bmatrix} \cdot \begin{bmatrix} 1 \\ 0 \\ 3 \\ 4 \end{bmatrix} = [0] \Rightarrow a = ?$

Yanıt / The Answer is 3

6. $\begin{bmatrix} 2 & 3 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} 4 & 1 \\ -2 & 0 \end{bmatrix} = ?$

Yanıt / The Answer is $\begin{bmatrix} 2 & 2 \\ -8 & -2 \end{bmatrix}$

7. $\begin{bmatrix} \sin x & \cos x \\ \cos x & \sin x \end{bmatrix} \begin{bmatrix} \sin x \\ \cos x \end{bmatrix} = ?$

Yanıt / The Answer is $\begin{bmatrix} 1 \\ \sin 2x \end{bmatrix}$

8. $\begin{bmatrix} 1 & 2 \\ 2 & 3 \\ 0 & -1 \end{bmatrix} \cdot \begin{bmatrix} -1 & 1 & 0 \\ -2 & 2 & 2 \end{bmatrix} = \begin{bmatrix} \cdot & \cdot & a \\ \cdot & b & \cdot \\ c & \cdot & \cdot \end{bmatrix}$

$\Rightarrow$ **a + b + c = ?**

Yanıt / The Answer is 14

9. $A=\begin{bmatrix}0 & 1\\ -1 & 2\end{bmatrix} \Rightarrow A^2=?$

Yanıt / The Answer is $\begin{bmatrix}-1 & 2\\ -2 & 3\end{bmatrix}$

10. $A=\begin{bmatrix}1 & -2\\ 2 & 3\end{bmatrix} \Rightarrow A^2-3A=?$

Yanıt / The Answer is $\begin{bmatrix}-6 & -2\\ 2 & -4\end{bmatrix}$

11. $A=\begin{bmatrix}4 & 0 & -1\\ 1 & -2 & 1\\ 3 & 0 & 4\end{bmatrix} \Rightarrow A^T=?$

Yanıt / The Answer is $\begin{bmatrix}4 & 1 & 3\\ 0 & -2 & 0\\ -1 & 1 & 4\end{bmatrix}$

12. $A=\begin{bmatrix}3 & 2\\ x-3 & 7\end{bmatrix},\ A^T=\begin{bmatrix}3 & 4\\ 2 & 7\end{bmatrix} \Rightarrow x=?$

Yanıt / The Answer is 7

13. $A=\begin{bmatrix}2 & -3 & 4\\ 0 & -1 & 3\end{bmatrix},\ B=\begin{bmatrix}2 & x-2y\\ -3 & x-y\\ 4 & 3\end{bmatrix}$

$A^T=B \Rightarrow x+y=?$

Yanıt / The Answer is -3

14. $A=\begin{bmatrix}1 & 0\\ -2 & 3\end{bmatrix},\ B=\begin{bmatrix}2 & -1\\ 0 & 1\end{bmatrix}$

$A^T+B^T=?$

Yanıt / The Answer is $\begin{bmatrix}3 & -2\\ -1 & 4\end{bmatrix}$

15. $A=\begin{bmatrix}1 & 2\\ 0 & -1\end{bmatrix}\begin{bmatrix}3 & 2 & 1\\ -2 & 0 & 1\end{bmatrix}$

$A^T=\begin{bmatrix}x & 2\\ 2 & y\\ z & -1\end{bmatrix} \Rightarrow x+y-z=?$

Yanıt / The Answer is -4

16. $A=\begin{bmatrix}1 & -1\\ 0 & 2\end{bmatrix},\ f(x)=x^2+2x+1$

$\Rightarrow f(A)=?$

Yanıt / The Answer is $\begin{bmatrix}4 & -5\\ 0 & 9\end{bmatrix}$

17. $A=\begin{bmatrix}1 & 0\\ 2 & -1\end{bmatrix} \Rightarrow A^4=?$

Yanıt / The Answer is $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$

18. $A=\begin{bmatrix}1 & 3\\ 0 & -1\end{bmatrix} \Rightarrow A^{13}=?$

Yanıt / The Answer is $\begin{bmatrix}1 & 3\\ 0 & -1\end{bmatrix}$

19. $A=\begin{bmatrix}-3 & -2\\ 0 & 3\end{bmatrix} \Rightarrow A^{2018}=?$

Yanıt / The Answer is $3^{2018}\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$

20. $A=\begin{bmatrix}1 & -1\\ 0 & 1\end{bmatrix} \Rightarrow A^{32}=?$

Yanıt / The Answer is $\begin{bmatrix}1 & -32\\ 0 & 1\end{bmatrix}$

21. $A=\begin{bmatrix}2 & 2\\ -8 & -8\end{bmatrix},\ A^2=k\ A \Rightarrow k=?$

Yanıt / The Answer is -6

22. $A=\begin{bmatrix}-3 & 5\\ 1 & -2\end{bmatrix} \Rightarrow A^{-1}=?$

Yanıt / The Answer is $\begin{bmatrix}-2 & -5\\ -1 & -3\end{bmatrix}$

23. $A=\begin{bmatrix}3 & 2\\ 1 & 2\end{bmatrix} \Rightarrow A^{-1}=?$

Yanıt / The Answer is $\begin{bmatrix}\frac{1}{2} & -\frac{1}{2}\\ -\frac{1}{4} & \frac{3}{4}\end{bmatrix}$

24. $A=\begin{bmatrix}-3 & -2\\ 2 & 1\end{bmatrix},\ A^{-1}=\begin{bmatrix}a & b\\ c & d\end{bmatrix} \Rightarrow c=?$

Yanıt / The Answer is -2

25. $A=\begin{bmatrix} x & 4 \\ y & -4 \end{bmatrix}$, $A \cdot A^{-1} = A^2$
$\Rightarrow$ $x \cdot y = ?$

Yanıt / The Answer is -15

26. $A=\begin{bmatrix} 1 & -2 \\ 3 & -7 \end{bmatrix}$, $B=\begin{bmatrix} 7 & x \\ -2 & y \end{bmatrix}$
$A^{-1} = B^{T} \Rightarrow x+y=?$

Yanıt / The Answer is 2

27. $A=\begin{bmatrix} \tan x & 0 \\ 0 & \cos x \end{bmatrix} \Rightarrow A^{-1}=?$

Yanıt / The Answer is $\begin{bmatrix} \cot x & 0 \\ 0 & \sec x \end{bmatrix}$

28. $A=\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \Rightarrow A^{-2}=?$

Yanıt / The Answer is $\begin{bmatrix} \frac{11}{2} & -\frac{5}{2} \\ -\frac{15}{4} & \frac{7}{4} \end{bmatrix}$

29. $A=\begin{bmatrix} x & 0 \\ 1 & y \end{bmatrix}$, $A = A^{-1} \Rightarrow x+y=?$

Yanıt / The Answer is 0

30. $\begin{vmatrix} 2 & 3 \\ -2 & 1 \end{vmatrix} = ?$

Yanıt / The Answer is 8

31. $\begin{vmatrix} x+2 & 2 \\ x-2 & 2 \end{vmatrix} = ?$

Yanıt / The Answer is 8

32. $\begin{vmatrix} 2018 & 2019 \\ 2016 & 2017 \end{vmatrix} = ?$

Yanıt / The Answer is 2

33. $\begin{vmatrix} x & 2 \\ x-1 & 3 \end{vmatrix} = 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\{-2\}$

34. $\begin{vmatrix} x+1 & -1 \\ x & 2x \end{vmatrix} = 0 \Rightarrow$ **ÇK(SS) = ?**

Yanıt / The Answer is $\left\{-\frac{3}{2}, 0\right\}$

35. $\begin{vmatrix} 2x+6 & k \\ x-1 & x \end{vmatrix} = 0$, ÇK(SS) $= \{-1, x_2\} \Rightarrow$ **k = ?**

Yanıt / The Answer is 2

36. $\begin{vmatrix} \sin x & -\cos x \\ -\cos x & -\sin x \end{vmatrix} = ?$

Yanıt / The Answer is -1

37. $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = 8 \Rightarrow \begin{vmatrix} c & d \\ a & b \end{vmatrix} = ?$

Yanıt / The Answer is -8

38. $f(x) = \begin{vmatrix} \log_3 x & x^2 \\ -x & \log_x 9 \end{vmatrix}$

$\Rightarrow$ **f(−1) + f(1) = ?**

Yanıt / The Answer is 4

39. $\begin{vmatrix} 2 & -1 & 1 \\ 3 & -2 & 5 \\ 0 & 0 & 0 \end{vmatrix} = ?$

Yanıt / The Answer is 0

40. $\begin{vmatrix} 0 & 2 & -3 \\ 0 & -7 & 5 \\ 0 & 0 & 3 \end{vmatrix} = ?$

Yanıt / The Answer is 0

41. $\begin{vmatrix} 1 & 3 & -2 \\ -2 & 0 & 4 \\ 4 & 0 & 8 \end{vmatrix} = ?$

Yanıt / The Answer is 96

42. $\begin{vmatrix} -3 & 1 & -2 \\ -5 & 7 & -1 \\ 6 & -2 & 4 \end{vmatrix} = ?$

Yanıt / The Answer is 0

43. $\begin{vmatrix} 1 & 1 & 4 \\ 3 & 1 & -2 \\ -1 & 1 & 5 \end{vmatrix} = ?$

Yanıt / The Answer is 10

44. $\begin{vmatrix} 1 & 0 & 3 \\ 4 & 5 & 2 \\ 6 & 4 & m \end{vmatrix} = 10 \Rightarrow m = ?$

Yanıt / The Answer is 12

45. $\begin{vmatrix} x & 0 & x \\ -1 & 3 & 3 \\ -1 & 3 & x \end{vmatrix} = -6 \Rightarrow \sum x = ?$

Yanıt / The Answer is 3

46. $i^2 = -1 \Rightarrow \begin{vmatrix} i & -i & 1 \\ 0 & i & 1 \\ 0 & i-1 & 1 \end{vmatrix} = ?$

Yanıt / The Answer is i

47. $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & k \end{vmatrix} = -10 \Rightarrow \begin{vmatrix} -a & -b & -c \\ d & e & f \\ 2g & 2h & 2k \end{vmatrix} = ?$

Yanıt / The Answer is 20

48. $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & k \end{vmatrix} = 5 \Rightarrow \begin{vmatrix} 3a & 3b & 3c \\ -d & -e & -f \\ g & h & k \end{vmatrix} = ?$

Yanıt / The Answer is −15

49. $A = \begin{vmatrix} 2 & 3 & -1 \\ 2 & 0 & 2 \\ 1 & -1 & -1 \end{vmatrix} \Rightarrow |A^{-1}| = ?$

Yanıt / The Answer is $\frac{1}{18}$

50. $i^2 = -1 \Rightarrow \begin{vmatrix} 2 & i \\ 1-i & 1 \end{vmatrix} = ?$

Yanıt / The Answer is $1-i$

51. $\begin{vmatrix} 2\cos x & -1 \\ -1 & \cos x \end{vmatrix} = 0,$

$0 < x < \frac{\pi}{2} \Rightarrow x = ?$

Yanıt / The Answer is $\frac{\pi}{4}$

52. $\begin{vmatrix} -1 & \sin x \\ 2\sin x & -1 \end{vmatrix} = 0,$

$0 < x < \frac{\pi}{2} \Rightarrow x = ?$

Yanıt / The Answer is $\frac{\pi}{4}$

53. $A = \begin{bmatrix} 2 & -1 \\ -3 & 2 \end{bmatrix} \Rightarrow |A^{-1} - 2A| = ?$

Yanıt / The Answer is -23

54. $\begin{vmatrix} -1 & 2 & 3 \\ 1 & 0 & 2 \\ 0 & 0 & 3 \end{vmatrix} = ?$

Yanıt / The Answer is -6

55. $\begin{vmatrix} 73878 & 73879 \\ 73876 & 73877 \end{vmatrix} = ?$

Yanıt / The Answer is 2

56. $\begin{vmatrix} x & x & x \\ 3 & 2 & 1 \\ 1 & 1 & 2 \end{vmatrix} = 2x - 9 \Rightarrow x = ?$

Yanıt / The Answer is 3

57. $x^2-5x-3=0,\ f(x_1)=f(x_2)=0$

$$\Rightarrow \begin{vmatrix} -x_1 & x_2-2 \\ x_1-2 & x_2 \end{vmatrix} = ?$$

Yanıt / The Answer is 12

58. $A=\begin{bmatrix} -10 & 4 \\ 6 & -2 \end{bmatrix} \Rightarrow \det(A^{30})=?$

Yanıt / The Answer is 2^{60}

59. $\begin{vmatrix} x+1 & 2 & 3 \\ 1 & x+2 & 3 \\ 1 & 2 & x+3 \end{vmatrix}=0 \Rightarrow ÇK(SS)=?$

Yanıt / The Answer is $\{-6,0\}$

60. $A=\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}, B=\begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix},\ A\cdot X=B \Rightarrow |X|=?$

Yanıt / The Answer is 1

61. $\begin{vmatrix} 1 & 3 & 5 \\ 3 & 0 & 7 \\ 1 & 3 & a-9 \end{vmatrix}=0 \Rightarrow a=?$

Yanıt / The Answer is 14

62. $\begin{vmatrix} 1 & \log_4 5 \\ \log_8 2 & \\ \log_5 4 & \log_3 27 \end{vmatrix}=?$

Yanıt / The Answer is 8

63. $A=\begin{bmatrix} 1 & -2 \\ 0 & a \end{bmatrix},\ B=\begin{bmatrix} a & 0 \\ -3 & -1 \end{bmatrix}$

$\det(A+B)=\det(A)+\det(B) \Rightarrow a=?$

Yanıt / The Answer is $\sqrt{7}$

64. $A=\begin{bmatrix} 0 & 3 \\ 2 & -2 \end{bmatrix} \Rightarrow |A^T-A|=?$

Yanıt / The Answer is 1

1. $A=\begin{bmatrix}1 & x & -2\\ 0 & 1 & x+y\end{bmatrix}$, $B=\begin{bmatrix}1 & 3 & -2\\ 0 & 1 & 5\end{bmatrix}$

$A=B \Rightarrow \mathbf{y=?}$

A) -1 B) 1 C) 2 D) 3 E) 4

2. $A=\begin{bmatrix}2 & 4 & -5\\ \cos 90^\circ & m & 3\end{bmatrix}$, $B=\begin{bmatrix}\log_3(x+4) & n & p\\ a & 4 & b\end{bmatrix}$

$A=B \Rightarrow \mathbf{a+b+m+n+x-p=?}$

A) 11 B) 14 C) 16 D) 20 E) 21

3. $\begin{bmatrix}1 & 3 & -5\\ x-2 & 4 & 0\\ 2 & -3 & 2y\end{bmatrix}=\begin{bmatrix}1 & 3 & a+3\\ 5 & 4 & 0\\ 2 & b+3 & 8\end{bmatrix}$

$\Rightarrow \mathbf{(x+y)\cdot(a-b)=?}$

A) -33 B) -22 C) -11 D) 11 E) 22

4. $A=\begin{bmatrix}3 & 2 & -1\\ 4 & 6 & 0\end{bmatrix}$, $B=\begin{bmatrix}-2 & 1 & 5\\ 0 & 4 & 2\end{bmatrix} \Rightarrow \mathbf{A-B=?}$

A) $\begin{bmatrix}5 & 1 & -6\\ 4 & 2 & -2\end{bmatrix}$ B) $\begin{bmatrix}5 & 2 & 2\\ 4 & 1 & 6\end{bmatrix}$ C) $\begin{bmatrix}5 & 2 & -6\\ 4 & 1 & -2\end{bmatrix}$

D) $\begin{bmatrix}5 & 1 & -6\\ 4 & 2 & 2\end{bmatrix}$ E) $\begin{bmatrix}5 & 1 & 6\\ 4 & 2 & -2\end{bmatrix}$

5. $A=\begin{bmatrix}1 & 2\\ -2 & 0\\ 3 & 5\end{bmatrix}$, $B=\begin{bmatrix}2 & 1\\ 0 & 5\\ 2 & -2\end{bmatrix} \Rightarrow \mathbf{A+B=?}$

A) $\begin{bmatrix}3 & 3\\ 2 & 5\\ 5 & 3\end{bmatrix}$ B) $\begin{bmatrix}3 & 3\\ 2 & -5\\ 5 & 3\end{bmatrix}$ C) $\begin{bmatrix}3 & 3\\ -2 & 5\\ 5 & 3\end{bmatrix}$

D) $\begin{bmatrix}3 & 3\\ -2 & 5\\ 3 & 5\end{bmatrix}$ E) $\begin{bmatrix}3 & 3\\ 5 & -2\\ 5 & 3\end{bmatrix}$

6. $A=\begin{bmatrix}2 & 1 & x\\ 3 & y & -1\end{bmatrix}+\begin{bmatrix}0 & 2 & 1\\ 4 & 5 & -3\end{bmatrix}=\begin{bmatrix}2 & 3 & 4\\ 7 & 0 & -4\end{bmatrix} \Rightarrow \mathbf{x+y=?}$

A) -3 B) -2 C) 0 D) 2 E) 3

7. $\begin{bmatrix}a-2 & b+4\\ c-2 & 2d-5\end{bmatrix}=\begin{bmatrix} & 2 & 6\\ -c-6 & 5\end{bmatrix}+\begin{bmatrix}-1 & -3\\ 2 & 5-d\end{bmatrix}$

$\Rightarrow \mathbf{a+b+c+d=?}$

A) 12 B) 6 C) 2 D) 1 E) 24

8. $x\cdot\begin{bmatrix}5\\ -2\end{bmatrix}+y\cdot\begin{bmatrix}-2\\ 1\end{bmatrix}=\begin{bmatrix}10\\ 4\end{bmatrix} \Rightarrow \mathbf{y=?}$

A) 40 B) 42 C) 44 D) 46 E) 48

9. $a\cdot\begin{bmatrix}2\\3\end{bmatrix}+b\cdot\begin{bmatrix}3\\1\end{bmatrix}=\begin{bmatrix}9\\10\end{bmatrix} \Rightarrow \mathbf{a\cdot b=?}$

A) 3 B) 6 C) 9 D) 12 E) 15

10. $x\cdot\begin{bmatrix}2&0\\0&-1\end{bmatrix}+y\cdot\begin{bmatrix}-3&0\\0&1\end{bmatrix}=\begin{bmatrix}4&0\\0&-3\end{bmatrix} \Rightarrow \mathbf{x=?}$

A) 2 B) 5 C) 6 D) 7 E) 9

11. $x\cdot\begin{bmatrix}2\\-3\end{bmatrix}+y\cdot\begin{bmatrix}-1\\4\end{bmatrix}=\begin{bmatrix}7\\-13\end{bmatrix} \Rightarrow \mathbf{3y-x=?}$

A) −6 B) −2 C) −1 D) 3 E) 4

12. $\begin{bmatrix}3x+3\\-y\end{bmatrix}+\begin{bmatrix}-2y\\5x\end{bmatrix}=\begin{bmatrix}15\\20\end{bmatrix} \Rightarrow \mathbf{x-y=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $A=\begin{bmatrix}0&a\\b&c\end{bmatrix}, B=\begin{bmatrix}1&-1\\3&6\end{bmatrix}, A+B=I_2 \Rightarrow \mathbf{a+b+c=?}$

A) −7 B) −6 C) −5 D) −4 E) −3

14. $A=\begin{bmatrix}3&0\\0&-2\end{bmatrix}, B=\begin{bmatrix}2&0\\0&1\end{bmatrix}, C=\begin{bmatrix}7&0\\0&2\end{bmatrix}$

$A\cdot x+B\cdot y=C \Rightarrow \mathbf{x+y=?}$

A) $-\frac{1}{15}$ B) −3 C) $\frac{23}{7}$ D) 3 E) $\frac{23}{10}$

15. $A=\begin{bmatrix}\log 9&2\\m&1\end{bmatrix}, B=\begin{bmatrix}\log 3&3\\-2&n\end{bmatrix}, C=\begin{bmatrix}\log x&-1\\-14&-5\end{bmatrix}$

$4A-3B=C \Rightarrow \mathbf{m+n+x=?}$

A) 171 B) 192 C) 213 D) 228 E) 241

16. $A=\begin{bmatrix}-1&3\\5&0\end{bmatrix}, B=\begin{bmatrix}\frac{1}{2}&3\\-2&-\frac{1}{4}\end{bmatrix}$

$3A-4B=\begin{bmatrix}a&b\\c&d\end{bmatrix} \Rightarrow \mathbf{a+b+c+d=?}$

A) 13 B) 15 C) 16 D) 18 E) 20

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1	2	3	4	5	6	7	8
C	E	B	A	C	B	B	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	B	A	D	A	C	E	C

1. $\left.\begin{array}{l} A-B=\begin{bmatrix}2 & 1\\ 1 & -1\end{bmatrix} \\ A-2B=\begin{bmatrix}1 & 2\\ -1 & 1\end{bmatrix}\end{array}\right\} \Rightarrow \mathbf{A=?}$

A) $\begin{bmatrix}3 & 0\\ 3 & -3\end{bmatrix}$ B) $\begin{bmatrix}3 & 0\\ -3 & 3\end{bmatrix}$ C) $\begin{bmatrix}3 & 0\\ -3 & -3\end{bmatrix}$

D) $\begin{bmatrix}-3 & 0\\ 3 & -3\end{bmatrix}$ E) $\begin{bmatrix}-3 & 0\\ -3 & -3\end{bmatrix}$

2. $\left.\begin{array}{l} A+2B=\begin{bmatrix}2 & 1 & 0\\ 1 & -1 & 2\end{bmatrix} \\ 2A+B=\begin{bmatrix}1 & 2 & -1\\ 2 & 0 & 1\end{bmatrix}\end{array}\right\} \Rightarrow \mathbf{B=?}$

A) $\begin{bmatrix}1 & 0 & 1/3\\ 0 & -2/3 & 1\end{bmatrix}$ B) $\begin{bmatrix}1 & 0 & 3\\ 0 & -2 & 1\end{bmatrix}$

C) $\begin{bmatrix}1 & 0 & -1/3\\ 0 & 2/3 & -1\end{bmatrix}$ D) $\begin{bmatrix}1 & 0 & 1/3\\ 0 & 2/3 & 1\end{bmatrix}$

E) $\begin{bmatrix}1 & 0 & -1\\ 0 & 3 & -1\end{bmatrix}$

3. $A=\begin{bmatrix}2 & 3 & 4\end{bmatrix},\ B=\begin{bmatrix}-2\\ 4\\ 5\end{bmatrix} \Rightarrow \mathbf{A\cdot B=?}$

A) $[22]$ B) $[23]$ C) $[27]$ D) $[28]$ E) $[30]$

4. $A=\begin{bmatrix}2\\ 3\\ 4\end{bmatrix},\ B=\begin{bmatrix}-2 & 3\end{bmatrix} \Rightarrow \mathbf{A\cdot B=?}$

A) $\begin{bmatrix}-4 & -6\\ -6 & -9\\ -8 & -12\end{bmatrix}$ B) $\begin{bmatrix}-4 & 6\\ -6 & 9\\ -8 & 12\end{bmatrix}$

C) $\begin{bmatrix}-4 & -6\\ -6 & 9\\ -8 & 12\end{bmatrix}$ D) $\begin{bmatrix}-4 & -6\\ -6 & 9\\ 8 & 12\end{bmatrix}$

E) $\begin{bmatrix}4 & 6\\ 6 & 9\\ 8 & 12\end{bmatrix}$

5. $A=\begin{bmatrix}-5 & 3+x\end{bmatrix},\ B=\begin{bmatrix}x\\ 3\end{bmatrix}$

$A\cdot B=[7] \Rightarrow \mathbf{x=?}$

A) -2 B) -1 C) 1 D) 2 E) 3

6. $\begin{bmatrix}2 & x & 16\end{bmatrix}\cdot\begin{bmatrix}3x\\ -2\\ -1\end{bmatrix}=[0] \Rightarrow \mathbf{x=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $A=\begin{bmatrix}1 & \frac{1}{3} & \frac{1}{5}\end{bmatrix},\ B=\begin{bmatrix}\log x\\ \log x^3\\ \log x^5\end{bmatrix}$

$A\cdot B=[\log 64] \Rightarrow \mathbf{x=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $\begin{bmatrix}a & -2\\ 2 & -1\end{bmatrix}\cdot\begin{bmatrix}1 & 5\\ 2 & b\end{bmatrix}=\begin{bmatrix}-1 & x\\ 0 & 9\end{bmatrix} \Rightarrow \mathbf{x=?}$

A) -1 B) 7 C) 9 D) 13 E) 17

9. $\begin{bmatrix}1 & 2\\3 & -1\end{bmatrix}\cdot\begin{bmatrix}x & 2\\y & 1\end{bmatrix}=\begin{bmatrix}5 & 4\\-6 & 5\end{bmatrix} \Rightarrow \mathbf{x+y=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

10. $\begin{bmatrix}1 & 3\\-1 & 2\end{bmatrix}\begin{bmatrix}a & a\\b & b\end{bmatrix}=\begin{bmatrix}3 & 3\\7 & 7\end{bmatrix} \Rightarrow \mathbf{a+b=?}$

A) −5 B) −1 C) 1 D) 2 E) 3

11. $A=\begin{bmatrix}-3 & 2\\1 & -2\end{bmatrix}$ $B=\begin{bmatrix}a & b\\c & d\end{bmatrix}$ $C=\begin{bmatrix}-2 & -6\\2 & -2\end{bmatrix}$

$A\cdot B=C \Rightarrow \mathbf{(b-c)\cdot(a+d)=?}$

A) 9 B) 12 C) 15 D) 18 E) 21

12. $A=\begin{bmatrix}1 & 2 & 3\\-3 & 0 & -1\end{bmatrix}$, $B=\begin{bmatrix}0 & 2\\1 & 0\\1 & 0\end{bmatrix}$,

$A\cdot B=\begin{bmatrix}x & y\\z & t\end{bmatrix} \Rightarrow \mathbf{x+y+z-t=?}$

A) 0 B) 6 C) 8 D) 10 E) 12

13. $A=\begin{bmatrix}4 & 1\\3 & 2\end{bmatrix}$, $B=\begin{bmatrix}1 & 2\\3 & 4\end{bmatrix}$

$A\cdot B=C \pmod 5 \Rightarrow \mathbf{C=?}$

A) $\begin{bmatrix}2 & 3\\4 & 3\end{bmatrix}$ B) $\begin{bmatrix}1 & 3\\4 & 1\end{bmatrix}$ C) $\begin{bmatrix}3 & 0\\0 & 4\end{bmatrix}$ D) $\begin{bmatrix}2 & 2\\4 & 4\end{bmatrix}$ E) $\begin{bmatrix}2 & 1\\4 & 4\end{bmatrix}$

14. $A=\begin{bmatrix}1 & 0\\2 & 3\end{bmatrix}$, $B=\begin{bmatrix}-2 & 0\\1 & 3\end{bmatrix}$, $C=\begin{bmatrix}-2 & 1\\0 & 2\end{bmatrix}$

$\Rightarrow \mathbf{A\cdot(B+C)=?}$

A) $\begin{bmatrix}-4 & 1\\-5 & 17\end{bmatrix}$ B) $\begin{bmatrix}4 & 1\\-5 & 17\end{bmatrix}$ C) $\begin{bmatrix}-4 & -1\\-5 & 17\end{bmatrix}$ D) $\begin{bmatrix}-4 & -1\\-5 & -17\end{bmatrix}$ E) $\begin{bmatrix}4 & 1\\5 & 17\end{bmatrix}$

15. $A=\begin{bmatrix}2 & -1\\3 & 1\end{bmatrix}$, $B=\begin{bmatrix}-2 & 1\\1 & 4\end{bmatrix}$

$\Rightarrow \mathbf{A\cdot B+B\cdot A=?}$

A) $\begin{bmatrix}-6 & -1\\9 & 10\end{bmatrix}$ B) $\begin{bmatrix}-6 & 1\\9 & 10\end{bmatrix}$ C) $\begin{bmatrix}6 & 1\\9 & 10\end{bmatrix}$ D) $\begin{bmatrix}6 & -1\\9 & 10\end{bmatrix}$ E) $\begin{bmatrix}6 & 1\\-9 & 10\end{bmatrix}$

16. $\begin{bmatrix}2 & -5 & -2\\1 & 2 & -4\\3 & -4 & -6\end{bmatrix}\begin{bmatrix}x\\y\\z\end{bmatrix}=\begin{bmatrix}7\\3\\5\end{bmatrix} \Rightarrow \mathbf{y=?}$

A) 9 B) 7 C) 5 D) 3 E) 1

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1	2	3	4	5	6	7	8
A	A	D	B	C	D	D	D
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	B	C	E	D	A	B	C

1. $f(x) = x^2,\ A = \begin{bmatrix} 2 & 3 \\ 4 & 4 \end{bmatrix} \Rightarrow \mathbf{f(A) = ?}$

A) $\begin{bmatrix} 16 & 12 \\ 24 & 28 \end{bmatrix}$ B) $\begin{bmatrix} 16 & 12 \\ 18 & 28 \end{bmatrix}$ C) $\begin{bmatrix} 16 & 18 \\ 24 & 28 \end{bmatrix}$ D) $\begin{bmatrix} 12 & -12 \\ 24 & 28 \end{bmatrix}$ E) $\begin{bmatrix} -16 & 18 \\ 24 & 28 \end{bmatrix}$

2. $A = \begin{bmatrix} 1 & 0 \\ 0 & -2 \end{bmatrix},\ I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix},\ f(x) = 2x^2 + 1 \Rightarrow \mathbf{f(A) = ?}$

A) $\begin{bmatrix} 3 & 1 \\ 1 & 9 \end{bmatrix}$ B) $\begin{bmatrix} 1 & 3 \\ 9 & 1 \end{bmatrix}$ C) $\begin{bmatrix} 3 & 0 \\ 0 & 9 \end{bmatrix}$ D) $\begin{bmatrix} 0 & 9 \\ 3 & 0 \end{bmatrix}$ E) $\begin{bmatrix} 3 & 9 \\ 0 & 0 \end{bmatrix}$

3. $A = \begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix} \Rightarrow \mathbf{A^2 - 2A + I = ?}$

A) $\begin{bmatrix} 6 & -2 \\ 3 & 7 \end{bmatrix}$ B) $\begin{bmatrix} -6 & -2 \\ 3 & 7 \end{bmatrix}$ C) $\begin{bmatrix} -6 & -2 \\ -3 & -7 \end{bmatrix}$ D) $\begin{bmatrix} 6 & 2 \\ 3 & 7 \end{bmatrix}$ E) $\begin{bmatrix} 6 & 2 \\ -3 & 7 \end{bmatrix}$

4. $f(x) = x^2 - x + 2,$

$A = \begin{bmatrix} 3 & 1 \\ -1 & 1 \end{bmatrix} \Rightarrow \mathbf{f(A) = ?}$

A) $\begin{bmatrix} 7 & 2 \\ -3 & 1 \end{bmatrix}$ B) $\begin{bmatrix} 7 & 3 \\ -3 & 1 \end{bmatrix}$ C) $\begin{bmatrix} 5 & 3 \\ 3 & 1 \end{bmatrix}$ D) $\begin{bmatrix} 5 & 2 \\ -3 & 1 \end{bmatrix}$ E) $\begin{bmatrix} 7 & 2 \\ -2 & 1 \end{bmatrix}$

5. $A = \begin{bmatrix} 2 & -1 \\ 0 & 3 \end{bmatrix},\ f(x) = x^2 - 3x + 2 \Rightarrow \mathbf{f(A) = ?}$

A) $\begin{bmatrix} 1 & -2 \\ 0 & 3 \end{bmatrix}$ B) $\begin{bmatrix} -2 & 1 \\ 0 & 3 \end{bmatrix}$ C) $\begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$ D) $2 \cdot \begin{bmatrix} -2 & 1 \\ 0 & 3 \end{bmatrix}$ E) $2 \cdot \begin{bmatrix} 0 & -1 \\ 0 & 1 \end{bmatrix}$

6. $f(x) = x^2 - 3x + 2,\ A = \begin{bmatrix} -1 & 3 \\ 2 & 1 \end{bmatrix},$

$f(A) = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \Rightarrow \mathbf{a - b + c - d = ?}$

A) 6 B) 8 C) 9 D) 12 E) 16

7. $f(x) = x^2 - 3x + 4,\ A = \begin{bmatrix} 3 & -1 \\ 0 & 2 \end{bmatrix}$

$\Rightarrow \mathbf{f(A) = ?}$

A) $\begin{bmatrix} 4 & -2 \\ 0 & 2 \end{bmatrix}$ B) $\begin{bmatrix} 3 & -2 \\ 2 & 0 \end{bmatrix}$ C) $\begin{bmatrix} 4 & -2 \\ 2 & 0 \end{bmatrix}$ D) $\begin{bmatrix} 3 & 2 \\ -2 & 0 \end{bmatrix}$ E) $\begin{bmatrix} 0 & 2 \\ -2 & 4 \end{bmatrix}$

8. $A = \begin{bmatrix} 3 & 0 \\ 0 & 5 \end{bmatrix},\ A^3 = \begin{bmatrix} m & 0 \\ 0 & 125 \end{bmatrix} \Rightarrow \mathbf{m = ?}$

A) −1 B) 9 C) 27 D) 54 E) 81

9. $A=\begin{bmatrix}3&0\\3&1\end{bmatrix}$, $A^5=\begin{bmatrix}a&b\\c&d\end{bmatrix} \Rightarrow a+c=?$

A) 600 B) 603 C) 606 D) 609 E) 612

10. $A=\begin{bmatrix}1&3\\1&-1\end{bmatrix} \Rightarrow A^{15}=?$

A) $2\cdot A$ B) $2^7\cdot A$ C) $2^{14}\cdot A$ D) $2^{21}\cdot A$ E) $2^{28}\cdot A$

11. $A=\begin{bmatrix}1&2\\0&1\end{bmatrix} \Rightarrow A^{64}=?$

A) $\begin{bmatrix}1&2^7\\0&1\end{bmatrix}$ B) $\begin{bmatrix}1&2^6\\0&1\end{bmatrix}$ C) $\begin{bmatrix}1&2^5\\0&1\end{bmatrix}$ D) $\begin{bmatrix}1&2^4\\0&1\end{bmatrix}$ E) $\begin{bmatrix}1&2^3\\0&1\end{bmatrix}$

12. $A=\begin{bmatrix}2&k\\1&-2\end{bmatrix}$, $A^{10}=\begin{bmatrix}32&0\\0&32\end{bmatrix} \Rightarrow k=?$

A) -1 B) 0 C) -4 D) 2 E) -2

13. $A=\begin{bmatrix}-1&1\\3&1\end{bmatrix} \Rightarrow A^{30}=?$

A) $2^{15}\cdot I$ B) $2^{30}\cdot I$ C) $2^{45}\cdot I$ D) $2^{60}\cdot I$ E) $2^{75}\cdot I$

14. $A=\begin{bmatrix}3&2\\0&-3\end{bmatrix} \Rightarrow A^{33}=?$

A) I B) $3^{32}\cdot I$ C) $3^{32}\cdot A$ D) $3^{17}\cdot A$ E) $9^{15}\cdot A$

15. $i^2=-1$,

$A=\begin{bmatrix}0&i\\i&0\end{bmatrix} \Rightarrow A^{16}=?$

A) $\begin{bmatrix}i&0\\0&i\end{bmatrix}$ B) $\begin{bmatrix}0&i\\-i&0\end{bmatrix}$ C) $\begin{bmatrix}0&1\\1&0\end{bmatrix}$ D) $\begin{bmatrix}1&0\\0&1\end{bmatrix}$ E) $\begin{bmatrix}-i&0\\0&-i\end{bmatrix}$

16. $A=\begin{bmatrix}3&-2\\4&-3\end{bmatrix} \Rightarrow A^{1905}=?$

A) $\begin{bmatrix}1&0\\0&1\end{bmatrix}$ B) $\begin{bmatrix}-3&2\\-4&3\end{bmatrix}$ C) $\begin{bmatrix}3&2\\-4&3\end{bmatrix}$ D) $\begin{bmatrix}-1&0\\0&-1\end{bmatrix}$ E) $\begin{bmatrix}3&-2\\4&-3\end{bmatrix}$

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1	2	3	4	5	6	7	8
C	C	D	B	E	C	A	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	C	A	E	B	C	D	E

1. $A=\begin{bmatrix} x & y \\ -3 & -1 \end{bmatrix}$, $A^T+A=\begin{bmatrix} 2 & -1 \\ z & -2 \end{bmatrix} \Rightarrow x+y+z=?$

A) −2 B) −1 C) 0 D) 1 E) 2

2. $A=\begin{bmatrix} -2 & 4 \\ 0 & 2x-y \\ 3 & 1 \end{bmatrix}$, $B=\begin{bmatrix} -2 & 0 & 3 \\ x+y & 5 & 1 \end{bmatrix}$

$A=B^T \Rightarrow 3x-y^2=?$

A) 5 B) 6 C) 7 D) 8 E) 9

3. $A=\begin{bmatrix} 2 & -3 \\ 1 & 0 \end{bmatrix}$, $B=\begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}$

$\Rightarrow 2\cdot A-3\cdot B^T=?$

A) $\begin{bmatrix} 2 & 3 \\ -4 & 0 \end{bmatrix}$ B) $\begin{bmatrix} 1 & 3 \\ -4 & 0 \end{bmatrix}$ C) $\begin{bmatrix} 1 & 3 \\ -5 & 2 \end{bmatrix}$ D) $\begin{bmatrix} 2 & 3 \\ -4 & 2 \end{bmatrix}$ E) $\begin{bmatrix} 1 & -4 \\ 3 & 0 \end{bmatrix}$

4. $A=\begin{bmatrix} 3 & 5 \\ 0 & -2 \end{bmatrix}$, $B=\begin{bmatrix} -4 & 0 \\ 1 & 2 \end{bmatrix}$

$(3A-2B^T)^T=\begin{bmatrix} x & y \\ z & t \end{bmatrix} \Rightarrow x+z=?$

A) 15 B) 18 C) 24 D) 30 E) 32

5. $A=\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$, $B=\begin{bmatrix} 1 & 6 \end{bmatrix} \Rightarrow (A\cdot B)^T=?$

A) $\begin{bmatrix} 1 & 2 & 3 \\ 6 & 12 & 18 \end{bmatrix}$ B) $\begin{bmatrix} 6 & 12 & 18 \\ 1 & 2 & 3 \end{bmatrix}$ C) $\begin{bmatrix} 1 & 6 \\ 2 & 12 \\ 3 & 18 \end{bmatrix}$ D) $\begin{bmatrix} 6 & 1 \\ 12 & 2 \\ 18 & 3 \end{bmatrix}$ E) $\begin{bmatrix} 4 & 5 & 6 \\ 6 & 12 & 18 \end{bmatrix}$

6. $A=\begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix} \Rightarrow A\cdot A^T=?$

A) $\begin{bmatrix} 12 & 13 \\ 13 & 16 \end{bmatrix}$ B) $\begin{bmatrix} 11 & 12 \\ 12 & 15 \end{bmatrix}$ C) $\begin{bmatrix} 13 & 14 \\ 14 & 17 \end{bmatrix}$ D) $\begin{bmatrix} 14 & 13 \\ 17 & 14 \end{bmatrix}$ E) $\begin{bmatrix} 13 & 12 \\ 16 & 13 \end{bmatrix}$

7. $A=\begin{bmatrix} 2 & 3 & 5 \\ 1 & 0 & 4 \end{bmatrix} \Rightarrow A\cdot A^T=?$

A) $\begin{bmatrix} 38 & 19 \\ 19 & 17 \end{bmatrix}$ B) $\begin{bmatrix} 38 & 20 \\ 20 & 17 \end{bmatrix}$ C) $\begin{bmatrix} 38 & 21 \\ 21 & 17 \end{bmatrix}$ D) $\begin{bmatrix} 38 & 22 \\ 22 & 17 \end{bmatrix}$ E) $\begin{bmatrix} 38 & 23 \\ 23 & 17 \end{bmatrix}$

8. $A=\begin{bmatrix} 2 & 3 & 1 \\ -1 & 0 & 2 \end{bmatrix}$, $B=\begin{bmatrix} 1 & 1 \\ 0 & 1 \\ 1 & 1 \end{bmatrix} \Rightarrow (A\cdot B)^T=?$

A) $\begin{bmatrix} 3 & 1 \\ 6 & 1 \end{bmatrix}$ B) $\begin{bmatrix} 3 & 1 \\ 1 & 6 \end{bmatrix}$ C) $\begin{bmatrix} 3 & 0 \\ 6 & 1 \end{bmatrix}$ D) $\begin{bmatrix} 3 & 6 \\ 1 & 1 \end{bmatrix}$ E) $\begin{bmatrix} 6 & 1 \\ 3 & 1 \end{bmatrix}$

9. $A=\begin{bmatrix}2 & -2\\ -2 & 3\end{bmatrix}$, $A^{-1}=\begin{bmatrix}a & b\\ c & d\end{bmatrix}$

$\Rightarrow$ **a+b+c+d = ?**

A) $\frac{7}{2}$ B) 4 C) $\frac{9}{2}$ D) 5 E) $\frac{11}{2}$

10. $A=\begin{bmatrix}a & 3\\ a+1 & 5\end{bmatrix}$, $A^{-1}=\begin{bmatrix}-5 & 3\\ 2 & -1\end{bmatrix}$

$\Rightarrow$ **a = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

11. $A=\begin{bmatrix}3 & -5\\ 4 & -7\end{bmatrix}$, $A^{-1}=\begin{bmatrix}a & b\\ c & d\end{bmatrix}$

$\Rightarrow$ **a+b+c+d = ?**

A) −5 B) −3 C) 0 D) 3 E) 5

12. $A=\begin{bmatrix}3 & 2\\ 7 & 5\end{bmatrix}$, $A^{-2}=\begin{bmatrix}a & b\\ c & d\end{bmatrix}$

$\Rightarrow$ **a+b+c+d = ?**

A) 10 B) 8 C) −8 D) −10 E) −18

13. $A=\begin{bmatrix}-1 & 2\\ 3 & 7\end{bmatrix}$, $A\cdot B=\begin{bmatrix}-2 & 3\\ 6 & 4\end{bmatrix}$ $\Rightarrow$ $\mathbf{B^{-1}=?}$

A) $\begin{bmatrix}0 & 1\\ 3 & 7\end{bmatrix}$ B) $\begin{bmatrix}1/2 & 0\\ 1/2 & 1\end{bmatrix}$ C) $\begin{bmatrix}1/2 & 0\\ 1/2 & -1\end{bmatrix}$

D) $\begin{bmatrix}1/2 & 1/2\\ 0 & 1\end{bmatrix}$ E) $\begin{bmatrix}1 & 0\\ 1/2 & 1\end{bmatrix}$

14. $A=\begin{bmatrix}-1 & 3\\ 2 & 1\end{bmatrix}$, $A\cdot B=\begin{bmatrix}-3 & 2\\ 0 & -1\end{bmatrix}$ $\Rightarrow$ **B = ?**

A) $\frac{1}{4}\begin{bmatrix}3 & -5\\ 6 & 3\end{bmatrix}$ B) $\frac{1}{5}\begin{bmatrix}3 & -5\\ 6 & 3\end{bmatrix}$ C) $\frac{1}{6}\begin{bmatrix}3 & -5\\ 6 & 3\end{bmatrix}$

D) $\frac{1}{7}\begin{bmatrix}3 & -5\\ -6 & 3\end{bmatrix}$ E) $\frac{1}{8}\begin{bmatrix}3 & -5\\ 6 & 3\end{bmatrix}$

15. $A=\begin{bmatrix}x & x-1\\ 2 & -x\end{bmatrix}$, $A^{-1}=A$ $\Rightarrow$ $\sum \mathbf{x}=?$

A) −2 B) 0 C) 1 D) 2 E) 3

16. $M=\begin{bmatrix}-3 & 1\\ -1 & 2\end{bmatrix}$, $N=\begin{bmatrix}1 & 2\\ 0 & 1\\ -2 & 0\end{bmatrix}$ $\Rightarrow$ $\mathbf{M^{-1}\cdot N^{T}=?}$

A) $\frac{1}{4}\begin{bmatrix}0 & 1 & 4\\ 5 & 3 & 2\end{bmatrix}$ B) $\frac{1}{5}\begin{bmatrix}0 & 1 & 4\\ 5 & 3 & 2\end{bmatrix}$ C) $\frac{1}{6}\begin{bmatrix}0 & 1 & 4\\ 5 & 3 & 2\end{bmatrix}$

D) $\frac{1}{7}\begin{bmatrix}0 & 1 & 4\\ 5 & 3 & 2\end{bmatrix}$ E) $\frac{1}{8}\begin{bmatrix}0 & 1 & 4\\ 5 & 3 & 2\end{bmatrix}$

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1	2	3	4	5	6	7	8
E	D	B	D	A	C	D	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	A	D	D	D	D	A	B

1. $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \Rightarrow \det(A) = ?$

A) −2 B) 4 C) 6 D) 12 E) 14

2. $\begin{vmatrix} 1995 & 1999 \\ 1991 & 1995 \end{vmatrix} = ?$

A) 4 B) 6 C) 8 D) 12 E) 16

3. $\begin{vmatrix} 2018 & 2019 \\ 2017 & 2018 \end{vmatrix} = ?$

A) 1 B) 3 C) 5 D) 7 E) 9

4. $\begin{vmatrix} x-2 & -3 \\ -4 & x-1 \end{vmatrix} = 0 \Rightarrow ÇK(SS) = ?$

A) $\{0\}$ B) $\{-2\}$ C) $\{-2,5\}$ D) $\{5\}$ E) $\{0,5\}$

5. $\begin{vmatrix} x+1 & 2 \\ 5 & x-2 \end{vmatrix} = 0 \Rightarrow \prod x = ?$

A) −12 B) −9 C) −6 D) −3 E) −1

6. $\begin{vmatrix} x-2 & -5 \\ -1 & x+3 \end{vmatrix} = 9 \Rightarrow \sum x = ?$

A) −5 B) −4 C) −2 D) −1 E) 9

7. $\begin{vmatrix} 1 & 2 & 3 \\ 3 & -2 & -1 \\ 2 & 1 & 3 \end{vmatrix} = ?$

A) −3 B) −6 C) −12 D) −15 E) −18

8. $\begin{vmatrix} 3 & 9 & 27 \\ 2 & 4 & 8 \\ 1 & 1 & 1 \end{vmatrix} = ?$

A) −12 B) −14 C) −16 D) −18 E) −20

9. $\begin{vmatrix} 2 & 3 & 4 \\ 4 & 2 & 3 \\ 3 & 4 & 2 \end{vmatrix} = ?$

A) 9 B) 27 C) 54 D) 81 E) −1

10. $A = \begin{bmatrix} 2 & 1 & 2 \\ 3 & 4 & 5 \\ 0 & 1 & 2 \end{bmatrix} \rightarrow |A| = ?$

A) 5 B) 6 C) 8 D) 10 E) 12

11. $\begin{vmatrix} 3 & x & 2x \\ 0 & x & 99 \\ 0 & 0 & x-1 \end{vmatrix} = 60 \Rightarrow \prod x = ?$

A) −10 B) −20 C) −30 D) −40 E) −50

12. $\begin{vmatrix} t & 1 & t \\ 20 & 30 & 40 \\ 4t & 10 & 4t \end{vmatrix} = -60 \Rightarrow t = ?$

A) −1 B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) −1 E) 2

13. $\begin{vmatrix} 1 & 0 & 0 \\ 1 & x & 1 \\ 0 & 3 & 2 \end{vmatrix} = 1 \Rightarrow x = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

14. $\begin{vmatrix} 3x-2 & x+1 \\ 2x-1 & 2x+3 \end{vmatrix} = 0 \rightarrow x_1 + x_2 = ?$

A) 1 B) −1 C) $\frac{1}{2}$ D) $-\frac{3}{4}$ E) $-\frac{3}{2}$

15. $A = \begin{bmatrix} x & y \\ -x & y \end{bmatrix}$, $B = \begin{bmatrix} x & 0 \\ 0 & y \end{bmatrix}$

$\det(A+B) = 10 \Rightarrow \det(A) + \det(B) = ?$

A) 4 B) 6 C) 8 D) 10 E) 12

16. $A = \begin{bmatrix} 1 & x \\ -3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 2 \\ 3 & -2 \end{bmatrix}$

$\det(A \cdot B) = 4 \Rightarrow x = ?$

A) −3 B) −1 C) 1 D) 3 E) 5

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1	2	3	4	5	6	7	8
A	E	A	C	A	D	B	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
B	B	B	C	C	B	B	B

1. $\begin{vmatrix} 2008 & 2012 \\ 2004 & 2008 \end{vmatrix} = ?$

A) 4 B) 6 C) 8 D) 12 E) 16

2. $A = \begin{vmatrix} \log_2 3 & -3 \\ 4 & \log_9 8 \end{vmatrix} \Rightarrow |A| = ?$

A) 9 B) 10 C) $\frac{25}{3}$ D) $\frac{27}{2}$ E) $\frac{29}{2}$

3. $\begin{vmatrix} \sin 24^\circ & \cos 24^\circ \\ \cos 36^\circ & \sin 36^\circ \end{vmatrix} = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) 1 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

4. $A = \begin{vmatrix} \sin 75^\circ & \cos 75^\circ \\ \sin 15^\circ & \cos 15^\circ \end{vmatrix} \Rightarrow |A| = ?$

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) 1 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

5. $\begin{vmatrix} x+2 & -x \\ 3 & x-3 \end{vmatrix} = ax^2 + bx + c \Rightarrow a + b + c = ?$

A) −9 B) −6 C) −3 D) 6 E) 9

6. $f(x) = \begin{vmatrix} e^{2x} & e^{-x} \\ e^{-2x} & e^{2x} \end{vmatrix} \Rightarrow f(\ln 2) = ?$

A) $\frac{63}{8}$ B) $\frac{65}{8}$ C) $\frac{127}{8}$ D) $\frac{129}{8}$ E) $\frac{63}{4}$

7. $\begin{bmatrix} 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 2 \\ 1 \end{bmatrix} = ?$

A) $\begin{bmatrix} -16 \end{bmatrix}$ B) $\begin{bmatrix} -8 \end{bmatrix}$ C) $\begin{bmatrix} -5 \\ 2 \end{bmatrix}$ D) $\begin{bmatrix} -5 & 2 \end{bmatrix}$ E) $\begin{bmatrix} -1 \end{bmatrix}$

8. $x^2 - 5x - 8 = 0$, ÇK(SS) = {m, n}

$A = \begin{bmatrix} m & 2 & 1 \\ 1 & n & 3 \\ 3 & 1 & 2 \end{bmatrix} \Rightarrow |A| = ?$

A) −20 B) −18 C) −16 D) 24 E) 26

9. $x \in R^+$,

$$\begin{vmatrix} 1 & x & 3x \\ -2x & 0 & -x \\ -1 & 1 & 0 \end{vmatrix} = 0 \Rightarrow \mathbf{x = ?}$$

A) $\frac{1}{5}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{3}{4}$ E) $\frac{3}{2}$

10. $f(x) = \begin{vmatrix} 3\cos x & 1+\sin x \\ 1-\sin x & \cos x \end{vmatrix} \Rightarrow f\left(\frac{\pi}{6}\right) = ?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{4}{3}$

11. $\begin{vmatrix} e^{2x} & e^{3} \\ e^{-3} & e^{x} \end{vmatrix} = 26 \Rightarrow \mathbf{x = ?}$

A) ln2 B) ln3 C) ln5 D) ln6 E) ln9

12. $\sum_{x=1}^{10} \begin{vmatrix} 1 & x \\ x & 2 \end{vmatrix} = ?$

A) −365 B) −245 C) −215 D) −180 E) −185

13. $i^2 = -1$, $\begin{vmatrix} i & 1 & i \\ 2 & 0 & -i \\ -1 & 0 & 1 \end{vmatrix} = ?$

A) i + 1 B) i − 1 C) i+2 D) i − 2 E) i+4

14. $\begin{vmatrix} 3 & -2k \\ 1 & -1 \end{vmatrix} \cdot \begin{vmatrix} 1 & 0 \\ -1 & 2 \end{vmatrix} = \begin{vmatrix} 1 & 1 \\ -3 & k \end{vmatrix} \Rightarrow \mathbf{k = ?}$

A) −4 B) −3 C) −2 D) 2 E) 3

15. $A = \begin{bmatrix} 1 & x \\ -3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 2 \\ 3 & -2 \end{bmatrix}$

$\det(A - B) = 14 \Rightarrow \mathbf{x = ?}$

A) −3 B) −1 C) 1 D) 3 E) 5

16. $A = \begin{bmatrix} x+7 & -4 & 4 \\ -1 & x+4 & -6 \\ 8 & -8 & x+6 \end{bmatrix}$, $\det(A) = 0$

$\Rightarrow$ **ÇK(SS) = ?**

A) $\{-16\}$ B) $\{-16, -3\}$ C) $\{2\}$ D) $\{-16, 2\}$ E) $\{-16, -3, 2\}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	D	B	E	C	C	B	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	C	B	A	D	E	D	E

1. $A = \begin{vmatrix} \log_2 27 & x \\ -2 & \log_3 4 \end{vmatrix}, \det(A) = -4 \Rightarrow x = ?$

A) −5 B) −4 C) −2 D) 2 E) 4

2. $\begin{vmatrix} e^{4x} & -e^{3-x} \\ e^{3x-3} & e^{-4x} \end{vmatrix} = 82 \Rightarrow x = ?$

A) ln3 B) 2ln3 C) 3ln3 D) 2ln2 E) 3ln2

3. $x \in Z$,

$\begin{vmatrix} 3 & -5 \\ -4 & |2x-3| \end{vmatrix} = 1 \Rightarrow \sum x = ?$

A) −3 B) −2 C) 1 D) 2 E) 3

4. $\frac{\pi}{2} < x < \pi$,

$A = \begin{vmatrix} 1-\cos x & 1-\sin x \\ \sin x & 1+\cos x \end{vmatrix}, |A| = 0 \Rightarrow x = ?$

A) $\frac{\pi}{6}$ B) $\frac{3\pi}{4}$ C) $\frac{4\pi}{5}$ D) $\frac{5\pi}{6}$ E) $\frac{7\pi}{8}$

5. $\begin{vmatrix} \sin 3x & \cos 3x \\ \sin 2x & \cos 2x \end{vmatrix} = \cos\frac{\pi}{3}, \ 0 < x < \frac{\pi}{2} \Rightarrow x = ?$

A) $\frac{\pi}{8}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{5}$ D) $\frac{\pi}{4}$ E) $\frac{\pi}{3}$

6. $\begin{vmatrix} 3 & -2x \\ 1 & -1 \end{vmatrix} \cdot \begin{vmatrix} 1 & 2 \\ -1 & 2 \end{vmatrix} = \begin{vmatrix} 1 & 2 \\ -1 & x \end{vmatrix} \Rightarrow x = ?$

A) −3 B) −2 C) 2 D) 4 E) 5

7. $A = \begin{bmatrix} 1 & 2 \\ 3 & 7 \end{bmatrix} \Rightarrow \det(A^{-1}) = ?$

A) 1 B) $\frac{1}{2}$ C) $\frac{1}{3}$ D) $\frac{1}{4}$ E) $\frac{1}{6}$

8. $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}, A \cdot B = \begin{bmatrix} -1 & 7 \\ -3 & 11 \end{bmatrix} \Rightarrow |B| = ?$

A) −16 B) −5 C) 5 D) 12 E) 16

9. $\begin{vmatrix} 1 & -1 & 0 \\ 1 & 2 & 3 \\ 0 & 1 & -2 \end{vmatrix} = ?$

A) -9 B) -7 C) -3 D) 3 E) 9

10. $A = \begin{vmatrix} 1 & 2 & 3 \\ 0 & -1 & 1 \\ 2 & 1 & -2 \end{vmatrix} \Rightarrow \det(A) = ?$

A) 7 B) 8 C) 9 D) 10 E) 11

11. $\begin{vmatrix} 10 & 20 & 30 \\ 0 & -1 & 1 \\ 2 & 1 & -2 \end{vmatrix} = ?$

A) 90 B) 100 C) 110 D) 120 E) 130

12. $A = \begin{vmatrix} -3 & 4 & 0 \\ 0 & 1 & 3 \\ x-2 & 0 & -2 \end{vmatrix}$, $|A| = 6 \Rightarrow x = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

13. $x \in R^+$,

$\begin{vmatrix} 2 & 0 & x \\ -x & 4 & 0 \\ 0 & -2 & x^2 \end{vmatrix} = 40 \Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $i^2 = -1$,

$\begin{vmatrix} 2i & i-2 & i+1 \\ 1 & 0 & 1 \\ i & 1 & -1 \end{vmatrix} = x + yi \Rightarrow x - y = ?$

A) -4 B) -2 C) 0 D) 2 E) 4

15. $A = \begin{vmatrix} 1 & 0 & 2 \\ 3 & 1 & 0 \\ 2 & 1 & 1 \end{vmatrix} \Rightarrow |A^{-1}| = ?$

A) $-\frac{1}{3}$ B) $-\frac{1}{9}$ C) $\frac{1}{3}$ D) $\frac{1}{9}$ E) $\frac{1}{81}$

16. $\begin{vmatrix} x+2 & -4 & 3 \\ -1 & x-3 & -1 \\ x+1 & -5 & x+1 \end{vmatrix} = 0 \Rightarrow ÇK(SS) = ?$

A) $\{-2\}$ B) $\{1\}$ C) $\{1,4\}$ D) $\{-2,1\}$ E) $\{-2,1,4\}$

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	B	E	D	B	C	A	B
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	E	C	E	B	C	C	E

1. $A=\begin{bmatrix} x+2 & 5 \\ 3 & y-1 \end{bmatrix}$, $B\begin{bmatrix} 8 & z+1 \\ 3 & 4 \end{bmatrix}$

$A = B \Rightarrow$ **$2x+2y+2z=?$**

A) 16 B) 20 C) 24 D) 26 E) 30

2. $A=\begin{bmatrix} 2 & 3 & 5 & 1 \\ 1 & 2 & 3 & -2 \end{bmatrix}$, $B=\begin{bmatrix} 2 & 3 \\ 5 & 7 \\ 1 & 2 \\ 0 & 1 \end{bmatrix}$

$\Rightarrow$ **$A^T+3B=?$**

A) $\begin{bmatrix} -4 & -8 \\ -12 & -19 \\ 2 & -3 \\ 1 & -5 \end{bmatrix}$ B) $\begin{bmatrix} 4 & 8 & 6 & 1 \\ 4 & 9 & 5 & -1 \end{bmatrix}$ C) $\begin{bmatrix} 5 & 10 & 7 & 2 \\ 3 & 7 & 4 & -2 \end{bmatrix}$

D) $\begin{bmatrix} 8 & 10 \\ 18 & 23 \\ 8 & 9 \\ 1 & 1 \end{bmatrix}$ E) $\begin{bmatrix} -8 & -10 \\ -18 & -23 \\ -8 & -9 \\ -1 & -1 \end{bmatrix}$

3. $A=\begin{bmatrix} 4 & -8 \\ 2 & -4 \end{bmatrix} \Rightarrow$ **$A^{10}=?$**

A) $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$ B) $\begin{bmatrix} 16 & -16 \\ 4 & -8 \end{bmatrix}$ C) $\begin{bmatrix} 24 & -8 \\ 12 & -4 \end{bmatrix}$

D) $\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}$ E) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

4. $A=\begin{bmatrix} 8 & 5 \\ 2 & 3 \end{bmatrix} \Rightarrow$ **$\det(A)+\det(A^T)=?$**

A) 28 B) 32 C) 40 D) 48 E) 68

5. $\begin{vmatrix} 2 & 3 & 4 \\ 1 & 2 & 0 \\ 2 & 6 & 1 \end{vmatrix}=?$

A) 8 B) 9 C) 10 D) 12 E) 18

6. $A=\begin{bmatrix} 2 & 5 & 3 \\ 1 & 4 & 8 \\ 3 & -2 & 9 \end{bmatrix} \Rightarrow$ **$M_{31}=?$**

A) 12 B) 15 C) 20 D) 24 E) 28

7. $\begin{vmatrix} 2 & 5 & 3 & 4 \\ 1 & 2 & 3 & 5 \\ 5 & 0 & 0 & 0 \\ 1 & 4 & 3 & 2 \end{vmatrix}=?$

A) 35 B) 45 C) −45 D) −21 E) −105

8. $A=[a_{ij}]_{3\times3}$

$\det(A)=10 \Rightarrow$ **$\det(2A)=?$**

A) 10 B) 20 C) 30 D) 60 E) 80

9. $x \in R$,

$$\begin{vmatrix} 2x+3 & x+1 \\ x & x+2 \end{vmatrix} = 2 \Rightarrow \sum x = ?$$

A) −6 B) −2 C) 1 D) 3 E) 8

10. $\begin{vmatrix} 2 & 3 & 5 \\ 1 & 3 & 8 \\ 6 & 9 & 15 \end{vmatrix} = ?$

A) −12 B) −6 C) −4 D) 0 E) 6

11. $\begin{vmatrix} 24 & 25 & 26 \\ 27 & 28 & 29 \\ 30 & 31 & 32 \end{vmatrix} = ?$

A) 0 B) 6 C) 12 D) 24 E) 56

12. $\begin{vmatrix} 2020 & 2009 \\ 2019 & 2008 \end{vmatrix} = ?$

A) −4 B) −7 C) −8 D) −11 E) −15

13. $\begin{vmatrix} 3 & 1 & 2 & 2 \\ 2 & 3 & 5 & 6 \\ 4 & 0 & 2 & 0 \\ 1 & -1 & 3 & -2 \end{vmatrix} = ?$

A) −12 B) −6 C) 0 D) 2 E) 10

14. $\begin{vmatrix} a & 2 & 1 \\ b & 3 & 4 \\ c & 5 & 2 \end{vmatrix} = 10 \Rightarrow \begin{vmatrix} a+3 & 2 & 1 \\ b+1 & 3 & 4 \\ c+2 & 5 & 2 \end{vmatrix} = ?$

A) −21 B) −6 C) 0 D) 3 E) 8

15. $A = \begin{bmatrix} x & 8 \\ 3 & 2 \end{bmatrix}$ matrisinin tersi olmaması için **x ne olmalıdır?**

For the inverse of matrix $A = \begin{bmatrix} x & 8 \\ 3 & 2 \end{bmatrix}$ not to exist, what should the value of x be?

A) 2 B) 3 C) 4 D) 8 E) 12

16. $A = [a_{ij}]_{2x2}$

A matrisinin her bir satırdaki elemanların toplamı 4 olduğuna göre, **A^2 matrisinin elemanları toplamı kaçtır?**

If sum of elements of each row of the matrix A is 4, what is sum of all elements of the matrix A^2?

A) 16 B) 24 C) 32 D) 40 E) 48

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
E	D	E	A	B	E	E	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	D	A	D	C	A	E	C

1. $\begin{bmatrix} x \\ y-1 \end{bmatrix} + \begin{bmatrix} y+1 \\ x \end{bmatrix} = \begin{bmatrix} 6 \\ 4 \end{bmatrix}$

$x - y = 3 \Rightarrow \begin{vmatrix} x & y \\ y & x \end{vmatrix} = ?$

A) 19 B) 17 C) 15 D) 13 E) 11

2. $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ için / for $a + b + c + d = 3$

$A + A^T = \begin{bmatrix} x & y \\ z & t \end{bmatrix} \Rightarrow x + y + z + t = ?$

A) 6 B) 3 C) 2 D) $\frac{1}{3}$ E) 0

3. $\begin{vmatrix} 1 & 2 & -1 \\ 0 & 1 & \tan\theta \\ -1 & 3 & -1 \end{vmatrix} = 8 \Rightarrow \sin\theta \cdot \cos\theta = ?$

A) $\frac{2}{5}$ B) $\frac{1}{5}$ C) 1 D) $-\frac{1}{5}$ E) $-\frac{2}{5}$

4. $\left.\begin{matrix} 3x - y = 2 \\ 5x + 2y = 3 \end{matrix}\right\} \Rightarrow A \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ 3 \end{bmatrix},$

$A \cdot \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} a \\ b \end{bmatrix} \Rightarrow a + b = ?$

A) 4 B) 6 C) 8 D) 10 E) 12

5. $A = \begin{bmatrix} 1 & 0 \\ -1 & 3 \end{bmatrix}, B = \begin{bmatrix} -1 & 1 \\ 0 & m \end{bmatrix}$

$\det(A + B) = \det(A) + \det(B)$

$\Rightarrow m = ?$

A) -3 B) -1 C) 0 D) 2 E) 4

6. $A^{-1} = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$

$A \cdot \begin{bmatrix} 1 \\ a \end{bmatrix} = \begin{bmatrix} b \\ 4 \end{bmatrix}$

$\Rightarrow a + b = ?$

A) 5 B) 7 C) 8 D) 9 E) 11

7. $A^2 = \begin{bmatrix} 2 & 1 \\ 1 & 5 \end{bmatrix} \Rightarrow \left|(A - I_2)\cdot(A + I_2)\right| = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

8. $A = \begin{bmatrix} -1 & 2 & 1 \\ 0 & 1 & 4 \\ 3 & -1 & -2 \end{bmatrix} \Rightarrow a_{12} \cdot A_{23} = ?$

A) -10 B) -8 C) 8 D) 6 E) 10

9. $[2\ \ 1]\cdot\begin{bmatrix}1 & 0\\3 & 1\end{bmatrix}^{-1}\cdot\begin{bmatrix}1\\4\end{bmatrix}=[a]$

$\Rightarrow$ **a = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

10. $A=\begin{bmatrix}1 & 1\\0 & 1\end{bmatrix},\ B=\begin{bmatrix}1 & 0\\1 & 1\end{bmatrix}$

$\Rightarrow$ **$\det(A^2-B^2)=$?**

A) −4 B) 0 C) 1 D) 2 E) 4

11. $A=\begin{bmatrix}1 & 0\\-1 & 1\end{bmatrix},\ B=\begin{bmatrix}1 & 0\\1 & 1\end{bmatrix}$

$A\cdot X=B\ \Rightarrow$ **X = ?**

A) $\begin{bmatrix}1 & -2\\0 & 1\end{bmatrix}$ B) $\begin{bmatrix}0 & 1\\1 & 0\end{bmatrix}$ C) $\begin{bmatrix}1 & 0\\2 & 1\end{bmatrix}$ D) $\begin{bmatrix}-1 & 0\\1 & -2\end{bmatrix}$ E) $\begin{bmatrix}0 & -1\\2 & 1\end{bmatrix}$

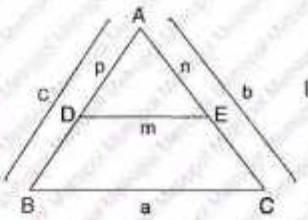
12. $A=\begin{bmatrix}1 & 3 & 5\\3 & 0 & 7\\1 & 3 & a-9\end{bmatrix}$

matrisinin ters matrisinin olmaması için **a kaç olmalıdır?**

For the inverse matrix of **A** not to exist, what should the value of a be?

A) 15 B) 14 C) 11 D) 6 E) 5

13.



[DE] // [BC]

$\Rightarrow \begin{vmatrix}1 & 2 & 3\\m & n & p\\a & b & c\end{vmatrix}=$?

A) 6 B) 3 C) 2 D) 1 E) 0

14. $A_{m\times n}$

$B=A^T+A\ \Rightarrow$ **$B^T=$?**

A) B^{-1} B) B C) A^{-1} D) A^T E) A

15. $m\in R^+,\ u=[x\ \ y]$

$u\cdot\begin{bmatrix}1 & 2\\2 & 1\end{bmatrix}=u\cdot\begin{bmatrix}m & 0\\0 & m\end{bmatrix}$

matris denkleminin sonsuz sayıda u çözümü olduğuna göre, **m kaçtır?**

If the matrix equation has infinite number of solutions for u, what is m?

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) 3 E) 4

16. $A_{3\times3}$

$[2\ \ 1\ \ 3]\cdot A=[0\ \ 2\ \ 2]$

$[1\ \ 4\ \ 0]\cdot A=[3\ \ 1\ \ 5]$

$\Rightarrow$ **$[5\ \ 6\ \ 6]\cdot A=$?**

A) [2 1 3] B) [3 3 7] C) [3 5 9] D) [6 2 10] E) [6 4 12]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
C	A	E	D	D	B	B	E
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	E	C	B	E	B	D	C

1. $x\begin{bmatrix}2\\1\end{bmatrix} - y\begin{bmatrix}-3\\4\end{bmatrix} = \begin{bmatrix}7\\-13\end{bmatrix}$

$\Rightarrow$ **y − x = ?**

A) 4 B) 3 C) 0 D) −3 E) −4

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2019]

2. $\begin{vmatrix}2 & 0 & m\\1 & -2 & 2\\3 & 2 & 1\end{vmatrix}$

matrisinin determinantı 12 olduğuna göre **m kaçtır?**

Provided that the determinant of the matrix is 12, what is the value of m?

A) 3 B) 2 C) 1 D) −2 E) −3

[ATATÜRK ÜNİVERSİTESİ – YÖS 2019]

3. $A = \begin{bmatrix}1 & -1 & 0\\4 & 0 & x\\0 & x & 1\end{bmatrix}$

matrisinin tersi olmaması için **x ne olmalıdır?**

For the inverse matrix of A not to exist, what should x be?

A) ±1 B) ±3 C) ±5 D) ±4 E) ±2

[ATATÜRK ÜNİVERSİTESİ – YÖS 2018]

4. $\left.\begin{array}{l} A + 2B = \begin{bmatrix}3 & -4\\0 & 6\end{bmatrix} \\ A - 3B = \begin{bmatrix}3 & 1\\5 & -4\end{bmatrix}\end{array}\right\} \Rightarrow$ **A = ?**

A) $\begin{bmatrix}3 & -2\\2 & 2\end{bmatrix}$ B) $\begin{bmatrix}3 & -2\\-2 & -2\end{bmatrix}$ C) $\begin{bmatrix}3 & 2\\2 & 2\end{bmatrix}$ D) $\begin{bmatrix}-3 & 2\\2 & 2\end{bmatrix}$ E) $\begin{bmatrix}-3 & -2\\-2 & -2\end{bmatrix}$

[DUMLUPINAR ÜNİVERSİTESİ – YÖS 2018]

5. $A = \begin{bmatrix}2 & 1 & -1 & 2\end{bmatrix}$, $B = \begin{bmatrix}1 & 0 & 2 & 3\\2 & 1 & 3 & 4\end{bmatrix}$

$\Rightarrow$ **$A \times B^T$ = ?**

A) $\begin{bmatrix}3 & 5\end{bmatrix}$ B) $\begin{bmatrix}6 & 10\end{bmatrix}$ C) $\begin{bmatrix}4 & 10\end{bmatrix}$ D) $\begin{bmatrix}6 & 9\end{bmatrix}$ E) $\begin{bmatrix}5 & 3\end{bmatrix}$

[FIRAT ÜNİVERSİTESİ – YÖS 2018]

6. $A = \begin{bmatrix}1 & 0\\-5 & 1\end{bmatrix} \Rightarrow$ **A^{14} = ?**

A) $\begin{bmatrix}1 & 5\\-14 & 1\end{bmatrix}$ B) $\begin{bmatrix}1 & 0\\-42 & 1\end{bmatrix}$ C) $\begin{bmatrix}1 & 0\\-70 & 1\end{bmatrix}$ D) $\begin{bmatrix}1 & -5\\0 & 1\end{bmatrix}$ E) $\begin{bmatrix}1 & 0\\-35 & 1\end{bmatrix}$

[FIRAT ÜNİVERSİTESİ – YÖS 2018]

7. $A = \begin{bmatrix}-2 & 3\\4 & 2\end{bmatrix} \Rightarrow$ **A^{2006} = ?**

A) $2^{4012}\begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}$ B) $2^{4012}\begin{bmatrix}2 & 3\\5 & 8\end{bmatrix}$ C) $2^{1003}\begin{bmatrix}2 & 3\\5 & 8\end{bmatrix}$ D) $2^{4017}\begin{bmatrix}0 & 1\\1 & 0\end{bmatrix}$ E) $2^{1003}\begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2017]

8. $A = \begin{bmatrix}2 & -1\\0 & 3\end{bmatrix}$, $B = \begin{bmatrix}4 & -2\\1 & 3\end{bmatrix}$

$\Rightarrow$ **det(A · B) = ?**

A) 84 B) 81 C) 80 D) 78 E) 75

[BALIKESİR ÜNİVERSİTESİ – YÖS 2017]

9. $A=\begin{bmatrix}-1 & -1\\ 0 & 3\end{bmatrix}$, $B=\begin{bmatrix}2 & 0\\ 1 & 3\end{bmatrix}$ $\Rightarrow$ **det(A · B) = ?**

A) 4 B) 10 C) −18 D) −3 E) −9

[SELÇUK ÜNİVERSİTESİ – YÖS 2017]

10. $\left.\begin{array}{l}3A+B=\begin{bmatrix}9 & -1\\ 9 & 3\end{bmatrix}\\ A-B=\begin{bmatrix}3 & -11\\ -1 & 1\end{bmatrix}\end{array}\right\}$ $\Rightarrow$ **A = ?**

A) $\begin{bmatrix}-2 & 1\\ 4 & 3\end{bmatrix}$ B) $\begin{bmatrix}3 & -3\\ 2 & 1\end{bmatrix}$ C) $\begin{bmatrix}4 & -3\\ 2 & 1\end{bmatrix}$ D) $\begin{bmatrix}0 & 3\\ 5 & 7\end{bmatrix}$ E) $\begin{bmatrix}-1 & 4\\ 2 & 1\end{bmatrix}$

[SELÇUK ÜNİVERSİTESİ – YÖS 2017]

11. $A=\begin{bmatrix}1 & 4 & -1\\ 2 & 3 & -2\\ 0 & 3 & x-2\end{bmatrix}$ matrisinin ters matrisinin olmaması için **x kaç olmalıdır?**

For the inverse matrix of A not to exist, what should x be?

A) 2 B) 3 C) 4 D) 5 E) 6

[SELÇUK ÜNİVERSİTESİ – YÖS 2017]

12. $A+B=\begin{bmatrix}1 & 3\\ 2 & 1\end{bmatrix}$, $A-2B=\begin{bmatrix}3 & 1\\ -1 & 2\end{bmatrix}$ $\Rightarrow$ **A = ?**

A) $\begin{bmatrix}5/3 & 7/3\\ 1 & 4/3\end{bmatrix}$ B) $\begin{bmatrix}5/3 & 7/3\\ -1 & 4/3\end{bmatrix}$ C) $\begin{bmatrix}4/3 & 7/3\\ -1/3 & 5/3\end{bmatrix}$ D) $\begin{bmatrix}4/3 & 7/3\\ -1/3 & -5/3\end{bmatrix}$ E) $\begin{bmatrix}5/3 & -7/3\\ -1 & -4/3\end{bmatrix}$

[İSTANBUL ÜNİVERSİTESİ – YÖS 2016]

13. $\begin{vmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ -7 & -8 & -9\end{vmatrix}+\begin{vmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ 7 & 8 & 9\end{vmatrix}=?$

A) 0 B) 1 C) 7 D) 10 E) 12

[İSTANBUL ÜNİVERSİTESİ – YÖS 2016]

14. $x_1\begin{bmatrix}1\\ 1\end{bmatrix}+x_2\begin{bmatrix}1\\ -2\end{bmatrix}=\begin{bmatrix}a\\ b\end{bmatrix}$ $\Rightarrow$ **x_1 = ?**

A) $a+2b$ B) $\frac{a-2b}{3}$ C) $\frac{2a+b}{3}$ D) $\frac{a+2b}{3}$ E) $\frac{2a-b}{3}$

[YILDIZ TEKNİK ÜNİVERSİTESİ – YÖS 2016]

15. $\begin{bmatrix}3 & -1\\ 1 & 0\end{bmatrix}\begin{bmatrix}a\\ b\end{bmatrix}=\begin{bmatrix}5\\ 2\end{bmatrix}$ $\Rightarrow$ **a · b = ?**

A) −2 B) −1 C) 0 D) 1 E) 2

[İSTANBUL ÜNİVERSİTESİ – YÖS 2015]

16. $A=\begin{bmatrix}-2 & -1\\ 3 & 0\\ 4 & 0\end{bmatrix}$, $B=\begin{bmatrix}-2 & \frac{-1}{2}\\ 4 & -3\end{bmatrix}$

$\Rightarrow$ **det(A − B) = ?**

A) $-\frac{29}{8}$ B) $-\frac{19}{4}$ C) $-\frac{13}{8}$ D) $\frac{13}{8}$ E) $\frac{19}{8}$

[ONDOKUZ MAYIS ÜNİVERSİTESİ – YÖS 2014]

YANITLAR / ANSWERS

1	2	3	4	5	6	7	8
A	A	E	A	B	C	A	A
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
C	B	A	A	A	C	E	C

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