

# YTÜYÖS-2018

## YILDIZ TEKNİK ÜNİVERSİTESİ YURT DIŐI ÖĐRENCİ GİRİŐ SINAVI MATEMATİK VE GENEL YETENEK TESTİ

THE ENTRANCE EXAMINATION FOR FOREIGN STUDENTS  
THE MATHEMATICS & IQ TEST

13 Mayıs 2018  
(13 May, 2018)

### ADAYIN / APPLICANT'S

ADI / NAME: .....

SOYADI / SURNAME: .....

ADAY NUMARASI / CANDIDATE NUMBER: .....

SINAV SALON NO / EXAMINATION HALL NO: .....

Adınızı, soyadınızı, aday numaranızı ve sınav salon numaranızı yukarıda boş bırakılan yere yazınız.

Write your name, surname, candidate number, and examination hall no in the appropriate places above.

### GENEL AÇIKLAMALAR (GENERAL INSTRUCTIONS)

- |  |   |
|--|---|
| <p>I. Bu testte 80 soru vardır.</p> <p>II. Bu test için verilen cevaplama süresi 130 dakikadır.</p> <p>III. Bu testteki soruların cevapları, sadece Cevap Kâğıdının ayrılmış olan kısmına işaretlenecektir.</p> <p>IV. Cevaplamaya istediğiniz sorudan yapabilirsiniz. Cevaplarınızı işaretlerken soru kitapçığındaki soru numarası cevap kâğıdındaki cevap numarasının aynı olmasına dikkat ediniz.</p> <p>V. Bu testlerdeki her sorunun bir tek doğru cevabı vardır. Bir soru için birden çok cevap yeri işaretlenmişse, o soru yanlış cevaplanmış sayılacaktır.</p> <p>VI. Cevaplarınızı koyu siyah ve yumuşak bir kurşun kalemle işaretleyiniz. İşaretlerinizi cevap yerinin dışına taşırmayınız. Tükenmez kalem veya dolma kalem kullanmayınız.</p> <p>VII. Cevap kâğıdınızı buruşturmayınız, katlamayınız ve üzerine gereksiz hiçbir işaret koymayınız. Deđiştirmek istediğiniz bir cevabı, yumuşak bir silgiyle, temizce siliniz ve yeni cevabınızı işaretlemeyi unutmayınız.</p> <p>VIII. Bu testler puanlanırken, doğru cevaplarınızın sayısından yanlış cevaplarınızın sayısının dörtte biri düşülecek ve kalan sayı ham puanınız olacaktır.</p> <p>IX. Sınavda uyulacak diđer kurallar bu kitapçığın arka kapağında belirtilmiştir.</p> | <p>I. This test is comprised of 80 questions.</p> <p>II. The time allowed for this test is 130 minutes.</p> <p>III. Please use the appropriate part of the only Answer Sheet.</p> <p>IV. The questions need not be answered in any special order, but make sure that the number on the answer sheet does indeed correspond to the number of the question you are working on in the test booklet.</p> <p>V. In these tests there is only one correct answer for each question. If more than one alternative is marked, that answer will automatically be considered wrong.</p> <p>VI. You should use a soft, black pencil to mark the answer sheet. Make sure your mark does not go beyond the borders of the circle. Do not use any kind of pen.</p> <p>VII. Keep the answer sheet flat and do not fold it. Do not make any unnecessary marks on it. If you wish to change an answer, carefully erase it completely with a very soft eraser. Do not forget to mark your new answer.</p> <p>VIII. In the scoring of the tests, for every four incorrect answers, one correct answer will be deducted, the remainder will be the raw score.</p> <p>IX. The other regulations concerning the administration of the tests will be found at the back of the booklet.</p> |
|--|---|

*Bu testlerin her hakkı saklıdır. Hangi amaçla olursa olsun, testlerin tamamının veya bir kısmının YTÜ Yurt Dışı Öğrenci Ofisinin yazılı izni olmadan kopya edilmesi, fotoğrafının çekilmesi, herhangi bir yolla çoğaltılması, yayımlanması ya da kullanılması yasaktır. Bu yasağa uymayanlar gerekli cezai sorumluluđu ve testlerin hazırlanmasındaki mali külfeti peşinen kabullenmiş sayılır.*

1. 
$$\frac{10-0,19}{(0,03)^2 \cdot (10,9)} = ?$$

- A) 1000    B) 27    C) 2,7    D) 100    E) 10

2. 
$$\frac{(-2)^{-3} - (-3^{-2})}{(-3)^{-2} - (-2)^{-3}} = ?$$

- A)  $\frac{-1}{17}$     B) 1    C)  $\frac{-1}{72}$     D) 1    E)  $\frac{-17}{72}$

3. 
$$\sqrt{13-2\sqrt{30}} + \sqrt{5-2\sqrt{6}} + \sqrt{2} = ?$$

- A)  $\sqrt{10}$     B)  $2\sqrt{3}$     C)  $\sqrt{2} + \sqrt{3}$   
D)  $\sqrt{10} - \sqrt{5}$     E)  $\sqrt{7} - \sqrt{2}$

4. 
$$\left. \begin{array}{l} x > 0 \\ 2x = 3y = 6z \\ x + y = yz \end{array} \right\} \Rightarrow x + z = ?$$

- A) 12    B)  $\frac{25}{2}$     C) 16    D)  $\frac{17}{2}$     E) 10

5. 
$$\left. \begin{array}{l} 8^x = 1 \\ 5^{x+y} = 25 \end{array} \right\} \Rightarrow y = ?$$

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

6. 
$$(0,04)^x = (0,0016)^y, \quad x + y = 3$$
  
$$\Rightarrow x \cdot y = ?$$

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

7.  $x > 1, 9^{\left|\frac{x}{2}-1\right|-1} = \frac{1}{3} \Rightarrow x = ?$

A) 2    B) 4    C) 3    D) 5    E) 6

8.  $3 - \frac{9}{3 - \frac{9}{\vdots}} = x \Rightarrow x^3 = ?$

A) -8    B) -16    C)  $-3\sqrt{2}$     D)  $-3\sqrt{3}$     E) -27

9.  $P(x) + (x+2)P(x) = x^3 + ax^2 + 9$   
 $\Rightarrow P(1) = ?$

A) 1    B) 3    C) 2    D) 5    E) 4

10.  $2x^2 - 5x + 2 = 0 \Rightarrow 4x^2 + \frac{4}{x^2} = ?$

A) 17    B) 25    C) 9    D) 33    E) 48

11.  $\left. \begin{array}{l} a \odot b = a^2 \otimes \frac{a}{b} \\ x \otimes y = x^{y^y} + \frac{1}{y^x} \end{array} \right\} \Rightarrow 2 \odot 4 = ?$

A) 33    B) 18    C) 9    D)  $\frac{33}{2}$     E)  $\frac{9}{16}$

12.

$$f(x) = x^2 + 3x + 2, \quad A = \begin{bmatrix} 1 & -2 \\ 2 & -1 \end{bmatrix}$$

$$\Rightarrow f(A) = ?$$

A)  $\begin{bmatrix} 3 & -6 \\ -3 & 2 \end{bmatrix}$

B)  $\begin{bmatrix} 2 & -6 \\ 6 & -4 \end{bmatrix}$

C)  $\begin{bmatrix} 10 & 0 \\ -6 & 2 \end{bmatrix}$

D)  $\begin{bmatrix} 2 & -10 \\ 6 & -4 \end{bmatrix}$

E)  $\begin{bmatrix} 8 & -6 \\ -3 & -2 \end{bmatrix}$

13.

$$i^2 = -1 \Rightarrow \left( \frac{1-i}{1+i} \right)^2 + 1 - \frac{1}{i} = ?$$

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

14.

$$a + \frac{1}{b} = 2, \quad b + \frac{2}{a} = 3$$

$$\Rightarrow \frac{3a+2b-1}{4b} = ?$$

A) 1    B) 3    C) 2    D) -4    E) 4

15.

$$x < 0 < y,$$

$$\sqrt{(x-y)^2} + \sqrt[3]{(x-y)^3} - \sqrt{x^2} + \sqrt{(-y)^2} = ?$$

A)  $x-y$

B)  $-x+y$

C)  $x+y$

D)  $x-3y$

E)  $3x-3y$

16.

$$10 - \frac{19}{5 - \frac{9}{x + \frac{1}{2}}} = \frac{1}{2} \Rightarrow 2x - 1 = ?$$

A) 9    B) 5    C) 7    D) 4    E) 11

$$17. \left. \begin{array}{l} \frac{x}{y} = \frac{u}{v} = \frac{3}{5} \\ \frac{4x+30}{2y+3v} = \frac{6}{5} \end{array} \right\} \Rightarrow u = ?$$

- A) -5   B) 5   C) 2   D) 1   E) 4

$$18. \frac{x+2}{3} + \frac{2x+3}{2} \equiv -1 \pmod{5} \rightarrow x = ?$$

- A) 0   B) 1   C) 2   D) 3   E) 4

$$19. \left. \begin{array}{l} 2\sqrt{x} + 3\sqrt{y} = 16 \\ 4x - 9y = 64 \end{array} \right\} \Rightarrow x \cdot y = ?$$

- A) 100   B) 99   C) 98  
D) 102   E) 105

$$20. \frac{1-2\sin^2 x}{\sin x} - 2\cos x \cdot \cot(2x) = ?$$

- A) 0   B)  $\cos(2x)$    C)  $\sin(2x)$   
D)  $\cos x$    E)  $\sin x$

$$21. \log_a b + \log_b a = 2 \Rightarrow \frac{2a+b}{a+2b} = ?$$

- A) 3   B) 2   C) 1   D) 8   E) 4

$$22. \left. \begin{array}{l} \log_a x + \log_{1/a} y = 1 \\ \log_x a + \log_y \frac{1}{a} = -1 \end{array} \right\} \Rightarrow \log_a x \cdot \log_y a = ?$$

- A) 4   B) -1   C) -2   D) 1   E) 2

23.  $f(x) = \sqrt{x}$ ,  $(g \circ f)(x) = x - \sqrt{x}$   
 $\Rightarrow g(x) = ?$

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

24.  $f(x) = x^2 + 1$ ,  $(g^{-1} \circ f)(x) = x^2 + 3$   
 $\Rightarrow g(3) = ?$

- A) -1    B) 0    C) 1    D) 4    E) 9

25.  $\tan 75^\circ - \cot 75^\circ = ?$

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

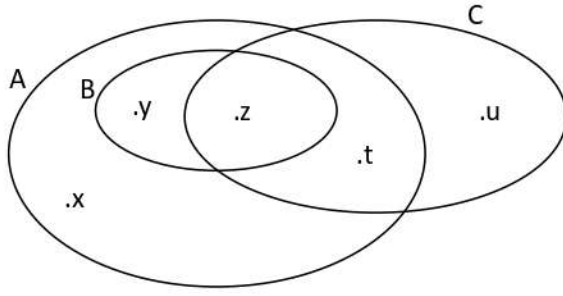
26.  $\sin \left[ \arcsin \left( -\frac{1}{2} \right) + 2 \arcsin \left( \frac{\sqrt{3}}{2} \right) \right] = ?$

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

27.  $f: \mathbb{R} \rightarrow \mathbb{R}, y = f(x) \left\{ \begin{array}{l} y^3 + 3x^3 = 1 - xy \end{array} \right. \Rightarrow f'(1) = ?$

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

28.



A-(B ∩ C)=?

- A) {x, y, t, u}    B) {x, y}    C) {x}  
 D) {x, y, t}    E) {u}

29.  $f(x) = \cos^2(e^{2x} - x^3) \Rightarrow f'(0) = ?$ 

- A) 0    B) 1    C)  $-2\sin 2$   
 D)  $-2\sin 1$     E)  $-2\cos 1$

30.

$$\int_{-1}^1 [\ln(2+x) - \ln(2-x)] dx = ?$$

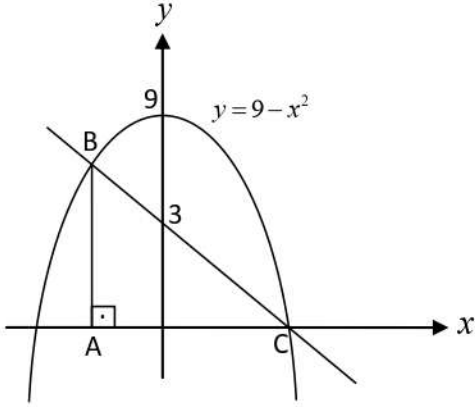
- A) -2    B) -1    C) 0    D) 1    E) 2

31.

$$\int_0^3 \frac{x}{1 + \sqrt{1+x}} dx = ?$$

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

32.



$$A(\triangle ABC) = ?$$

- A)  $\frac{5}{2}$     B)  $\frac{15}{2}$     C)  $\frac{25}{2}$     D) 2    E) 3

33.

$$\lim_{x \rightarrow \infty} 2^{x - \sqrt{x^2 + 2x}} = ?$$

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

34.

$$\lim_{x \rightarrow 0^+} \frac{\sin x}{x + \sqrt{x}} = ?$$

- A) 1    B) 0    C)  $\frac{1}{2}$     D)  $\infty$     E) 2

35.

$$\lim_{x \rightarrow \infty} \frac{x \ln x}{e^x - 1} = ?$$

- A)  $\infty$     B)  $e$     C) 0    D) 1    E)  $e^2$



36.

$$f(x) = \frac{1}{x(x+1)}$$

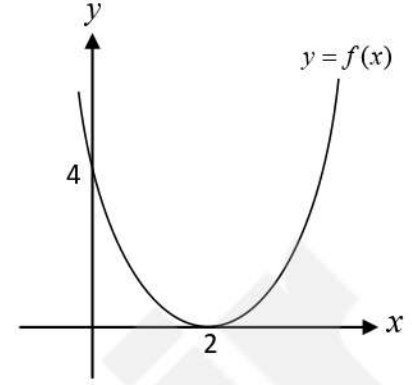
$$\Rightarrow 11 \cdot [f(1) + f(2) + \dots + f(10)] = ?$$

A) 110 B) 11 C) 10 D) 121 E) 1

37.

$$\begin{aligned} m - n &= 5 \\ n + 2r &= 4 \end{aligned} \rightarrow n^2 - 2mr - mn + 2nr = ?$$

A) -30 B) 15 C) -20 D) -15 E) 20

38.  $f(x) = ax^2 + bx + c$ 

$$f(3) = ?$$

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

39.

$$A = \begin{bmatrix} 0 & 2 & 0 \\ x & x & 3 \\ x+2 & x^2 & 2 \end{bmatrix}, \quad \det(A) = 22 \Rightarrow x = ?$$

A) 5 B) -17 C) -5 D) 16 E) 21

40.  $P(n,4) = 30 \cdot C(n,5) \Rightarrow n = ?$

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

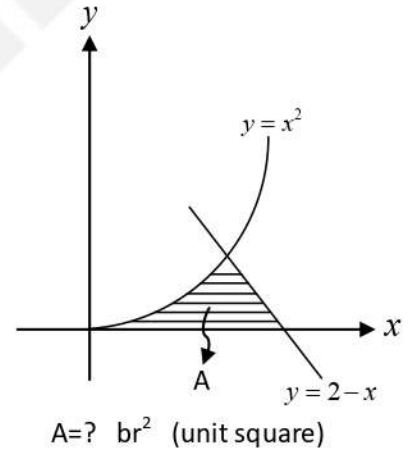
41.  $P(n+1,4) = 4 \cdot P(n,2) \Rightarrow n = ?$

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

42.  $\frac{x^3 - 27}{x^4 - 81} \div \frac{x^2 + 3x + 9}{x^4 + 3x^3 + 9x^2 + 27x} = ?$

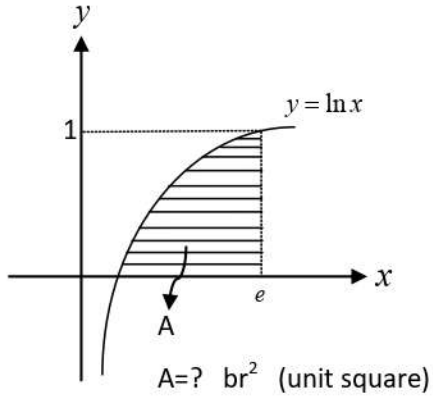
- A) 1 B)  $x$  C)  $x-3$   
D)  $x+3$  E)  $\frac{x+3}{x^2+9}$

43.



- A)  $\frac{1}{2}$  B)  $\frac{3}{4}$  C)  $\frac{6}{7}$  D)  $\frac{5}{6}$  E) 1

44.

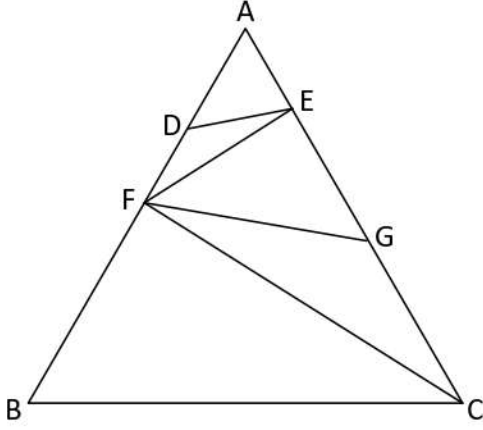


- A)  $e$     B)  $1$     C)  $\frac{e}{2}$     D)  $2e$     E)  $2$

45.  $\frac{20}{13} + \frac{26}{17} = a \Rightarrow \frac{1}{13} + \frac{1}{17} = ?$

- A)  $3a - 12$     B)  $a - 6$     C)  $2a - 6$   
 D)  $3a - 16$     E)  $2a - 21$

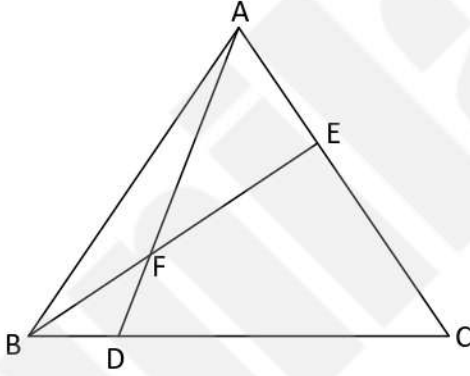
46.



$|AE|=|DE|=|DF|$ ,  $|EF|=|EG|$ ,  $|GF|=|GC|$ ,  
 $|CF|=|CB|$ ,  $m(\angle BCF)=30^\circ$ ,  $m(\angle FGC)=?$

- A) 95      B) 106      C) 115  
 D) 126      E) 135

47.

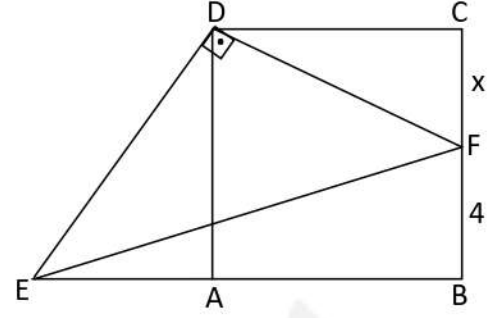


$|BD|=\frac{1}{4}|BC|$ ,  $|AE|=\frac{1}{3}|AC|$ ,

$A(\triangle ABF)=12 \text{ cm}^2$ ,  $A(\triangle ABC)=? \text{ cm}^2$

- A) 48    B) 54    C) 66    D) 72    E) 76

48.

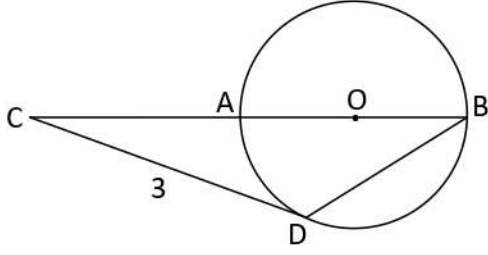


ABCD kare (square),  $[DE] \perp [DF]$ ,

$|BF|=4 \text{ cm}$ ,  $A(\triangle DEF)=20 \text{ cm}^2$ ,  
 $|CF|=x=? \text{ cm}$

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

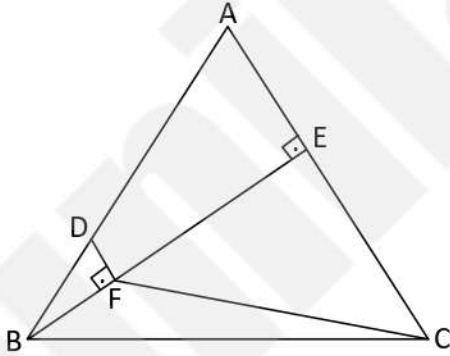
49.



[AB] çap (diameter), O merkez (center),  
A,B,C doğrusal (collinear), [CD] çembere  
teğet (tangent to circle),  $m(\angle ABD) = 15^\circ$ ,  
|CD|=3 cm, dairenin alanı (area of disc)=?

- A)  $9\pi$       B)  $12\pi$       C)  $18\pi$   
D)  $24\pi$       E)  $27\pi$

50.



$|AB|=|BC|=|AC|$ ,  $[BE] \perp [AC]$ ,  $[DF] \perp [BE]$ ,  
 $m(\angle BCF) = 15^\circ$ ,  $|CF| = 3\sqrt{2}$  cm,  $|BD| = ?$  cm

- A)  $6 - 2\sqrt{3}$       B)  $3 - \sqrt{3}$       C)  $3\sqrt{3} - 3$   
D)  $3 + \sqrt{3}$       E)  $6 - \sqrt{3}$

51.

+	a	b	c
a			
b		20	3a
c	b		

$$a, b, c \in \mathbb{Z}^+ \Rightarrow a = ?$$

- A) 1    B) 2    C) 4    D) 5    E) 10

52.

$$\left. \begin{array}{l} 6*3*5 = 183033 \\ 5*4*3 = 201532 \\ 7*2*7 = 144928 \end{array} \right\} \Rightarrow 8*2*9 = ?$$

- A) 177335      B) 167230      C) 167234  
D) 187435      E) 161872

53.

$$\begin{array}{l} 6373 \longrightarrow 2118 \\ 4728 \longrightarrow 1628 \\ 5426 \longrightarrow 1220 \\ 3496 \longrightarrow ? \end{array}$$

- A) 1882      B) 5412      C) 4728  
D) 9226      E) 8224

54. 
$$\begin{array}{cccc} 3 & 1 & 24 & 12 \\ 4 & 3 & 42 & 21 \\ 5 & 5 & 60 & 30 \\ 6 & X & 72 & Y \end{array}$$
  
 $\Rightarrow X+Y=?$

- A) 25    B) 28    C) 38    D) 42    E) 44

55.  $2, 9, 28, 65, ?, 217$

- A) 126    B) 104    C) 112  
D) 140    E) 159

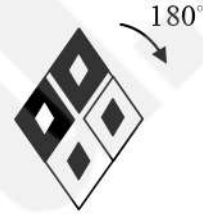
56. 
$$\left. \begin{array}{l} KALE \\ ALEK \\ EKLA \\ LERİ \end{array} \right\} \equiv \left\{ \begin{array}{l} 3167 \\ 1763 \\ 7631 \\ 6342 \end{array} \right. \Rightarrow AREK = ?$$

- A) 1437    B) 3471    C) 4731  
D) 7431    E) 6473

57.  $a, b \in \mathbb{Z}^+, a \otimes b = 2a + 4b - 2(b \otimes a)$   
 $\Rightarrow 2 \otimes 1 = ?$

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

58.



A)



B)



C)



D)



E)

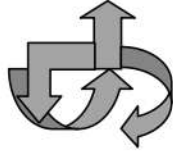


59. Hangisi farklıdır? (Which one is different?)

A)



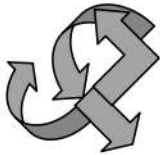
B)



C)



D)



E)



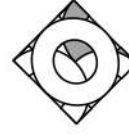
60.

17	8	5	5
20	4	6	4
18	3	7	3
7	?	8	2

A) 3    B) 6    C) 2    D) 9    E) 4

61. Hangisi farklıdır? (Which one is different?)

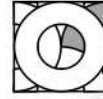
A)



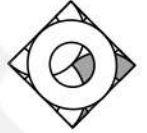
B)



C)



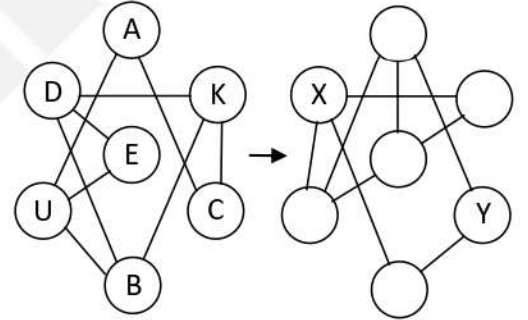
D)



E)



62.



X=?; Y=?

A) D;A

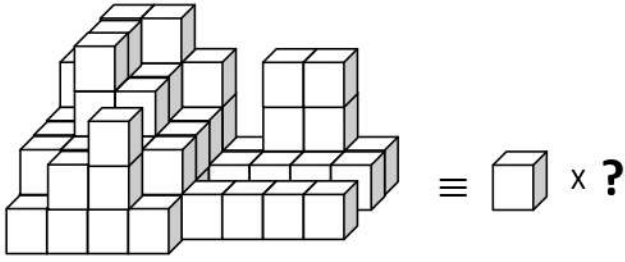
B) B;E

C) U;C

D) D;C

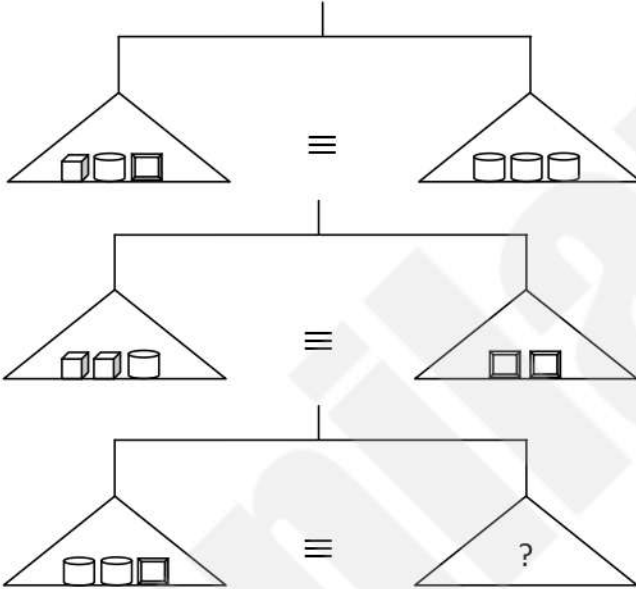
E) K;E

63.



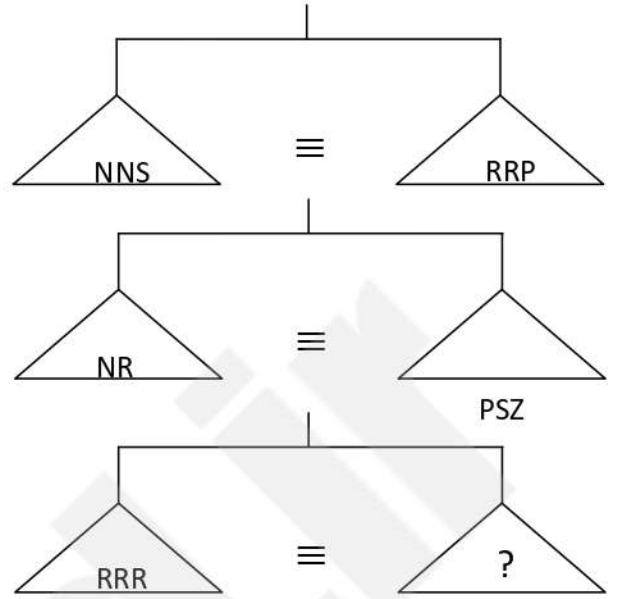
- A) 66 B) 65 C) 69 D) 68 E) 67

64.



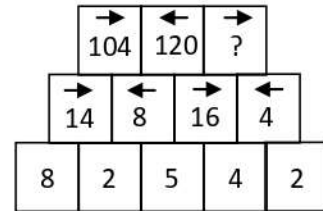
- A) B)   
 C) D)   
 E)

65.



- A) ZSNN B) SSNZ C) PSZZ  
 D) NNZZ E) NZZS

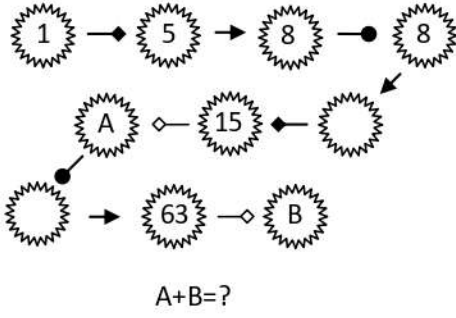
66.



- A) 56 B) 60 C) 62 D) 64 E) 102

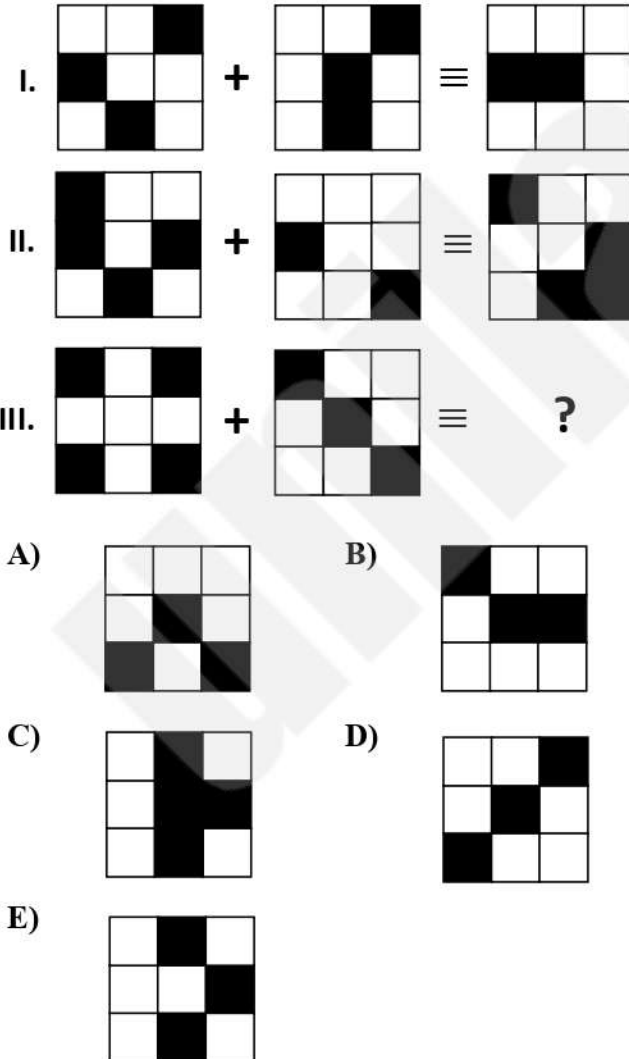


67.



- A) 158      B) 204      C) 112  
D) 148      E) 168

68.



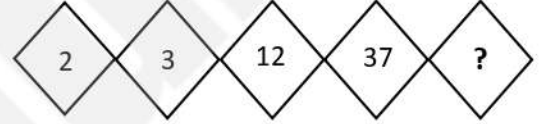
69.

	♣	•	♦
36	17	A	5
48	B	15	7
60	29	19	C

$$A+B+C=?$$

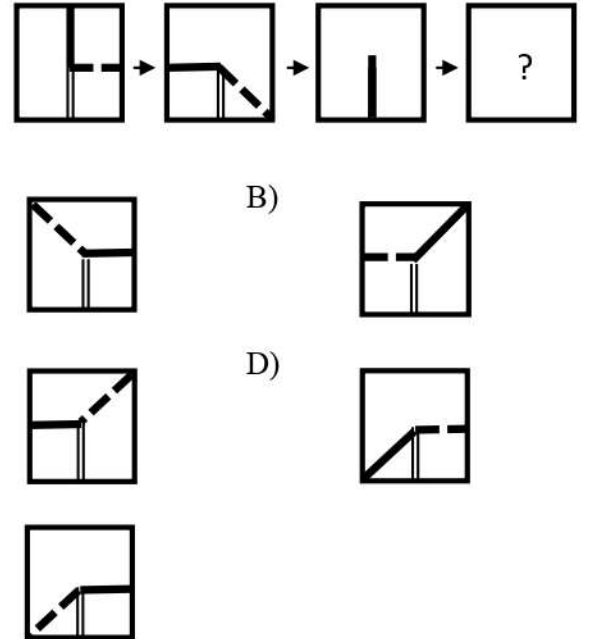
- A) 43    B) 42    C) 41    D) 40    E) 39

70.

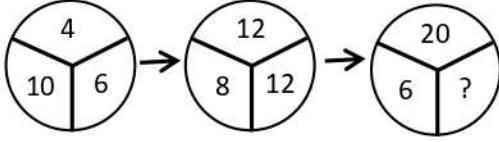


- A) 101    B) 53    C) 86    D) 73    E) 41

71.



72.



- A) 14 B) 16 C) 18 D) 20 E) 22

73.



- A) 95 B) 107 C) 155  
D) 347 E) 1115

74.

-	a	b
a		4
b		

x	a	b
a		4
b		

$$\Rightarrow a^3 - b^3 = ?$$

- A) 120 B) 112 C) 104 D) 96 E) 128

75.

$$7 \oplus 5 = 12352$$

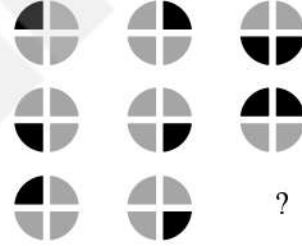
$$8 \oplus 3 = 11245$$

$$5 \oplus 4 = 9201$$

$$9 \oplus 6 = ?$$

- A) 15543 B) 54153 C) 31554  
D) 35415 E) 15354

76.



A)



B)



C)



D)



E)



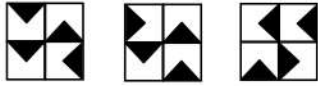
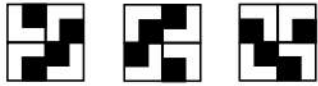
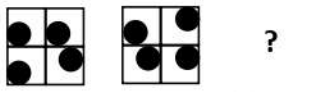
77.  $\left. \begin{array}{l} \blacksquare \star \blacktriangle \bullet \blacklozenge \\ \star \bullet \blacksquare \blacklozenge \blacktriangle \\ \star \blacktriangle \bullet \blacklozenge \blacksquare \\ \blacksquare \star \blacktriangle \blacklozenge \bullet \end{array} \right\} \equiv \left\{ \begin{array}{l} 52683 \\ 35268 \\ 56382 \\ 35286 \end{array} \right.$






$\bullet \blacksquare \blacklozenge \blacktriangle \star = ?$

- A) 65823      B) 56382      C) 23825  
D) 63825      E) 86523

78.  $\begin{array}{l} \boxed{1} \xrightarrow{2} \textcircled{-1} \\ \boxed{2} \xrightarrow{1} \textcircled{3} \\ \boxed{5} \xrightarrow{3} \textcircled{22} \\ \boxed{3} \xrightarrow{5} \textcircled{?} \end{array}$

- A) -4    B) -1    C) 4    D) 14    E) 8

79. I.  II.  III. 

- A)  B)   
C)  D)   
E) 

80. 

+	a	b	c
a		d+1	
b			
c			

x	a	b	5
a		d+4	
b	b+c		
c			a+c

$$\frac{a+b+c}{5} = ?$$

- A) 50    B) 15    C) 10    D) 25    E) 5

**TEST BİTTİ.**  
**CEVAPLARINIZI KONTROL EDİNİZ.**

END OF TEST.  
PLEASE CHECK YOUR ANSWERS.

1- A  
2- Y  
3- A  
4- E  
5- C  
6- D  
7- C  
8- E  
9- B  
10- A  
11- B  
12- B  
13- C  
14- A  
15- C  
16- D  
17- B  
18- C  
19- A  
20- A  
21- C  
22- Y  
23- E  
24- C  
25- B  
26- D  
27- C  
28- D  
29- C  
30- C  
31- E  
32- C  
33- A  
34- B  
35- C  
36- C  
37- C  
38- D  
39- A  
40- E  
41- A  
42- B  
43- D  
44- B

45- C  
46- D  
47- D  
48- B  
49- E  
50- A  
51- D  
52- C  
53- B  
54- D  
55- A  
56- D  
57- B  
58- C  
59- C  
60- D  
61- E  
62- C  
63- E  
64- D  
65- B  
66- B  
67- E  
68- D  
69- A  
70- C  
71- E  
72- C  
73- D  
74- B  
75- A  
76- C  
77- D  
78- C  
79- A  
80- Y

By yoslovers