MATHEMATICS

1. $x \in \mathbb{R}$ and $3x + 3$ is an odd number.

According to this, which of the below is certainly an even number?

A) $x + 2$ B) $9x + 2$ C) $x - 3$

      D) $x^2 + x - 2$ E) $9x^2 + 1$

2. How many pairs are possible with (x, y) which meet the requirement of $x^y = -y^x$?

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

3. How many (x) natural numbers are there which makes $\dfrac{120}{x!}$ a whole number?

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

4. $\dfrac{(42!)^2 - (27!)^2}{42! + 27!} = A \cdot 10^n$

What is the highest possible value which (n) can take in the equilibrium above ?

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

5. $\dfrac{3 - 3 \div 0,\overline{1}}{2 \div 0,\overline{2} + 1} = ?$

A) 0   B) $-2{,}4$ C) $2{,}4$

      D) $-1{,}2$ E) $1{,}2$

6.

$$(23023)^{0,\overline{9}^{1,\overline{9}^{2,\overline{9}^{\cdots 9,\overline{9}}}}} = A \qquad \text{and}$$

$$\begin{array}{r|l} A & 23 \\ \hline = & B \\ K & \end{array} \text{ is the case, } B = ?$$

A) 0   B) 10   C) 11

      D) 101   E) 1001

1

7. If this is the case $(x+1)^{(x+1)^{(x+1)^{\cdot^{\cdot^{\cdot}}}}} = 2$ which of the below is $x \in \mathbb{R}^+$?

A) $\sqrt{2}-1$ B) $\sqrt{2}+1$ C) $\sqrt{2}$

D) $\sqrt{3}$ E) 1

8. $a \cdot x = b \cdot y = c \cdot z = 3$

$x \cdot y + x \cdot z + y \cdot z = 3xyz$ is the case,

$a + b + c = ?$

A) 1   B) 3   C) 6   D) 9   E) 12

9. AAA96 as a five digit number and BC as a two digit numbers, they are natural numbers.

$$\begin{array}{r|l} \text{AAA96} & \underline{48} \\ \underline{} & \text{BC} \end{array}$$

According to the division, how many possible values can BC take?

A) 3   B) 13   C) 17   D) 19   E) 38

10. $3^x + 3^{-x} = 3$ is the case, $3^{3x} + 3^{-3x} = ?$

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

11. $0 < x < y$ as is the case,

$$\sqrt{\frac{1}{x^2} - \frac{2}{xy} + \frac{1}{y^2}} \cdot \frac{xy}{x-y} = ?$$

A) 1   B) -1 C) $\frac{x}{y}$ D) xy E) $x-y$

12.

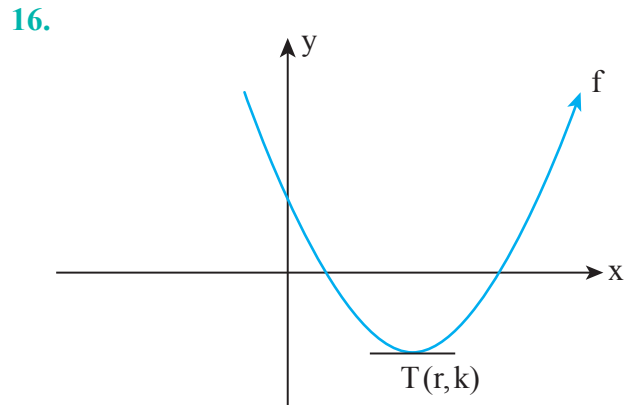In the $\widehat{ABC}$ triangle $a < b < c$ is the case,

$|a - y + c| + |x - z| + |a + b| = ?$

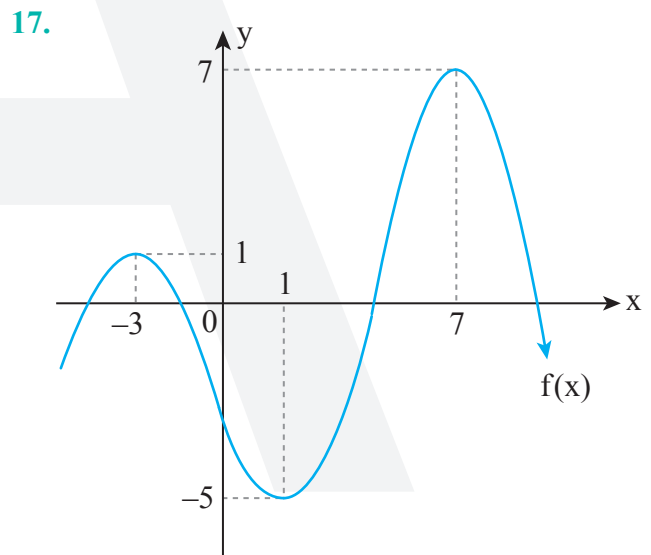A) x   B) y   C) z   D) a   E) b

2
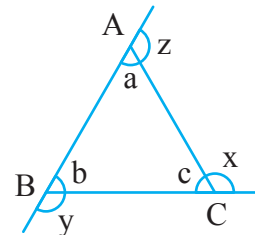
13. f(x) is the unit function and
$f(3x^2 + mx) = (n+2)x^2 - x + p$ is the case,
$m \cdot n \cdot p = ?$

A) −1   B) 0   C) 1   D) 2   E) 3

14. $P(x) = (x-4)(x^2 - 8x - 15)$ is the case,

$\dfrac{P(1) - P(3)}{P(5) - P(7)} = ?$

A) 2   B) 1   C) 0   D) −1   E) −2

15. For $a \in \mathbb{R}$, what is the solution set for the
equation $3 - \sqrt{4+a} = \dfrac{a}{4} + 1$?

A) ∅   B) $\{1\}$ C) $\{0, 4\}$

D) $\{0\}$ E) $\{0, 1\}$

16.

For the parabola $f(x) = ax^2 + bx + c$,
which of the below is false?

A) $a > 0$

B) $a^3 \cdot b^2 \cdot c > 0$

C) $a \cdot b \cdot c < 0$

D) $\dfrac{a+c}{b \cdot k} > 0$

E) $\dfrac{a \cdot r \cdot c}{b \cdot k} < 0$

17.

$c \in \mathbb{R}$ as is the case, what is the widest
value range of (c) in order for the equation
$f(x) = c$ can have four different radicals?

A) $-3 < c < 1$

B) $-3 < c < 7$

C) $1 < c < 7$

D) $-5 < c < 1$

E) $0 < c < 1$

3

18. What is the sum of the radicals in the equation?

$$\sqrt{x-1} + \frac{3}{\sqrt{x-1}+1} = 3$$

A) 1   B) 2   C) 4   D) 6   E) 8

19. $(2-\sqrt{3})^{\cos x} = (2+\sqrt{3})^{\sin x}$ is the case,

   $\cot x = ?$

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

20. $0 < x < \frac{\pi}{4}$ as is the case,

$$\frac{1}{2}\left(\sqrt{1-\sin 2x} - \sqrt{1+\sin 2x}\right)^2 - 1 = ?$$

A) $2\sin^2 x$ B) $\sin 2x$ C) 0

          D) $\cos 2x$ E) $-\cos 2x$

21. $i^2 = -1$ as is the case and one of the radicals is i in the equation $x^2 + (a-1)x + b + i = 0$,

   $a^{-b} = ?$

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

22. $x^{\ln x} = e$ is the case, what is the multiplication of the values which x can take?

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

23. $|AC| = \sin 3x$

   $m(\widehat{ABC}) = x \Rightarrow$

   $\lim\limits_{x \to 0} |AB| = ?$

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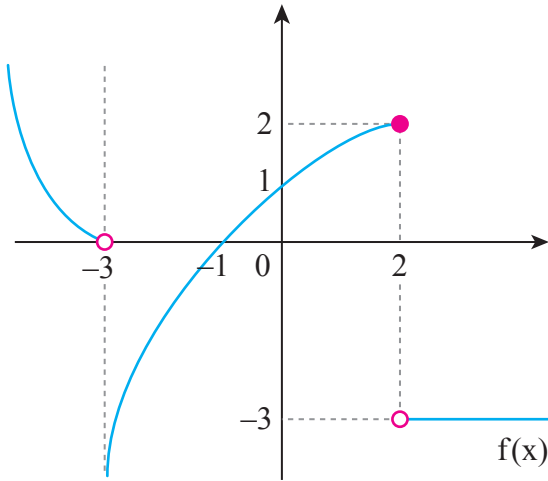
4

24.

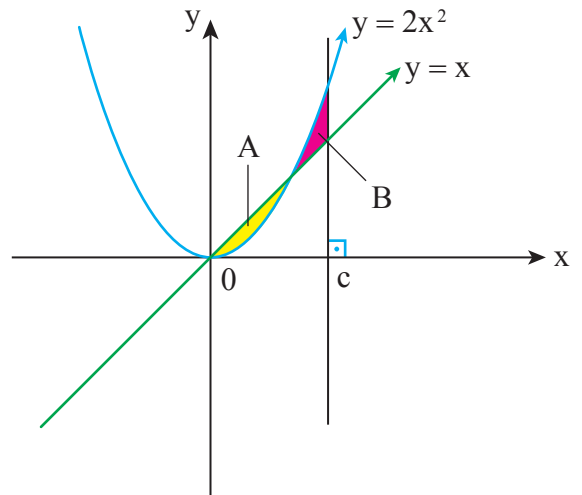In the graph of the f(x) function, which of the below is false?

A) $\lim\limits_{x \to -3^+} f(x) = -\infty$

B) $\lim\limits_{x \to -1} f(x) = 0$

C) $\lim\limits_{x \to 2^-} f(x) = 2$

D) $\lim\limits_{x \to 2^+} f(x) = -3$

E) $\lim\limits_{x \to -3} f(x) = 0$

25. $f(x) = x^2 + 2x + 2 \Rightarrow$

$\lim\limits_{x \to 2} \dfrac{f(x) - f(2)}{f'(2) - f'(x)} = ?$
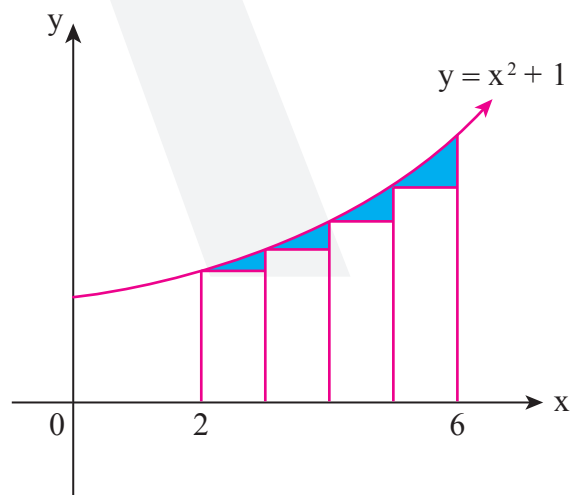
A) -3 B) 3 C) -2 D) 2 E) 1

26.

In the graph, the areas of A and B are equal, in this case c=?

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

27.

In the graph, short edges of the rectangles are equal.

What is the unit of the shaded area as br²?

A) $\dfrac{46}{3}$ B) $\dfrac{47}{3}$ C) $\dfrac{49}{3}$ D) $\dfrac{53}{3}$ E) $\dfrac{57}{3}$

28.
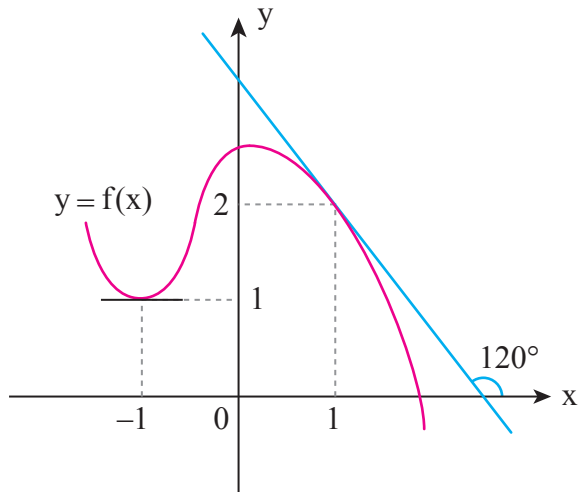
Above given the graph of the function f(x).

$$\int_{-1}^{1} f'(x) \cdot (1 + f''(x)) dx = ?$$

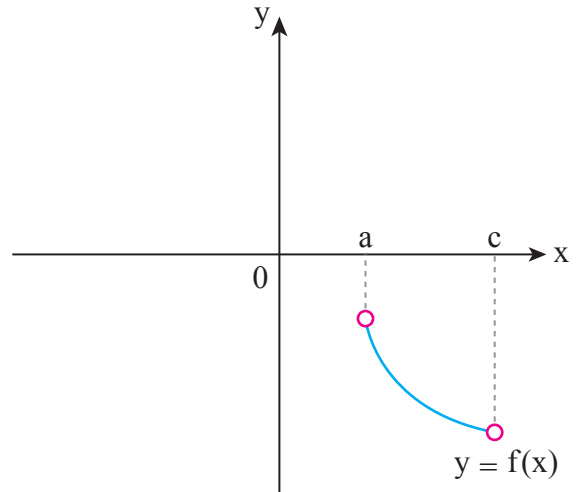A) $\dfrac{1}{2}$ B) $-\dfrac{1}{2}$ C) $\dfrac{3}{2}$ D) $\dfrac{5}{2}$ E) $-\dfrac{5}{2}$

29. As (a_n) is a geometric sequence,

$a_1 = 2$ and $a_{11} = 128$ $\Rightarrow$

$a_2 \cdot a_3 \cdot a_4 \cdot a_5 \cdot a_6 \cdot a_7 \cdot a_8 \cdot a_9 \cdot a_{10} = ?$

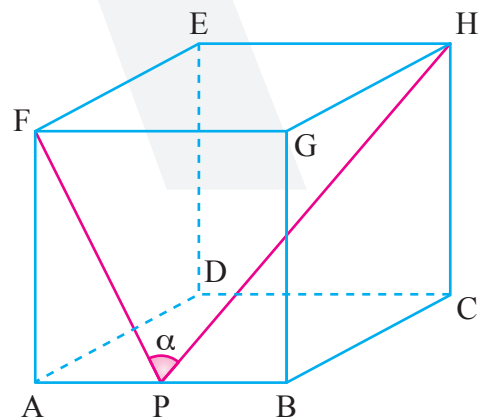A) 2^{36} B) 2^{34} C) 2^{32} D) 2^{30} E) 2^{28}

30.

According to the graph, which of the below is correct in the range of (a,c) ?

A) $x^3 \cdot f(x) > 0$

B) $f(x) \cdot f'(x) < 0$

C) $\dfrac{f^2(x)}{f'(x)} > 0$

D) $x^2 \cdot f'(x) > 0$

E) $x \cdot f^2(x) \cdot f'(x) < 0$

31.

ABCDEFGH is a cube.

$|AP| = |PB|$ $\Rightarrow$ $\cos \alpha = ?$

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

32. $m(\widehat{BAD}) = 30°$,
$|BD| = 2\,\text{br}$,
$|DC| = 2\sqrt{7}\,\text{br} \Rightarrow$
$x = ?$
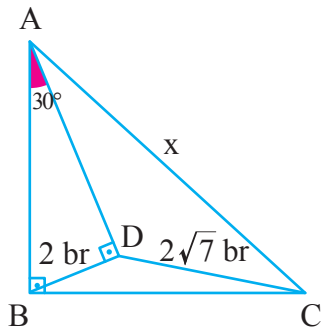
A) 8   B) 13   C) 17   D) $3\sqrt{6}$ E) $\sqrt{91}$

33. In the ABC triangle,
$|AC| = |AB| + |BD|$
is the case, $\alpha = ?$
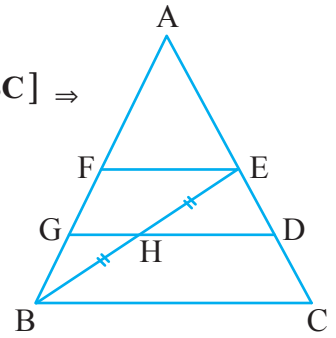
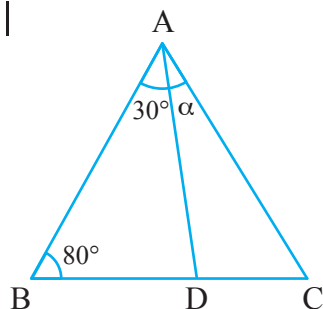A) 40   B) 30   C) 20   D) 15   E) 10

34. $|AE| = |EC|$,
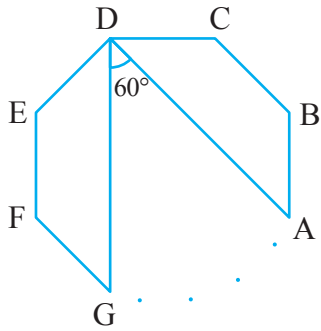$[FE] \parallel [GD] \parallel [BC] \Rightarrow$
$\dfrac{|GD|}{|BC|} = ?$

A) $\dfrac{1}{3}$ B) $\dfrac{2}{3}$ C) $\dfrac{3}{4}$ D) $\dfrac{4}{5}$ E) $\dfrac{2}{5}$

35.
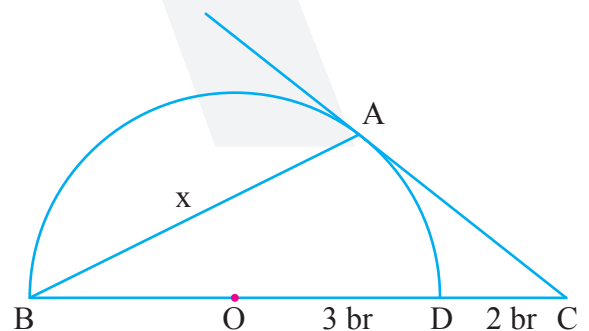
[CA, is tangent at the A point to the semicircle, and $|OD| = 3\,\text{br}$, $|DC| = 2\,\text{br}$ as is the case, how many units is x?

A) $\dfrac{3}{\sqrt{5}}$ B) $\dfrac{7}{\sqrt{5}}$ C) $\dfrac{12}{\sqrt{5}}$ D) $\dfrac{12}{5}$ E) $\dfrac{7}{5}$
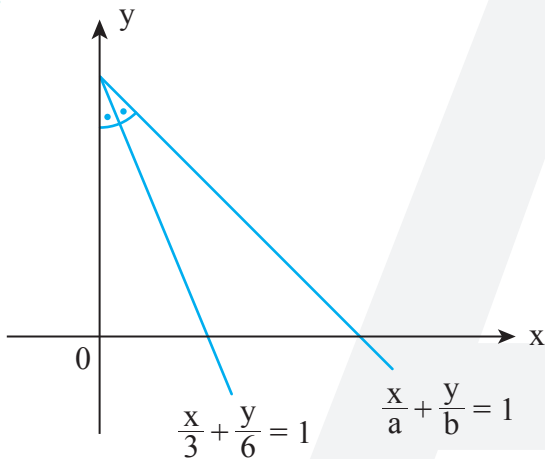
36.

How many sided is the ABCDEF… regular polygon?

A) 9   B) 7   C) 11   D) 12   E) 17

37.

$$\frac{x}{3} + \frac{y}{6} = 1 \qquad \frac{x}{a} + \frac{y}{b} = 1$$
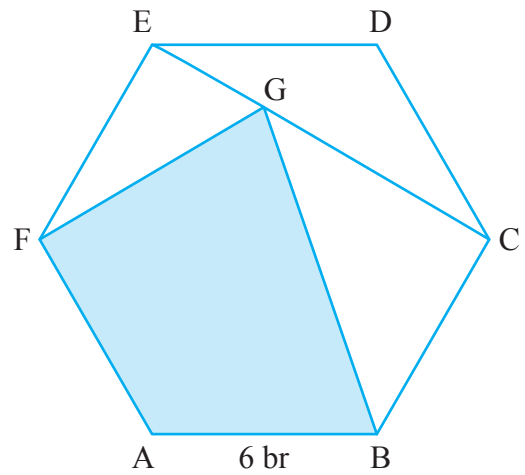
a + b = ?

A) 13   B) 14   C) 15   D) 16   E) 17

38. $x^2 + y^2 + 4x + 6y + c = 0$

equation defines a point, so what is c?
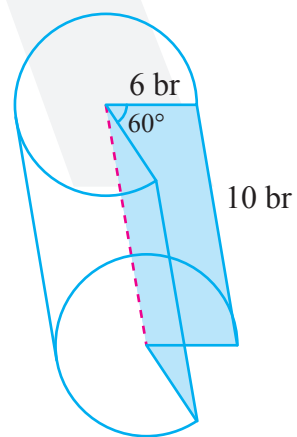
A) 4   B) 6   C) 8   D) 11   E) 13

39.

ABCDEF is a regular hexagon and as $|AB| = 6\,br$ is the case, $A(ABGF) = ?$

A) $42\sqrt{3}$ B) $36\sqrt{3}$ C) $32\sqrt{3}$
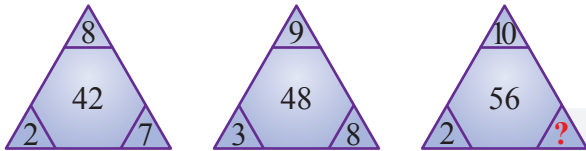
D) $29\sqrt{3}$ E) $27\sqrt{3}$

40.

How many unit cubes is the volume of the right cylinder in the image?

A) 60π B) 120π C) 180π
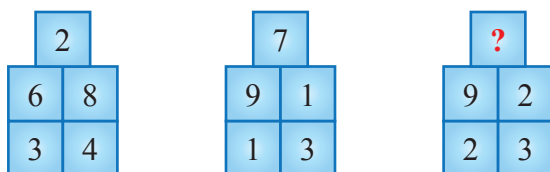
D) 300π E) 320π

Between question 41 and question 45, find the suitable numbers according to the rules shown in the figures.

41.

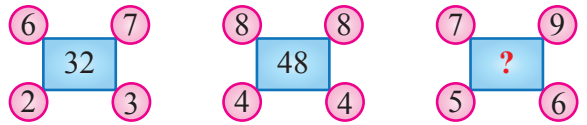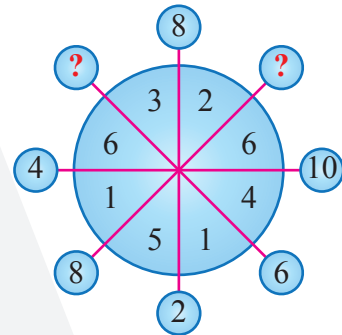A) 4   B) 5   C) 6   D) 7   E) 8

42.

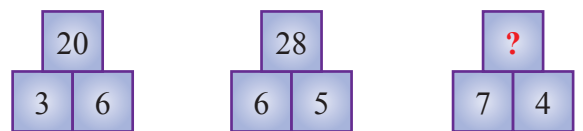A) 8   B) 7   C) 6   D) 5   E) 4

43.

A) 36   B) 64   C) 72   D) 87   E) 92

44.

A) 4 8   B) 6 8   C) 6 5   D) 10 8   E) 7 6

45.

A) 6   B) 12   C) 24   D) 32   E) 36

46. 2 2 3 4 2 **?** 2 2 2 1

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

47. 2, 7, 23, 72, 220, 665, 2001, **?**

A) 4002   B) 4010   C) 6010
D) 6060   E) 8020

48. 1, 6, 3, 8, 4, 9, **?**

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

49.

2	3	5	8
5	6	?	11
7	?	?	13
4	5	?	10

A)
	8	
9	11	
	6	

B)
	7	
8	12	
	8	

C)
	8	
8	10	
	7	

D)
	9	
10	12	
	7	

E)
	10	
9	11	
	9	

50.

45	46	44	43	47
41	?	43	?	40
49	48	?	47	50
44	?	46	?	47
51	49	48	50	47

A)
38		42
	46	
43		48

B)
42		38
	51	
45		43

C)
44		42
	51	
45		43

D)
39		42
	51	
48		45

E)
38		39
	46	
45		43

10

51.

First step   Second step   Third step
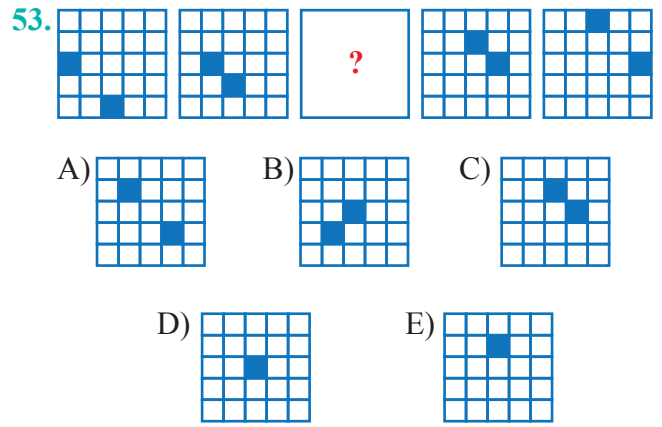

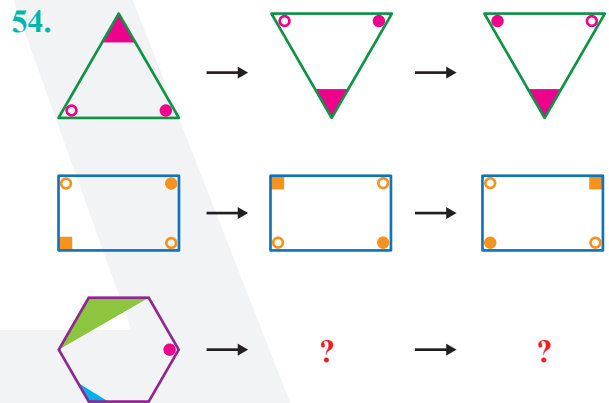1   4   10

According to the given pattern, how many triangles are there in the fifth step?

A) 44   B) 46   C) 48

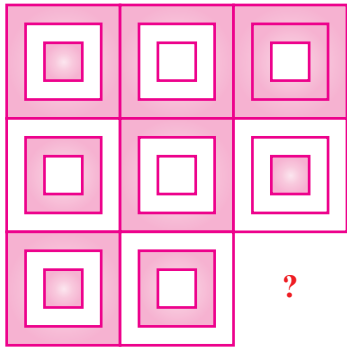   D) 50   E) 52

52.

A)   B)   C)

    D)   E)

53.

A)   B)   C)

    D)   E)

54.

A)

B)

C)

D)

E)
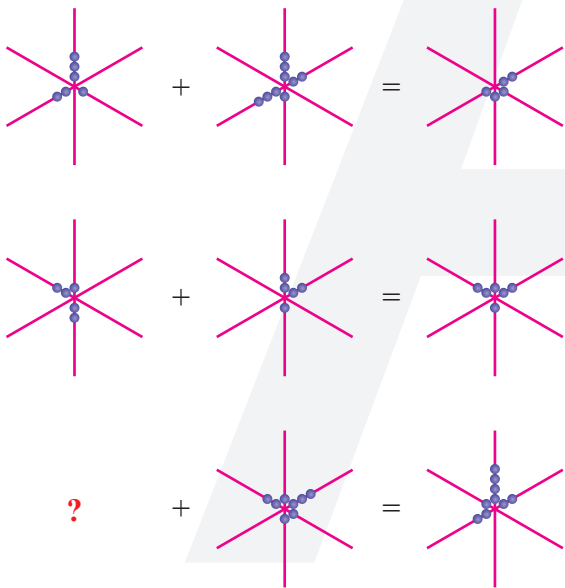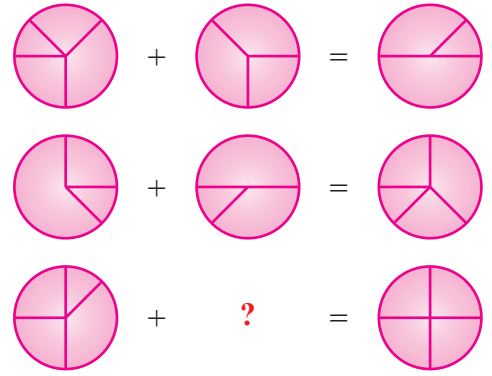
55.

A)

B)

C)

D)
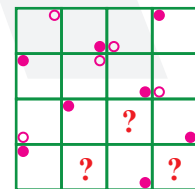
E)

57.

A)

B)

C)

D)

E)

56.

A)

B)

C)

D)

E)

58.

A)

B)

C)

D)

E)

Between question 59 and question 62, the letters in the first group refer to the numbers which are obtained in the second group. According to this, find the suitable numbers to be replaced with the question mark.

59.

I. Words
SALİH
HALİS
İHLAS

→

II. Numerical Matching
86574
67584
47586

Asked Word
SİLAH

→ **?**

A) 48576   B) 45867   C) 64587
D) 68475   E) 74568

60.

I. Words
KİTAP
PATİK
TAKİP
KATİP

→

II. Numerical Matching
12543
32541
34521
52341

Asked Word
PİKAP

→ **?**

A) 31243   B) 23412   C) 14321
D) 42134   E) 12341

61.

I. Words
NİKES
SİNEK
KESİN

→

II. Numerical Matching
85123
35821
12358

Asked Word
SENKİ

→ **?**

A) 32815   B) 58123   C) 82315
D) 38215   E) 12358

62.

I. Words
SİREN
NESİR
RESİN

→

II. Numerical Matching
54713
71345
34715

Asked Word
ESRİN

→ **?**
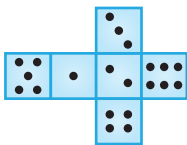
A) 35714   B) 37145   C) 47315
D) 74513   E) 51374

63. Below given the views of a dice from different perspectives.

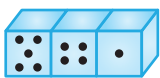**According to this, which of the views below can be the view shown as question mark?**
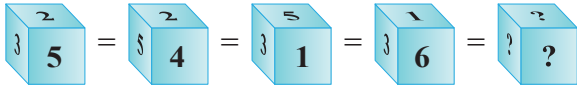
A)   B)   C)

D)   E)

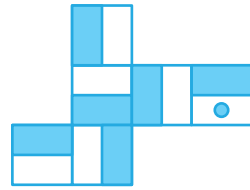**64.** On the right, the view of an open cube is given.

When three cubes are put side by side as shown in the figure on the right, what could be the most total number of the dots on the upper surfaces?
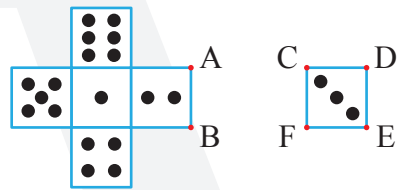

A) 12   B) 14   C) 15   D) 17   E) 19

65.

Above given the open form of a cube, which of the below options given the correct form of the cube shown above?

A)   B)   C)

D)   E)

66.

Above the open form of a cube is cut into two parts. CDEF part can only be attached to the other part by points A and B.

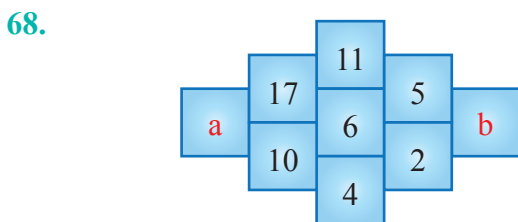**According to this, which of the options below can be the attached form of the parts shown above?**

A)   B)   C)

D)   E)

14

Between question 67 and question 68, the numbers are put in a specific pattern. Find the suitable numbers which can be put instead of the letters.

67.

4	4
2	6

5	7
3	9

8	16
6	18

a	b
c	12

A) a:8   B) a:6   C) a:6   D) a:14   E) a:6

    b:10   b:8   b:10   b:8   b:10

    c:4   c:4   c:8   c:10   c:4

68.

Cross figure:
```
        11
   17    5
 a   6     b
   10    2
        4
```

A) a:7   B) a:7   C) a:27   D) a:27   E) a:28

    b:3   b:7   b:7   b:3   b:6

69. The numbers given below are ordered in a specific pattern. Which of the numbers given in options is suitable to be replaced with the question mark?
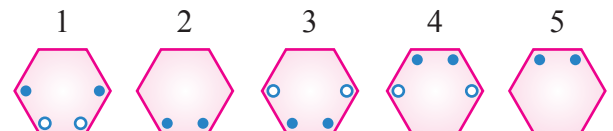
1432   ⟶   2431

45781   ⟶   48751

963245   ⟶   246953

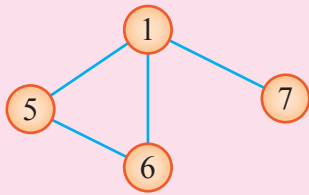1458723   ⟶   **?**

A) 2487531   B) 5713482   C) 8421357

          D) 7531248   E) 4827513

70. Which of the figures below disrupts the pattern?

    1   2   3   4   5

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

73.
$1 \longrightarrow 9$
$2 \longrightarrow 14$
$3 \longrightarrow 11$
$4 \longrightarrow 4$
$5 \longrightarrow 6$
$6 \longrightarrow 2$

$$\dfrac{Z - X}{Y} = ?$$

A) $\dfrac{1}{6}$ B) $\dfrac{1}{5}$ C) $\dfrac{1}{4}$ D) $\dfrac{2}{5}$ E) $\dfrac{1}{2}$

71.
$1 \longrightarrow 12$
$2 \longrightarrow 13$
$3 \longrightarrow 8$
$4 \longrightarrow 3$
$5 \longrightarrow 2$
$6 \longrightarrow 4$

$$\dfrac{X + Z}{Y} = ?$$

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

72.
$1 \longrightarrow 12$
$2 \longrightarrow 15$
$3 \longrightarrow 1$
$4 \longrightarrow 9$
$5 \longrightarrow 3$
$6 \longrightarrow 6$

$(X + Y) - Z = ?$

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

74.
$1 \longrightarrow 5$
$2 \longrightarrow 10$
$3 \longrightarrow 6$
$4 \longrightarrow 13$
$5 \longrightarrow 9$
$6 \longrightarrow 4$
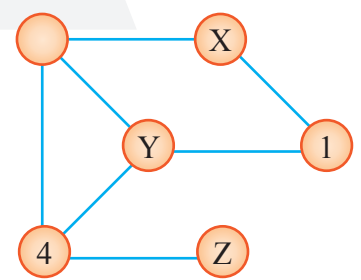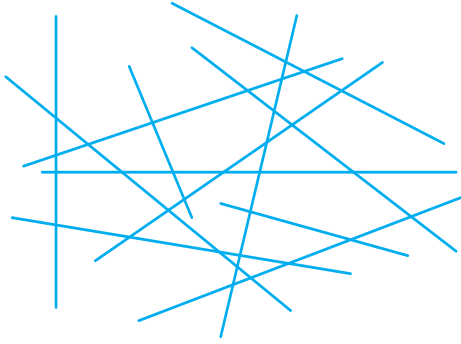

$X + Y - Z = ?$

A) –3 B) –1 C) 0 D) 1 E) 2

16

75. In the figure shown below, how many line segments are there?
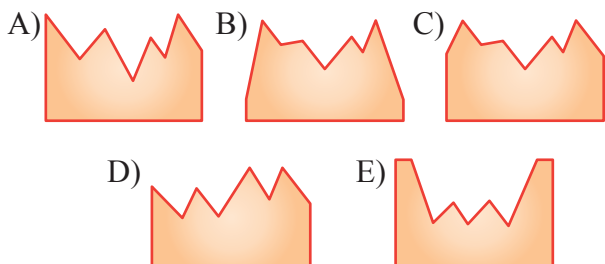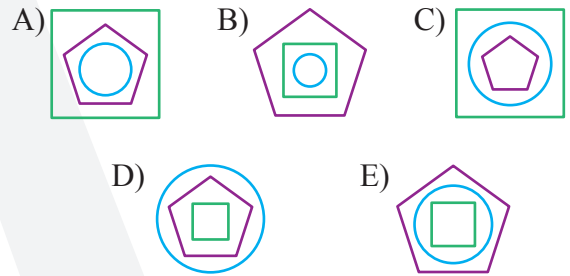

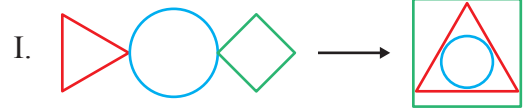A) 9   B) 10   C) 11   D) 12   E) 13

76.

Which of the figure parts below can complete the figure shown above as a square?
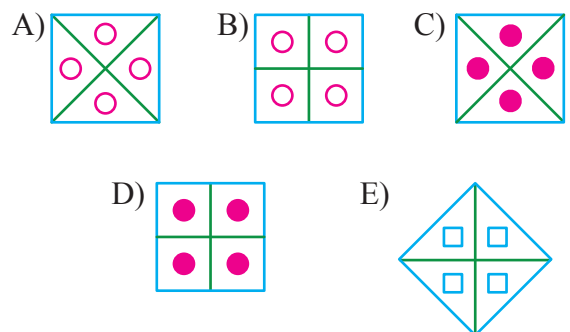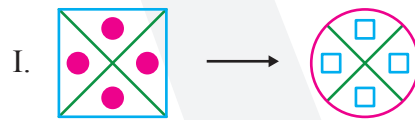
A)   B)   C)

D)   E)

Between question 77 and question 80, according to the relation defined in the (I) line, which of the below figures can complete the (II) line.
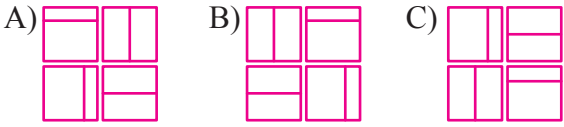
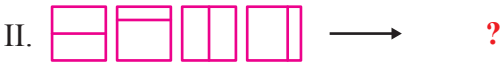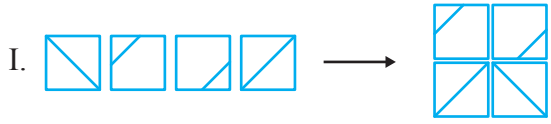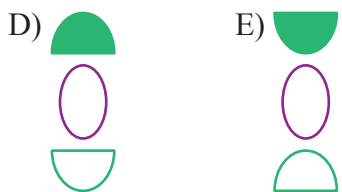**77.**
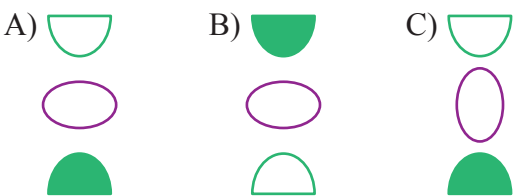
I.

II.   **?**

A)   B)   C)

D)   E)

78.

I.

II.   **?**

A)   B)   C)

D)   E)

79.

I.

II. ?

A)   B)   C)

D)   E)

80.

I.

II. ?

A)   B)   C)

D)   E)

18

ANSWER KEY

1. B	21. C	41. D	61. A
2. C	22. C	42. E	62. C
3. B	23. C	43. A	63. B
4. E	24. E	44. B	64. D
5. B	25. A	45. C	65. E
6. E	26. C	46. E	66. B
7. A	27. A	47. C	67. E
8. D	28. D	48. A	68. D
9. A	29. A	49. C	69. A
10. E	30. E	50. D	70. D
11. B	31. E	51. B	71. C
12. C	32. A	52. A	72. C
13. B	33. B	53. D	73. D
14. B	34. C	54. B	74. B
15. D	35. C	55. E	75. D
16. E	36. A	56. B	76. C
17. D	37. B	57. E	77. E
18. D	38. E	58. A	78. B
19. A	39. E	59. A	79. A
20. E	40. D	60. C	80. E

MATHEMATICS

1. If this is the case $(x+1)^{(x+1)^{(x+1)^{\cdots}}} = 2$ which of the below is $x \in \mathbb{R}^+$?

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

2. $a \cdot x = b \cdot y = c \cdot z = 3$

   $x \cdot y + x \cdot z + y \cdot z = 3xyz$ is the case,

   $a + b + c = ?$

   A) 1   B) 3   C) 6   D) 9   E) 12

3. AAA96 as a five digit number and BC as a two digit numbers, they are natural numbers.

   $$\begin{array}{r|l} \text{AAA96} & \underline{48} \\ \underline{} & \\ & \text{BC} \end{array}$$

   According to the division, how many possible values can BC take?

   A) 3   B) 13   C) 17   D) 19   E) 38

4. $P(x) = (x-4)(x^2 - 8x - 15)$ is the case,

   $$\frac{P(1) - P(3)}{P(5) - P(7)} = ?$$

   A) 2   B) 1   C) 0   D) –1   E) –2

5. How many (x) natural numbers are there which makes $\dfrac{120}{x!}$ a whole number?

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

6. What is the sum of the radicals in the equation?

   $$\sqrt{x-1} + \frac{3}{\sqrt{x-1}+1} = 3$$

   A) 1   B) 2   C) 4   D) 6   E) 8

7. $x \in \mathbb{R}$ and $3x + 3$ is an odd number.

According to this, which of the below is certainly an even number?

A) $x + 2$ 　　 B) $9x + 2$ 　　 C) $x - 3$

　　 D) $x^2 + x - 2$ 　 E) $9x^2 + 1$

8. How many pairs are possible with (x, y) which meet the requirement of $x^y = -y^x$?
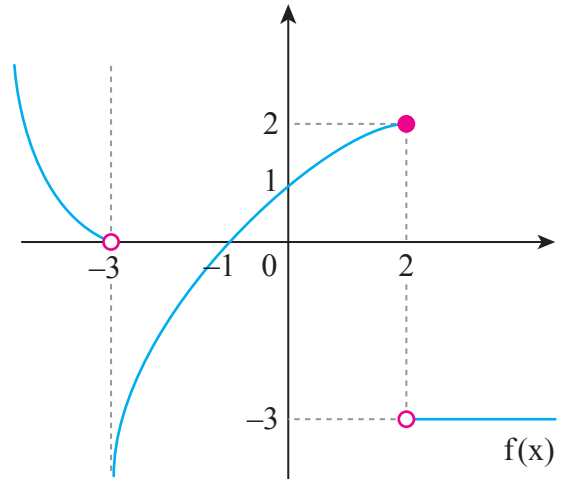
A) 4 　　 B) 3 　　 C) 2 　　 D) 1 　　 E) 0

9.

$$(23023)^{0,\overline{9}^{1,\overline{9}^{2,\overline{9}^{\cdots\,9,\overline{9}}}}} = A \qquad \text{and}$$

$$= \dfrac{A \,\big|\, 23}{\dfrac{}{K}\,\big|\,B} \text{ is the case, } B = ?$$

A) 0 　　　 B) 10 　　　 C) 11

　　　 D) 101 　　 E) 1001

10.

In the graph of the f(x) function, which of the below is false?

A) $\lim\limits_{x \to -3^+} f(x) = -\infty$

B) $\lim\limits_{x \to -1} f(x) = 0$

C) $\lim\limits_{x \to 2^-} f(x) = 2$

D) $\lim\limits_{x \to 2^+} f(x) = -3$

E) $\lim\limits_{x \to -3} f(x) = 0$
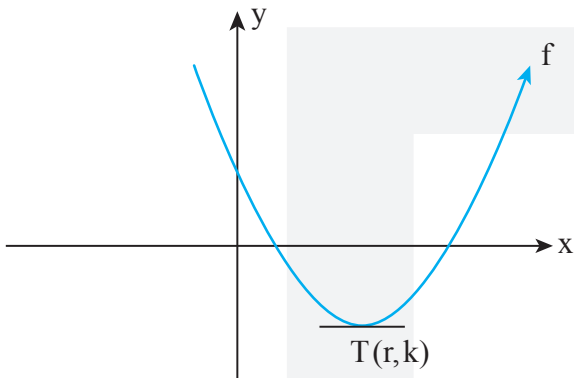
11. $0 < x < y$ **as is the case,**

$$\sqrt{\dfrac{1}{x^2} - \dfrac{2}{xy} + \dfrac{1}{y^2}} \cdot \dfrac{xy}{x - y} = ?$$

A) 1 　 B) -1 　 C) $\dfrac{x}{y}$ 　 D) xy 　 E) $x - y$

12. $\dfrac{3 - 3 \div 0,\overline{1}}{2 \div 0,\overline{2} + 1} = ?$

A) 0   B) –2,4   C) 2,4

D) –1,2   E) 1,2
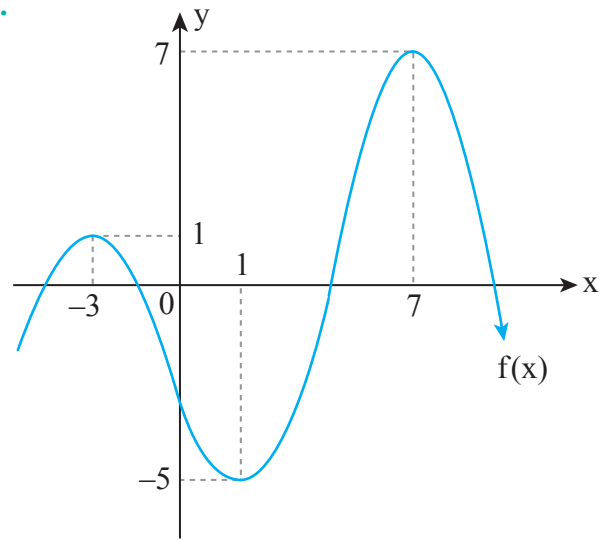
13.

For the parabola $f(x) = ax^2 + bx + c$, which of the below is false?

A) $a > 0$

B) $a^3 \cdot b^2 \cdot c > 0$

C) $a \cdot b \cdot c < 0$

D) $\dfrac{a + c}{b \cdot k} > 0$

E) $\dfrac{a \cdot r \cdot c}{b \cdot k} < 0$

14. $i^2 = -1$ as is the case and one of the radicals is i in the equation $x^2 + (a - 1)x + b + i = 0$, $a^{-b} = ?$

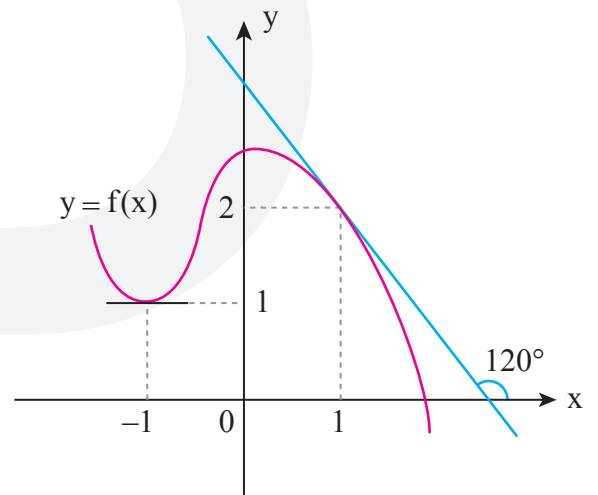A) 1   B) –1   C) 0   D) –2   E) $-\dfrac{1}{2}$

15.

$c \in \mathbb{R}$ as is the case, what is the widest value range of (c) in order for the equation $f(x) = c$ can have four different radicals?

A) $-3 < c < 1$

B) $-3 < c < 7$

C) $1 < c < 7$

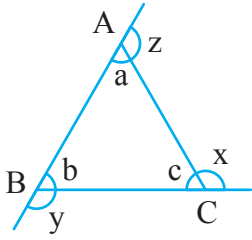D) $-5 < c < 1$

E) $0 < c < 1$

16.

Above given the graph of the function f(x).

$\displaystyle\int_{-1}^{1} f'(x) \cdot (1 + f''(x))\,dx = ?$

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

3

17.

In the $\widehat{ABC}$ triangle $a < b < c$ is the case,

$\left| a - y + c \right| + \left| x - z \right| + \left| a + b \right| = ?$

A) x   B) y   C) z   D) a   E) b

18. $3^x + 3^{-x} = 3$ is the case, $3^{3x} + 3^{-3x} = ?$

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

19. $x^{\ln x} = e$ is the case, what is the multiplication of the values which x can take?

A) e   B) $\dfrac{1}{e}$ C) 1   D) –1   E) 0

20. $f(x) = x^2 + 2x + 2 \implies$

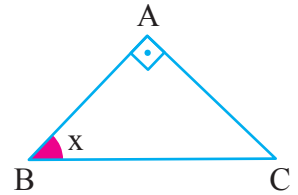$\lim\limits_{x \to 2} \dfrac{f(x) - f(2)}{f'(2) - f'(x)} = ?$

A) –3   B) 3   C) –2   D) 2   E) 1

21. $\left| AC \right| = \sin 3x$

$m(\widehat{ABC}) = x \implies$

$\lim\limits_{x \to 0} \left| AB \right| = ?$

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

22. $\dfrac{(42!)^2 - (27!)^2}{42! + 27!} = A \cdot 10^n$
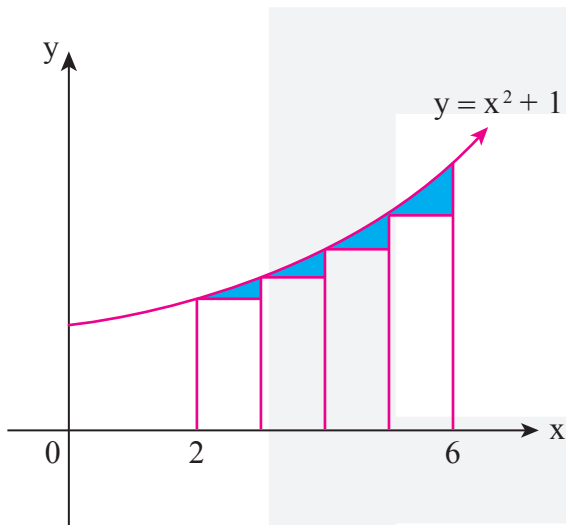
What is the highest possible value which (n) can take in the equilibrium above ?

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

23. For $a \in \mathbb{R}$, what is the solution set for the equation $3 - \sqrt{4+a} = \frac{a}{4} + 1$?

A) $\varnothing$ B) $\{1\}$ C) $\{0,4\}$

D) $\{0\}$ E) $\{0,1\}$

24.

$y = x^2 + 1$

In the graph, short edges of the rectangles are equal.

What is the unit of the shaded area as br²?

A) $\frac{46}{3}$ B) $\frac{47}{3}$ C) $\frac{49}{3}$ D) $\frac{53}{3}$ E) $\frac{57}{3}$

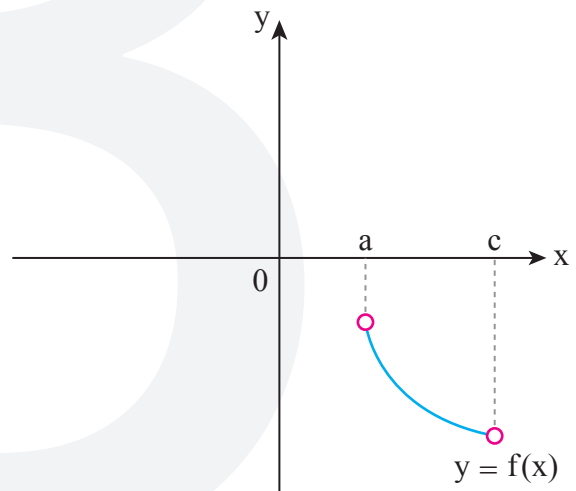**25.** $(2-\sqrt{3})^{\cos x} = (2+\sqrt{3})^{\sin x}$ is the case,

$\cot x = ?$

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

26. $0 < x < \frac{\pi}{4}$ as is the case,

$$\frac{1}{2}\left(\sqrt{1-\sin 2x} - \sqrt{1+\sin 2x}\,\right)^2 - 1 = ?$$

A) $2\sin^2 x$ B) $\sin 2x$ C) 0

D) $\cos 2x$ E) $-\cos 2x$

27.

$y = f(x)$

According to the graph, which of the below is correct in the range of (a,c) ?

A) $x^3 \cdot f(x) > 0$

B) $f(x) \cdot f'(x) < 0$

C) $\dfrac{f^2(x)}{f'(x)} > 0$

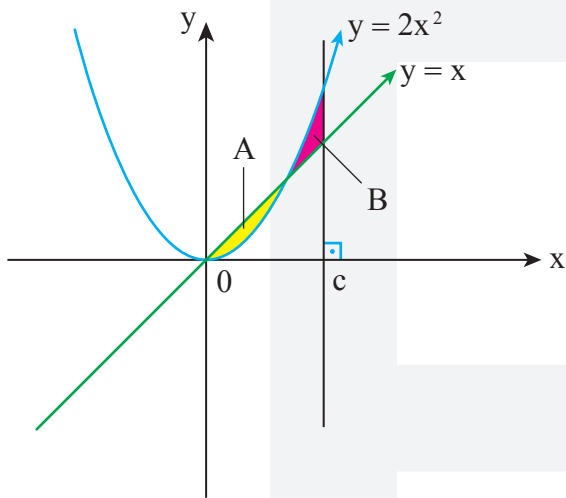D) $x^2 \cdot f'(x) > 0$

E) $x \cdot f^2(x) \cdot f'(x) < 0$

28. As (a_n) is a geometric sequence,

$a_1 = 2$ and $a_{11} = 128 \Rightarrow$

$a_2 \cdot a_3 \cdot a_4 \cdot a_5 \cdot a_6 \cdot a_7 \cdot a_8 \cdot a_9 \cdot a_{10} = ?$

A) 2^{36} B) 2^{34} C) 2^{32} D) 2^{30} E) 2^{28}

29.

In the graph, the areas of A and B are equal, in this case c=?

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

30. $f(x)$ is the unit function and

$f(3x^2 + mx) = (n+2)x^2 - x + p$ is the case,

$m \cdot n \cdot p = ?$

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

31. $x^2 + y^2 + 4x + 6y + c = 0$

equation defines a point, so what is c?

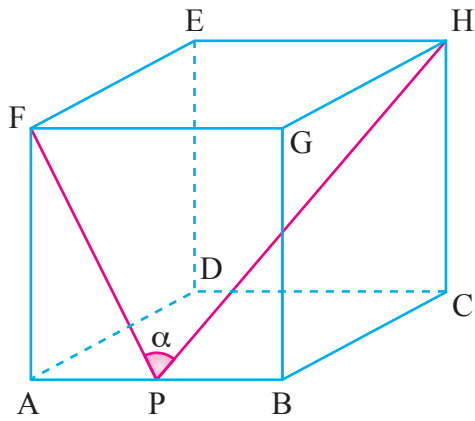A) 4   B) 6   C) 8   D) 11   E) 13

32.
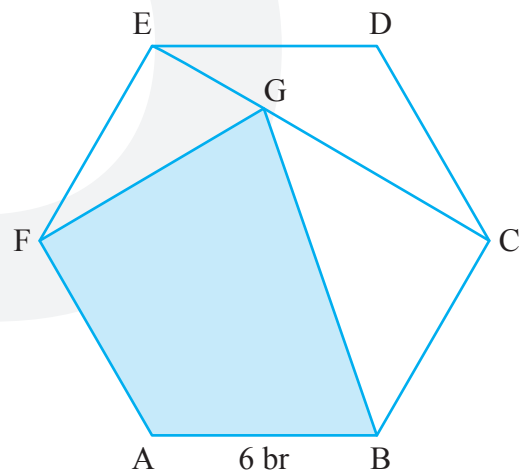
ABCDEF is a regular hexagon and as $|AB| = 6$ br is the case, $A(ABGF) = ?$

A) $42\sqrt{3}$ B) $36\sqrt{3}$ C) $32\sqrt{3}$
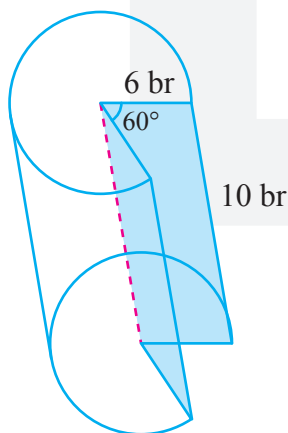
D) $29\sqrt{3}$ E) $27\sqrt{3}$

6

33.

ABCDEFGH is a cube.

$|AP| = |PB| \Rightarrow \cos\alpha = ?$

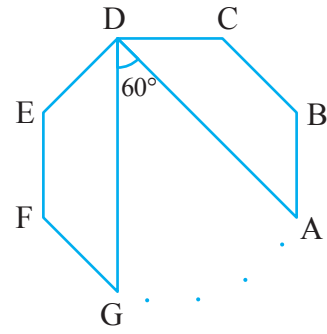A) $\dfrac{1}{\sqrt{2}}$ B) $\sqrt{3}$ C) $\sqrt{5}$ D) $\dfrac{1}{\sqrt{3}}$ E) $\dfrac{\sqrt{5}}{5}$

34.

How many unit cubes is the volume of the right cylinder in the image?
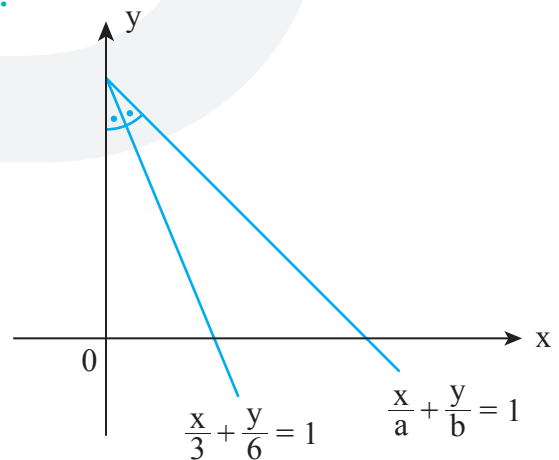
A) 60π B) 120π C) 180π

   D) 300π E) 320π

35.

How many sided is the ABCDEF… regular polygon?

A) 9   B) 7   C) 11   D) 12   E) 17
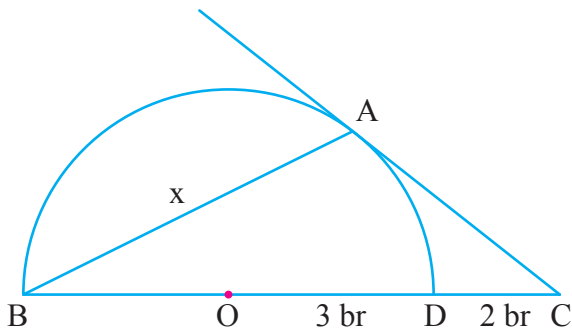
36.

$a + b = ?$

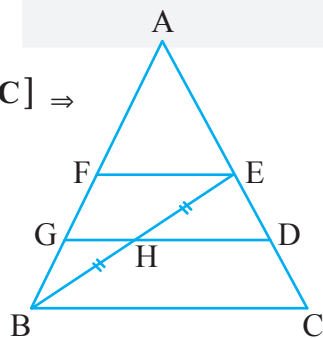A) 13   B) 14   C) 15   D) 16   E) 17

7

37.

[CA, is tangent at the A point to the semicircle, and $|OD| = 3\,br$, $|DC| = 2\,br$ as is the case, how many units is x?

A) $\dfrac{3}{\sqrt{5}}$ B) $\dfrac{7}{\sqrt{5}}$ C) $\dfrac{12}{\sqrt{5}}$ D) $\dfrac{12}{5}$ E) $\dfrac{7}{5}$

38. $|AE| = |EC|$,

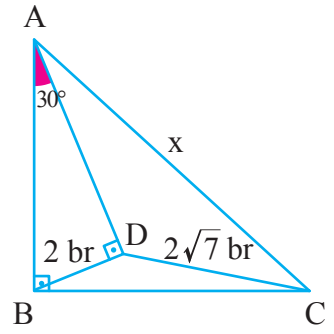$[FE] \parallel [GD] \parallel [BC] \Rightarrow$

$\dfrac{|GD|}{|BC|} = ?$

A) $\dfrac{1}{3}$ B) $\dfrac{2}{3}$ C) $\dfrac{3}{4}$ D) $\dfrac{4}{5}$ E) $\dfrac{2}{5}$

39. $m(\widehat{BAD}) = 30°$,

$|BD| = 2\,br$,

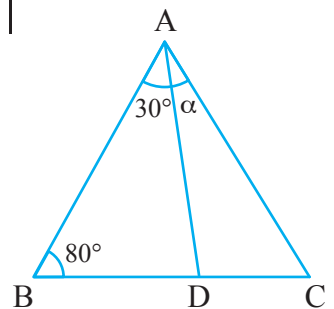$|DC| = 2\sqrt{7}\,br \Rightarrow$

$x = ?$

A) 8 B) 13 C) 17 D) $3\sqrt{6}$ E) $\sqrt{91}$

40. In the ABC triangle,

$|AC| = |AB| + |BD|$
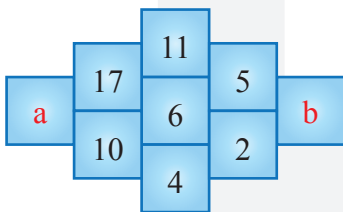
is the case, $\alpha = ?$

A) 40 B) 30 C) 20 D) 15 E) 10
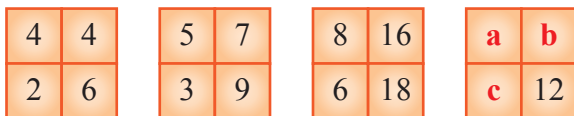
8

BASIC LEARNING SKILLS

Between question 41 and question 42, the numbers are put in a specific pattern. Find the suitable numbers which can be put instead of the letters.

41.

11
17		5
a	6	b
10		2
4

A) a:7   B) a:7   C) a:27   D) a:27   E) a:28
   b:3   b:7   b:7   b:3   b:6

42.

4	4
2	6

5	7
3	9

8	16
6	18

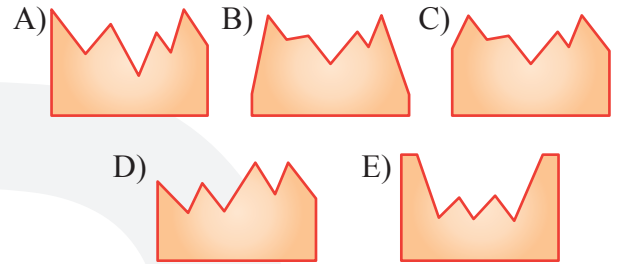| a	b
c	12

A) a:8   B) a:6   C) a:6   D) a:14   E) a:6
   b:10   b:8   b:10   b:8   b:10
   c:4   c:4   c:8   c:10   c:4
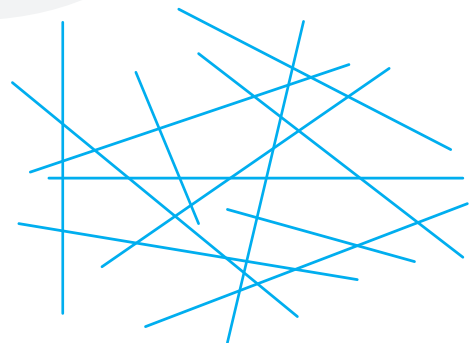
43.

Which of the figure parts below can complete the figure shown above as a square?

A)   B)   C)

D)   E)

44. In the figure shown below, how many line segments are there?

A) 9   B) 10   C) 11   D) 12   E) 13

45.   1,   6,   3,   8,   4,   9,   ?

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

46.   2   2   3   4   2   ?   2   2   2   1

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

47.   2, 7, 23, 72, 220, 665, 2001, ?

A) 4002   B) 4010   C) 6010
       D) 6060   E) 8020

48.

45	46	44	43	47
41	?	43	?	40
49	48	?	47	50
44	?	46	?	47
51	49	48	50	47

A)

38		42
	46	
43		48

B)

42		38
	51	
45		43

C)

44		42
	51	
45		43

D)

39		42
	51	
48		45

E)

38		39
	46	
45		43

49.

2	3	5	8
5	6	?	11
7	?	?	13
4	5	?	10

A)

	8
9	11
	6

B)

	7
8	12
	8

C)

	8
8	10
	7

D)

	9
10	12
	7

E)

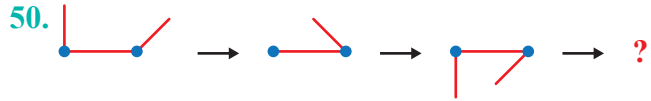|	10
9	11
	9

10

Between question 50 and question 51, find the suitable pattern to be replaced with (?) according to the given figures pattern.

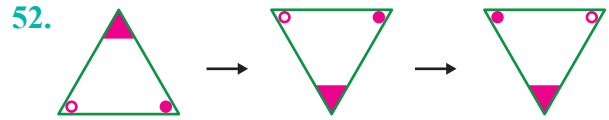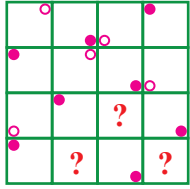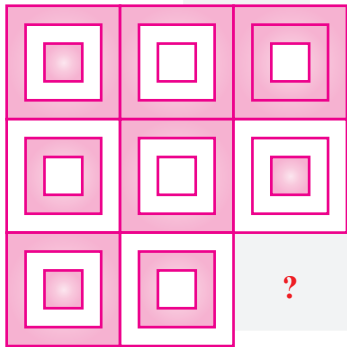Between question 52 and question 56, find the suitable figures which are to be placed in the missing parts.

50.

A)

B)

C)

D)

E)

51.

A) B) C)

D) E)

52.

A)

B)

C)

D)

E)

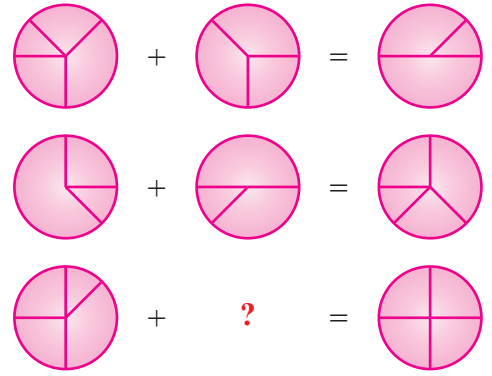11

53.

A)   B)   C)

D)   E)

54.

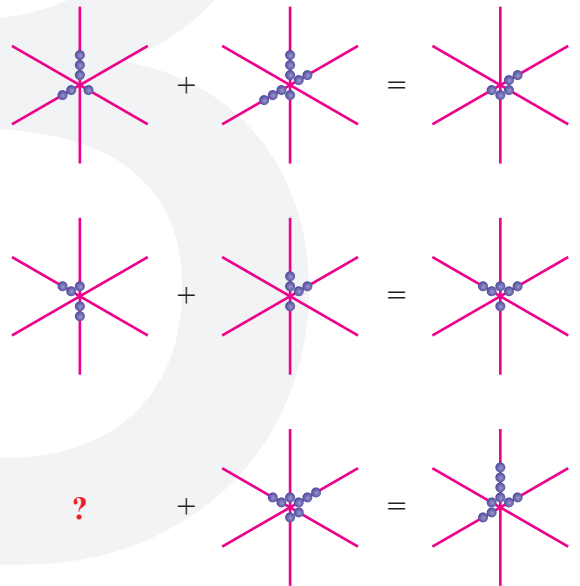A)   B)   C)

D)   E)

55.

A)   B)   C)

D)   E)

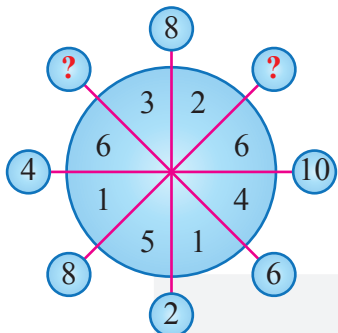**56.**

A)   B)   C)

D)   E)

12

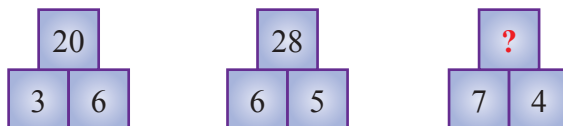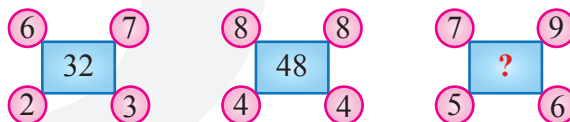**Between question 57 and question 61, find the suitable numbers according to the rules shown in the figures.**

59.

20 | 3 6   28 | 6 5   ? | 7 4

A) 6   B) 12   C) 24   D) 32   E) 36

57.

8
? 3 2 ?
6 6
4 — 10
1 4
5 1
8 2 6

A) 4 8   B) 6 8   C) 6 5   D) 10 8   E) 7 6

60.

6 [32] 7 / 2 3   8 [48] 8 / 4 4   7 [?] 9 / 5 6

A) 36   B) 64   C) 72   D) 87   E) 92

58.

2 / 6 8 / 3 4   7 / 9 1 / 1 3   ? / 9 2 / 2 3

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

61.

8 [42] 2 7   9 [48] 3 8   10 [56] 2 ?

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

13
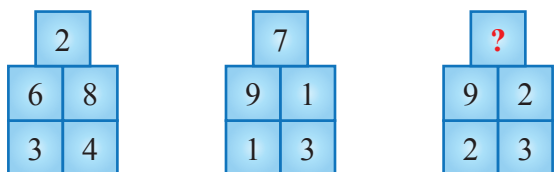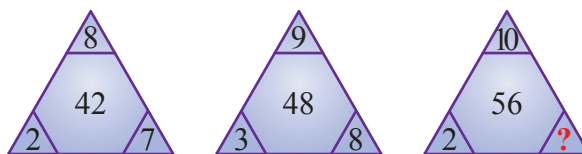
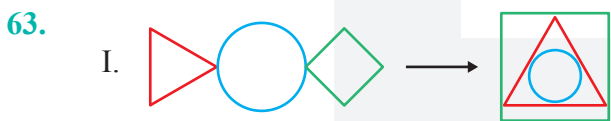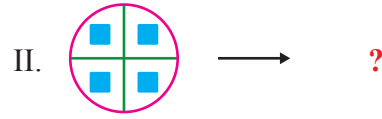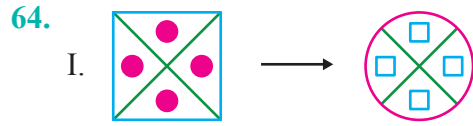Between question 62 and question 65, according to the relation defined in the (I) line, which of the below figures can complete the (II) line.
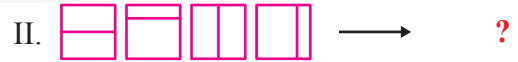
62.

I.

II. ?

A)
B)
C)

D)
E)

63.

I.

II. ?

A)
B)
C)

D)
E)

64.

I.

II. ?

A)
B)
C)

D)
E)

65.

I.

II. ?

A)
B)
C)

D)
E)

14
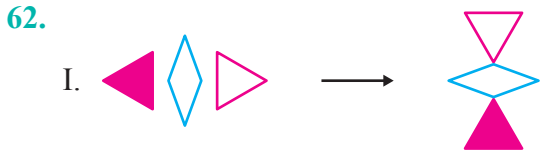
Between question 66 and question 69, the letters in the first group refer to the numbers which are obtained in the second group. According to this, find the suitable numbers to be replaced with the question mark.

66.

I. Words
KİTAP
PATİK
TAKİP
KATİP

→

II. Numerical Matching
12543
32541
34521
52341

Asked Word
PİKAP

→ **?**

A) 31243 B) 23412 C) 14321

D) 42134 E) 12341

67.

I. Words
NİKES
SİNEK
KESİN

→

II. Numerical Matching
85123
35821
12358

Asked Word
SENKİ

→ **?**

A) 32815 B) 58123 C) 82315

D) 38215 E) 12358

68.

I. Words
SALİH
HALİS
İHLAS

→

II. Numerical Matching
86574
67584
47586

Asked Word
SİLAH

→ **?**

A) 48576 B) 45867 C) 64587

D) 68475 E) 74568

69.

I. Words
SİREN
NESİR
RESİN

→

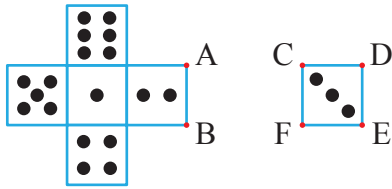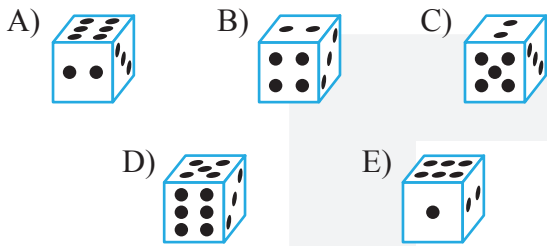| II. Numerical Matching |
|---|
| 54713 |
| 71345 |
| 34715 |

Asked Word
ESRİN

→ **?**

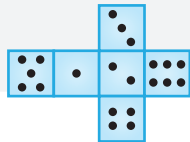A) 35714 B) 37145 C) 47315

D) 74513 E) 51374

70.

Above the open form of a cube is cut into two parts. CDEF part can only be attached to the other part by points A and B.
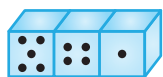
According to this, which of the options below can be the attached form of the parts shown above?

A)   B)   C)

D)   E)

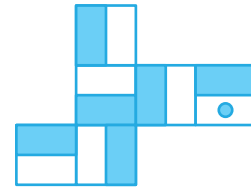**71.** On the right, the view of an open cube is given.

When three cubes are put side by side as shown in the figure on the right, what could be the most total number of the dots on the upper surfaces?
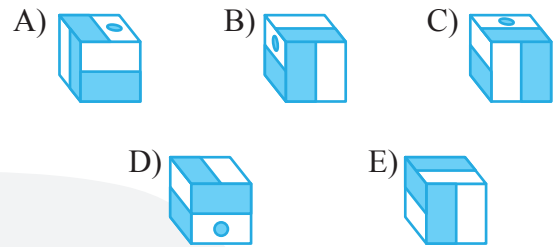

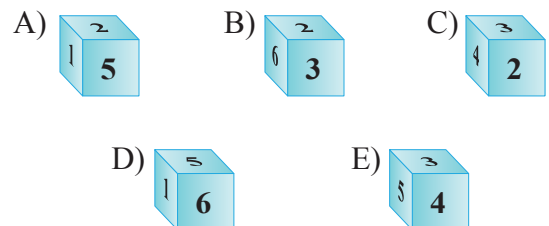A) 12   B) 14   C) 15   D) 17   E) 19

72.

Above given the open form of a cube, which of the below options given the correct form of the cube shown above?
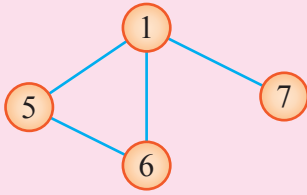
A)   B)   C)

D)   E)

73. Below given the views of a dice from different perspectives.

According to this, which of the views below can be the view shown as question mark?

A)   B)   C)

D)   E)

Between question 74 and question 77, as shown in the figure below, numbers within the circles are equal to number in the circle which they are attached to. According to this, find the asked answers. Example:

$1 \rightarrow 18$ $(= 5+6+7)$
$5 \rightarrow 7$ $(= 6+1)$
$6 \rightarrow 6$ $(= 5+1)$
$7 \rightarrow 1$

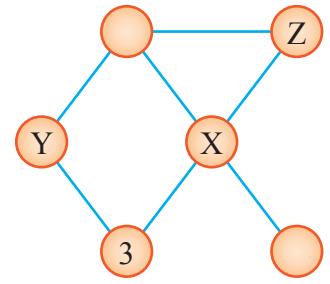**74.** $1 \longrightarrow 12$
$2 \longrightarrow 15$
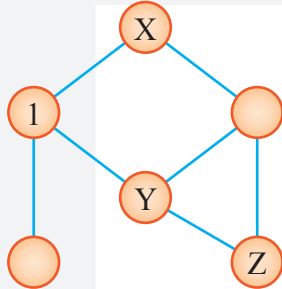$3 \longrightarrow 1$
$4 \longrightarrow 9$
$5 \longrightarrow 3$
$6 \longrightarrow 6$

$(X + Y) - Z = ?$

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

75. $1 \longrightarrow 5$
$2 \longrightarrow 10$
$3 \longrightarrow 6$
$4 \longrightarrow 13$
$5 \longrightarrow 9$
$6 \longrightarrow 4$

$X + Y - Z = ?$

A) −3   B) −1   C) 0   D) 1   E) 2

76. $1 \longrightarrow 12$
$2 \longrightarrow 13$
$3 \longrightarrow 8$
$4 \longrightarrow 3$
$5 \longrightarrow 2$
$6 \longrightarrow 4$

$\dfrac{X + Z}{Y} = ?$

A) $\dfrac{1}{4}$ B) $\dfrac{1}{2}$ C) 1   D) 2   E) 4
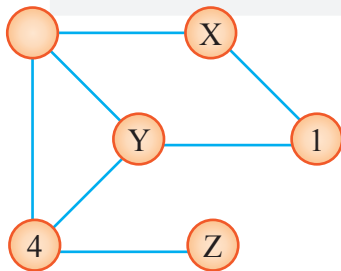
77. $1 \longrightarrow 9$
$2 \longrightarrow 14$
$3 \longrightarrow 11$
$4 \longrightarrow 4$
$5 \longrightarrow 6$
$6 \longrightarrow 2$

$\dfrac{Z - X}{Y} = ?$

A) $\dfrac{1}{6}$ B) $\dfrac{1}{5}$ C) $\dfrac{1}{4}$ D) $\dfrac{2}{5}$ E) $\dfrac{1}{2}$

17

78. **Which of the figures below disrupts the pattern?**

1   2   3   4   5

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

79. **The numbers given below are ordered in a specific pattern. Which of the numbers given in options is suitable to be replaced with the question mark?**
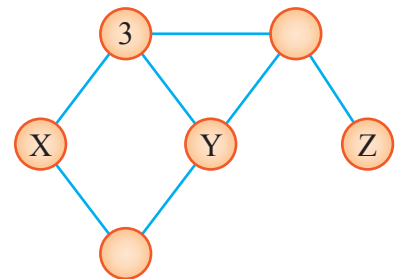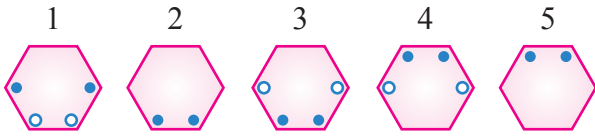
1432   ⟶   2431

45781   ⟶   48751

963245   ⟶   246953

1458723   ⟶   **?**

A) 2487531   B) 5713482   C) 8421357

D) 7531248   E) 4827513

80.

First step   Second step   Third step
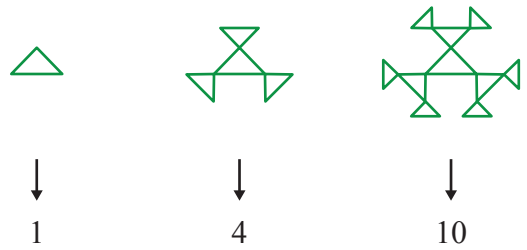
↓   ↓   ↓

1   4   10

According to the given pattern, how many triangles are there in the fifth step?

A) 44   B) 46   C) 48

D) 50   E) 52

18

ANSWER KEY

1. A	**21.** C	**41.** D	**61.** D
2. D	**22.** E	**42.** E	**62.** E
3. A	**23.** D	**43.** C	**63.** E
4. B	**24.** A	**44.** D	**64.** B
5. B	**25.** A	**45.** A	**65.** A
6. D	**26.** E	**46.** E	**66.** C
7. B	**27.** E	**47.** C	**67.** A
8. C	**28.** A	**48.** D	**68.** A
9. E	**29.** C	**49.** C	**69.** C
10. E	**30.** B	**50.** A	**70.** B
11. B	**31.** E	**51.** D	**71.** D
12. B	**32.** E	**52.** B	**72.** E
13. E	**33.** E	**53.** A	**73.** B
14. C	**34.** D	**54.** E	**74.** C
15. D	**35.** A	**55.** E	**75.** B
16. D	**36.** B	**56.** B	**76.** C
17. C	**37.** C	**57.** B	**77.** D
18. E	**38.** C	**58.** E	**78.** D
19. C	**39.** A	**59.** C	**79.** A
20. A	**40.** B	**60.** A	**80.** B