

ریاضی یوس ۲۰۲۲

دانشگاه اینونو



Inonu University

INTERNATIONAL STUDENTS' EXAM

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☎ ۰۲۱۹۱۳۰۵۹۰۵

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1. $\frac{1 - 5(2 - 3) + 2}{-6(3 - 1) : 2 + 1} = ?$

A) $-\frac{8}{3}$ B) -2 C) $-\frac{8}{5}$ D) $-\frac{3}{2}$ E) $-\frac{6}{5}$

2. $\left(\frac{1}{3} - \frac{1}{2}\right) - \left(1 - \frac{1}{2}\right) = ?$

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

3. $\frac{0,1 + 0,03 + 0,002}{0,01 + 0,006 + 0,05} = ?$

A) 0,5 B) 0,2 C) 1 D) 2 E) 5

4. $\frac{\sqrt{12 - \sqrt{128}}}{\sqrt{72} - \sqrt{36}} = ?$

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

5. $x < 0 < y \Rightarrow |2y - x| - |2x - y| = ?$

A) $x + y$ B) $-x + 3y$ C) $3x - 3y$
D) $-x - y$ E) $-3x + 3y$

6. $\frac{1}{x^2 - 4x + 3} : \frac{1}{x - 1} = \frac{1}{2} \Rightarrow x = ?$

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



7. $2, \bar{7} + 3, \bar{5} = ?$

- A) $5, \bar{2}$ B) $5, \bar{3}$ C) $6, \bar{2}$
D) $6, \bar{3}$ E) $7, \bar{2}$

8.
$$\left. \begin{array}{l} f: \mathbb{R} \rightarrow \mathbb{R}, \quad f(x) = (x+1)^2 - 1 \\ A = \{-1, 0, 1, 2\}, \quad B = \{-4, -2, -1, 1\} \end{array} \right\}$$

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

- A) $f(A) \setminus f(\{-4, 0\})$ B) $f(B) \setminus \{f(0)\}$
C) $f(A) \cap f(B)$ D) $f(A \cup B) \setminus \{f(1)\}$
E) $f(A) \cup f(B)$

9.
$$\left. \begin{array}{l} k, l, m \in \mathbb{R} \\ 2k + l + m = 3 \\ -k + 2l + 3m = -4 \\ 3k + l - m = -4 \end{array} \right\} \Rightarrow k + l - m = ?$$

- A) -10 B) -8 C) -2 D) 2 E) 8

10.
$$\left. \begin{array}{l} a, b \in \mathbb{R}, \\ 9a^2 - 3ab + b^2 - 3\sqrt{3}b = -9 \end{array} \right\} \Rightarrow ab = ?$$

- A) 2 B) $2\sqrt{3}$ C) 3 D) 4 E) $4\sqrt{3}$

11. $4^x = 6^y \Rightarrow 3^{\frac{2y}{2x-y}} = ?$

- A) 9 B) 8 C) 6 D) 4 E) 3

12. $\frac{x^2 - y^2}{xy} = 2 \Rightarrow \frac{x^2}{y^2} + \frac{y^2}{x^2} = ?$

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



13. $\left. \begin{array}{l} a, b \in \mathbb{R}, \\ a + b = 4, \\ ab = 3 \end{array} \right\} \Rightarrow a^3 + b^3 = ?$

- A) 36 B) 28 C) 22 D) 16 E) 12

14. $\left. \begin{array}{l} x, y \in \mathbb{R}, \\ x \boxplus y = \begin{cases} x + 2y, & x < y \\ 2x - y, & x \geq y \end{cases} \end{array} \right\}$

$\Rightarrow [1 \boxplus (-1)] \boxplus 2 = ?$

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

15. $3\sqrt{3} - 2 = b \Rightarrow b^2 + 4b - 13 = ?$

- A) 10 B) 8 C) 3 D) -3 E) -8

16. $\left. \begin{array}{l} f, g : \mathbb{R} \rightarrow \mathbb{R} \\ (g \circ f)(x) = 3x - 5 \\ g(x + 1) = 2x + 1 \end{array} \right\} \Rightarrow f(-1) = ?$

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

17. $x \in \mathbb{R}, \frac{\sin 2x}{\sin^3 x + \sin x \cos^2 x} = ?$

- A) 1 B) $\sin x$ C) $2 \cos x$ D) $\tan x$ E) $2 \cot x$

18. $x \in \mathbb{R}, \frac{3 + \cos^2 2x}{2 - \sin 2x} - 2 = ?$

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



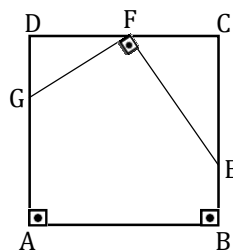
19. $\left. \begin{array}{l} a = 0 \\ b = -2 \\ c = 3 \end{array} \right\} \Rightarrow b < a < c$

$\left. \begin{array}{l} x = \sin 40^\circ, \\ y = \sin 80^\circ, \\ z = \sin 110^\circ \end{array} \right\} \Rightarrow ?$

A) $x < y < z$ B) $x < z < y$ C) $y < x < z$

D) $y < z < x$ E) $z < y < x$

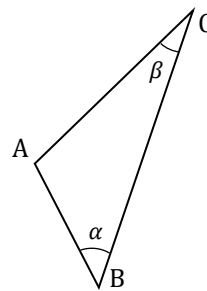
20.



$\left. \begin{array}{l} [DC] // [AB], [AD] // [BC], \\ [AD] \perp [DC], [GF] \perp [EF], \\ |AD| = |DC|, |DF| = |FC|, \\ |AG| = 3|DG|, \\ m(\widehat{FEC}) = x \end{array} \right\} \Rightarrow \tan x = ?$

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

21.



$\left. \begin{array}{l} |AB| = 2\text{ cm}, |BC| = 7\text{ cm} \\ |AC| \in \mathbb{N} = \{1, 2, 3, \dots\} \\ \alpha + \beta < 85^\circ \end{array} \right\}$

$\Rightarrow |AC| = ? \text{ cm}$

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

22. $\left. \begin{array}{l} 0 < 2\alpha \leq 90^\circ \\ \cos 2\alpha = \sin \alpha \end{array} \right\} \Rightarrow \sin 2\alpha + \cos \alpha = ?$

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

23. $i = \sqrt{-1}, z = \sqrt{2} - i\sqrt{2} \Rightarrow |z^2 - \bar{z}^2| = ?$

A) $-\sqrt{2}$ B) $\sqrt{2}$ C) $2\sqrt{2}$ D) $4\sqrt{2}$ E) 8

24.

$$x, y \in \mathbb{R}, \quad x \wedge y = \begin{cases} x, & x < y \\ x + y, & x \geq y \end{cases}$$

$$\Rightarrow (\log_5 90 \wedge \log_3 45) \wedge \log_2 20 = ?$$

A) $\log_5 90$ B) $\log_3 45$ C) $\log_2 20$

D) $\log_{15} 135$ E) $\log_{10} 110$

25. $\frac{1}{\log_5 x} + \frac{1}{\log_2 x} = \frac{1}{2} \Rightarrow x = ?$

A) 4 B) 10 C) 20 D) 25 E) 100

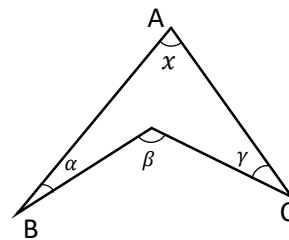
26.

$$\sum_{k=1}^5 3^k \binom{5}{k} = ?$$

A) $3^5 - 1$ B) 3^6 C) $3^6 - 1$

D) $4^5 - 1$ E) $4^6 - 1$

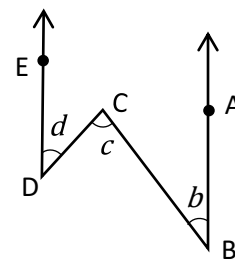
27.



$$\left. \begin{aligned} \alpha &= 25^\circ \\ \beta &= 135^\circ \\ \gamma &= 40^\circ \end{aligned} \right\} \Rightarrow x = ?$$

A) 60° B) 65° C) 70° D) 75° E) 80°

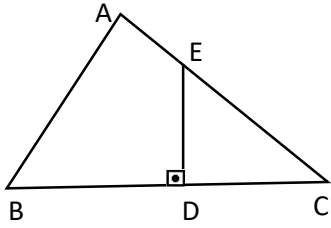
28.



$$\left. \begin{aligned} [BA // DE, \\ m(\widehat{ABC}) = b, \\ m(\widehat{BCD}) = c, \\ m(\widehat{CDE}) = d, \\ |b - 2c| = 80^\circ, \\ |c - d| = 30^\circ \end{aligned} \right\} \Rightarrow c = ?$$

A) 50° B) 55° C) 60° D) 65° E) 70°

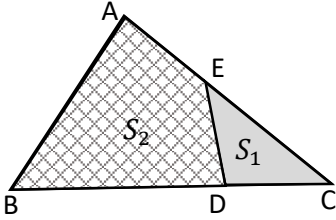
29.



$$\left. \begin{array}{l} [DE] \perp [BC], \\ |EC| = 2|AE|, \\ |DE| = 8 \text{ cm}, \\ |BC| = 18 \text{ cm}, \\ A(ABC) = ? \text{ cm}^2 \end{array} \right\}$$

- A) 86 B) 97 C) 102 D) 108 E) 112

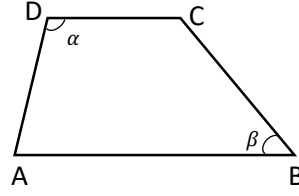
30.



$$\left. \begin{array}{l} 5|AC| = 9|EC|, \\ 4|BC| = 10|DC|, \\ A(EDC) = S_1, \\ A(ABDE) = S_2, \end{array} \right\} \Rightarrow \frac{S_1}{S_2} = ?$$

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

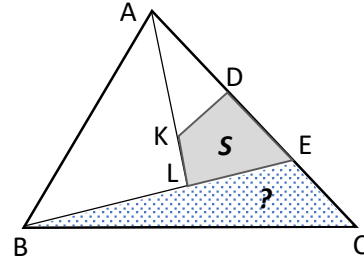
31.



$$\left. \begin{array}{l} [DC] \parallel [AB], \\ |DC| = 7 \text{ cm}, \\ |AD| = 8 \text{ cm}, \\ \alpha = 120^\circ, \beta = 45^\circ, \\ A(ABCD) = ? \text{ cm}^2 \end{array} \right\}$$

- A) $4(5 + 8\sqrt{3})$ B) $8(3 + 4\sqrt{3})$
C) $12(2 + 3\sqrt{3})$ D) $4(7 + 8\sqrt{3})$
E) $4(7 + 9\sqrt{3})$

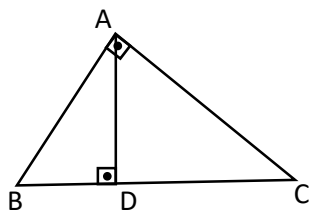
32.



$$\left. \begin{array}{l} |AD| = |DE| = |EC|, \\ |AK| = 2|KL|, |BL| = 2|LE|, \\ A(KDEL) = S \end{array} \right\} \Rightarrow A(BEC) = ?$$

- A) $\frac{7}{2}S$ B) $\frac{9}{4}S$ C) $\frac{13}{7}S$ D) S E) $\frac{6}{7}S$

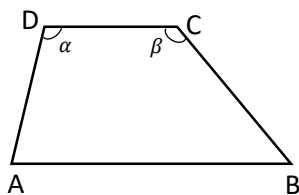
33.



$$\left. \begin{array}{l} [AB] \perp [AC], \\ [AD] \perp [BC], \\ |AB| = 12 \text{ cm}, \\ |BC| = 18 \text{ cm}, \\ |AD| = ? \text{ cm} \end{array} \right\}$$

- A) $2\sqrt{3}$ B) $3\sqrt{2}$ C) 5 D) $4\sqrt{3}$ E) $4\sqrt{5}$

34.



$$\left. \begin{array}{l} [DC] // [AB], \\ |DC| = 6 \text{ cm}, \\ |AD| = 5 \text{ cm}, \\ |AB| = 12 \text{ cm}, \\ \alpha + \beta = 270^\circ \end{array} \right\}$$

$$\Rightarrow \cos \alpha = ?$$

- A) $-\frac{2}{3}$ B) $-\frac{1}{2}$ C) $-\frac{11}{12}$ D) $-\frac{5}{6}$ E) $\frac{5}{12}$

35.
$$\lim_{x \rightarrow 2} \frac{|x^2 - 5x + 4| - 2}{|x - 3| - 1} = ?$$

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

36.
$$\left. \begin{array}{l} f: [2, 10] \rightarrow \mathbb{R}, \\ f(x) = 2 \ln(x^2 - 4) - 3 \ln(x - 2) + \ln(x - 2) \end{array} \right\}$$

$$\lim_{a \rightarrow 2^+} e^{f(a)} = ?$$

- A) $\ln 4$ B) 4 C) 16 D) e^4 E) e^{16}



37.

$$\left. \begin{array}{l} f: \mathbb{R} \rightarrow \mathbb{R} \\ f(x) = x^3 - 3x^2 - 4 \end{array} \right\}$$

$$\Rightarrow \lim_{h \rightarrow 0} \frac{f(3+2h) - f(3)}{h} = ?$$

- A) -9 B) -1 C) 0 D) 9 E) 18

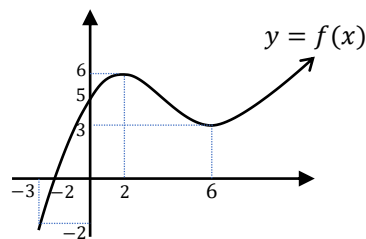
38.

$$f: \mathbb{R} \rightarrow \mathbb{R}, \quad \int_1^4 f(2x-5)dx = a$$

$$\Rightarrow \int_1^{-\frac{1}{2}} f(4x-1)dx = ?$$

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

39.



$$\Rightarrow \int_{-2}^6 f'(x)f(x)dx = ?$$

- A) 0 B) 3 C) $\frac{9}{2}$ D) 5 E) 6

$$40. \quad A = \begin{bmatrix} 1 & 1 \\ 1 & 3 \end{bmatrix} \Rightarrow 2A^{-1} = ?$$

- A) $\begin{bmatrix} 6 & -3 \\ -2 & 3 \end{bmatrix}$ B) $\begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$ C) $\begin{bmatrix} 3 & -1 \\ -1 & 1 \end{bmatrix}$
D) $\begin{bmatrix} 3 & 2 \\ -2 & 1 \end{bmatrix}$ E) $\begin{bmatrix} -2 & -2 \\ 3 & 2 \end{bmatrix}$

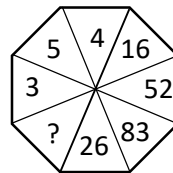


41. I. 148 → 3
II. 252 → -2
III. 324 → 9
IV. 413 → 13
V. 452 → 4
VI. 533 → ?
A) -12 B) -5 C) -3 D) 5 E) 12

42. I. 2361 → 9
II. 2453 → -2
III. 3642 → 0
IV. 4481 → 28
V. 5683 → 22
VI. 6873 → ?
A) 22 B) 18 C) 12 D) -12 E) -20

43. 13257 → -4
26453 → 24
24198 → -11
38753 → 69
34653 → 34
47353 → 25
58155 → ?
A) -13 B) -3 C) 0 D) 3 E) 13

44.

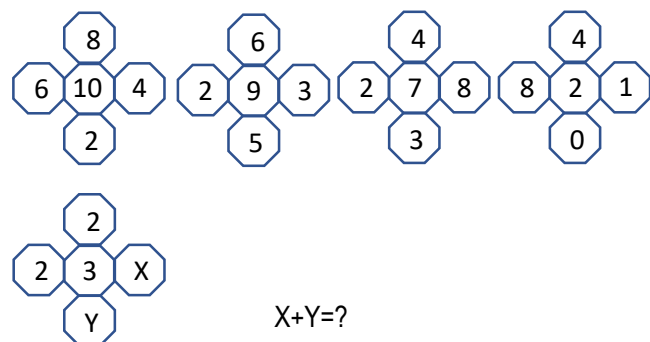


- A) 13 B) 11 C) 8 D) 5 E) 2

45. 2 ★ 5 = -6
3 ★ 4 = 1
4 ★ 2 = 12
4 ★ 5 = 6
5 ★ 8 = 9
7 ★ 7 = ?

- A) 35 B) 30 C) 25 D) 20 E) -7

46.



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

47. $\rightarrow$ -1
 $\rightarrow$ 3
 $\rightarrow$ 12
 $\rightarrow$ 11
 $\rightarrow$?

A) 9 B) 8 C) 7 D) 6 E) 5

48.

1.	2.	3.	4.	5.	6.	7.	...	20.
5	10	17	26	37	50	65	...	?

A) 359 B) 386 C) 420 D) 442 E) 536

49. ?
V

A) B) C)
D) E)

50. ?

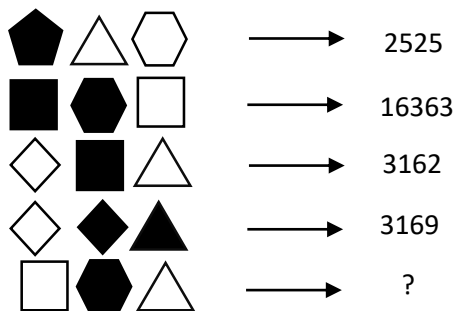
A) B) C)
D) E)

51. ?

A) B) C)
D) E)

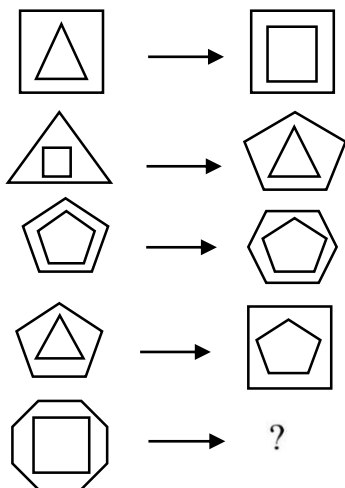


52.



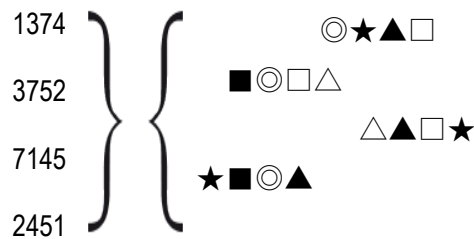
- A) 16363 B) 4363 C) 4362 D) 3363 E) 3362

53.



- A) B) C)
D) E)

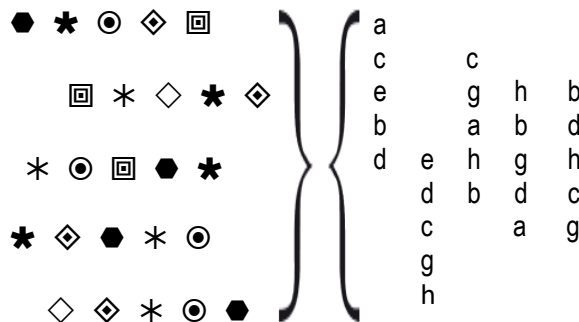
54.



White circle with dot, White triangle, White square, Black square = ?

- A) 7253 B) 7235 C) 5273 D) 5723 E) 4173

55.



(White diamond, White square, White circle with dot, Black star) = ?

- A) (e,d,g,c) B) (c,d,h,g) C) (g,a,d,h)
D) (d,a,g,b) E) (d,g,a,h)

56.

4	1	3	4
3	4	1	7
2	0	4	6
1	2	0	3
9	2	5	5
8	4	3	6
X	3	2	6

X = ?

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

57.

1475	{	○ ■ ◆ ●
6542		▲ ● ○ ☆
7826		● ☆ ○ ◆
4718		○ ○ ▲ ■

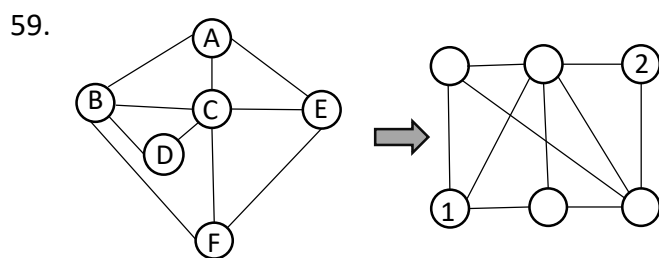
2846 = ?

- A) ○ ■ ◆ ○ B) ○ ■ ◆ ▲ C) ◆ ■ ○ ●
D) ○ ■ ◆ ● E) ◆ ○ ■ ●

58.

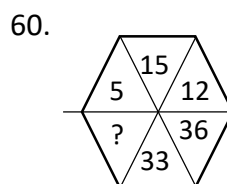
abc	→	acb
abc	→	cab
251	→	?

- A) 152 B) 215 C) 251 D) 512 E) 521

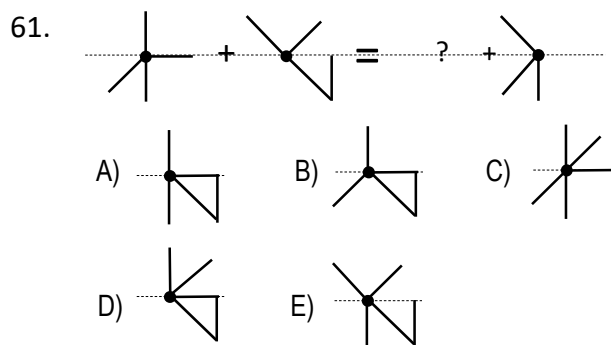


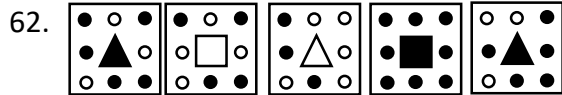
(1,2)=?

- A) (E,A) B) (F,E) C) (E, D) D) (F, D) E) (A,D)

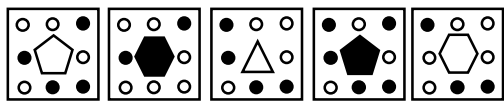


- A) 108 B) 99 C) 69 D) 59 E) 30





A3C2 B4E0 B3D2 A4C8 A3C2



B5E0 A6D4 B3E0 A5C2 ?

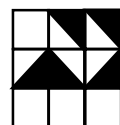
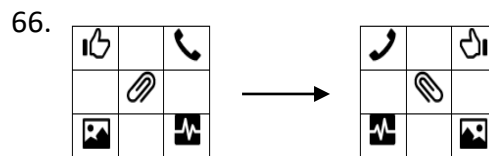
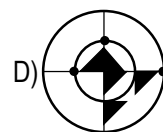
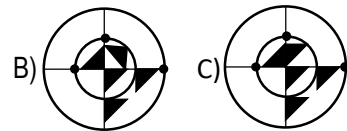
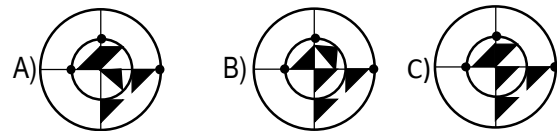
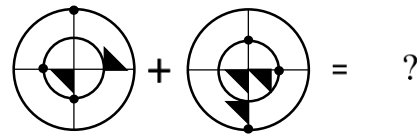
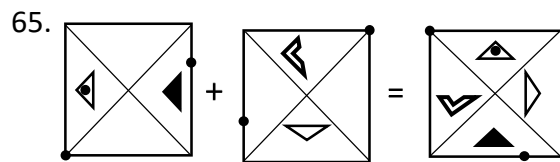
A) B6C2 B) B6D2 C) A6C2 D) A6D2 E) A6E0

63. $b+d = 10$
 $a+b+e = 25$
 $a+c+d = 22$
 $d+e = 3$
 $b+c+e = 13$
 $a+d+e = ?$

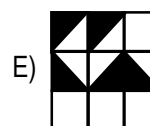
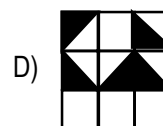
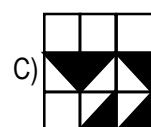
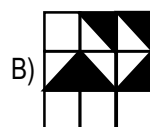
A) 12 B) 15 C) 16 D) 19 E) 23

64. $4 \times 6 = 24/21$
 $3 \times 5 = 6/15$
 $6 \times 17 = 720/153$
 $5 \times 8 = 120/36$
 $2 \times 7 = ?$

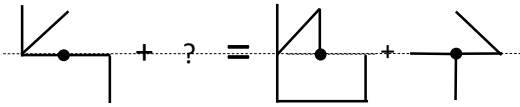
A) 2/28 B) 3/14 C) 2/30 D) 3/24 E) 2/20



?

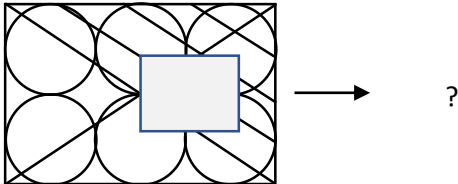
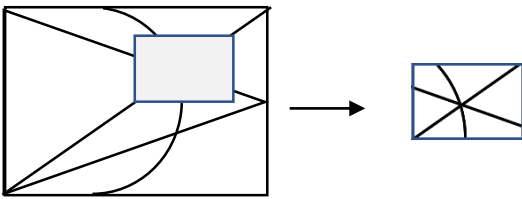


67.



- A) B) C) D) E)

68.



- A) B) C) D) E)

69.

☾	⇒	△	□	★	☾	⊗	I
⇒	□	☾	☾	△	★	⊗	II
□	⊗	△	☾	⇒	★	☾	III
⊗	□	☾	★	⇒	☾	△	IV
?							V

- A) B) C) D) E)

70.

△	□	□	△	□	□	□	□	□
□	□	△	□	□	□	□	□	□
-9	11	2	0	?				

- A) 12 B) 8 C) 4 D) -4 E) -8

71.

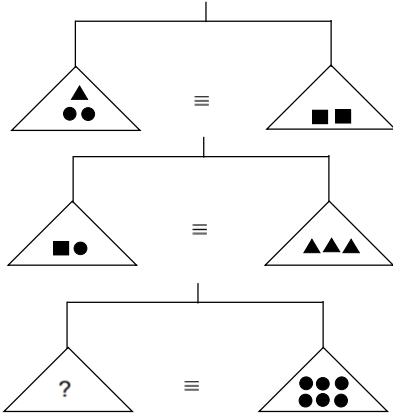
5	6	16	6	3	10	6	4	14	8	X	18
8	4	24	3	9	8	4	8	10	4	7	Y

I II III IV

X+Y=?

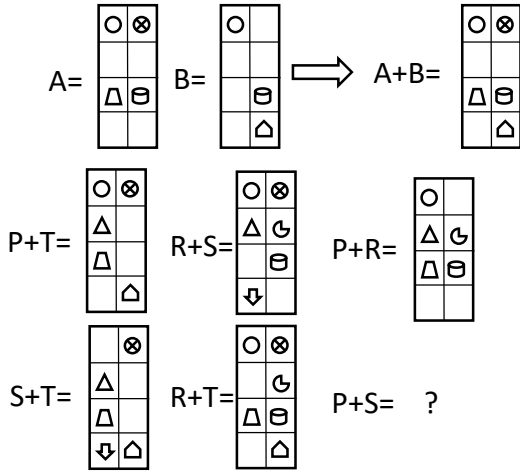
- A) 18 B) 19 C) 20 D) 22 E) 24

72.



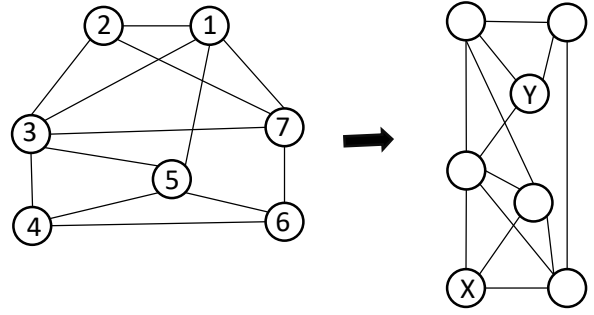
- A) ▲▲▲■● B) ▲▲▲■●●
C) ▲▲▲▲■ D) ▲▲▲■●
E) ▲■●●

73.



- A) [O, X; Δ, Δ; ↓, Δ] B) [O, X; Δ, Δ; ↓, Δ] C) [O, X; Δ, Δ; ↓, Δ] D) [O, ; Δ, G; ↓, Δ] E) [; X; Δ, G; ↓, Δ]

74.



(X, Y)=?

- A) (4, 6) B) (2, 4) C) (1, 4) D) (6, 2) E) (4, 2)

75.

I.	1 2 3 4 5 6 7
II.	1 3 5 7 2 4 6
III.	1 4 7 3 6 2 5
IV.	1 5 2 6 3 7 4
V.	?

- A) 1 6 4 2 7 5 3 B) 1 6 4 7 2 5 3
C) 1 6 4 2 7 3 5 D) 1 6 2 4 7 5 3
E) 1 6 4 5 7 2 3

76.

+	⊗	●	⬠	⬡
⬠	10	13	A	9
⬡	5	8	9	B
⊗	6	9	10	5
●	9	C	13	8

A+B-2C=?

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

77.
 X Y X+Y
 K+M K+L K+N
 L+M L+N M+N
 M=?
 A) B) C)
 D) E)

78.
 ?
 A) B) C)
 D) E)

79.
 I II III IV V
 A) B) C)
 D) E)

80.

3	6	8	16	18	36	38	X
---	---	---	----	----	----	----	---

2	8	4	10	6	12	8	Y
---	---	---	----	---	----	---	---

X-Y=?

A) 13 B) 33 C) 53 D) 62 E) 72

SINAV BİTTİ. LÜTFEN CEVAPLARINIZI KONTROL EDİNİZ.

END OF THE EXAM. PLEASE CHECK YOUR ANSWERS.