

1.  $(301)_4 = (122)_4 + (1ab)_4 \Rightarrow a + b = ?$

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

2.  $\sqrt{a - \sqrt{a - \sqrt{a - \dots}}} = \sqrt[3]{9^3 \sqrt[3]{9^3 \sqrt[3]{9^3 \dots}}}$   
 $\Rightarrow a = ?$

- A) 6    **B) 12**    C) 16  
 D) 27    E) 36

3.  $3 < x < 5 \Rightarrow \frac{|(x-2)(x-5)| + x - 5}{x^2 - 4x + 3} = ?$

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

4.  $\frac{(n+1)!}{(n-1)!} = 420 \Rightarrow n = ?$

- A) 16    **B) 20**    C) 24  
 D) 28    E) 32

5.  $\frac{a}{b} = -2 \Rightarrow \frac{2b}{a} - \frac{3a}{b} = ?$

- A) -5    B) -4    C) -3  
 D) 4    **E) 5**

6. If  $\begin{cases} 2a = 3b \\ 4b = 5c \end{cases}$ , then which of the following is correct?

- A)  $a < b < c$     **B)  $a < c < b$**   
 C)  $c < a < b$     D)  $b < c < a$   
**E)  $c < b < a$**

$$7. \begin{cases} 3^{x+y} = 80! \\ 3^{2x+y} = 81! \end{cases} \Rightarrow x = ?$$

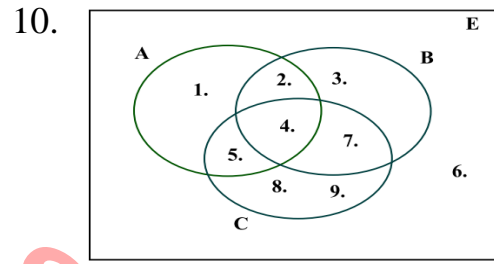
- A) -4      B) -2      C) 2  
**D) 4**      E) 5

$$8. \frac{4}{1 + \frac{3}{1 + \frac{2}{x-2}}} = 2 \Rightarrow x = ?$$

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

9. If 3 workers finish 200 units of work in 5 days working 8 hours a day, how many hours a day should 4 workers work to finish 300 units of work in 5 days?

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



$$A \setminus (B \cap C) = ?$$

- A) {1}      B) {1,2}      C) {1,5}  
 D) {1,6}      **E) {1,2,5}**

$$11. \frac{0,1\bar{6}}{0,3\bar{3}} = ?$$

- A)  $\frac{3}{2}$       B) 1  
 C)  $\frac{2}{3}$       **D)  $\frac{1}{2}$**   
 E)  $\frac{16}{33}$

$$12. \left(\frac{3}{2} - \frac{5}{4}\right) - \left[\left(2\frac{1}{4}\right)\frac{1}{4} - 1\right] = ?$$

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

$$13. \left( \frac{2^{-2} + 2^{-3}}{2^{-2} + 2^2} \right)^{-1} = ?$$

A)  $\frac{3}{34}$

B)  $\frac{2}{17}$

C)  $\frac{3}{17}$

D)  $\frac{17}{3}$

E)  $\frac{34}{3}$

$$14. \frac{\sqrt[3]{(-3)^3} - \sqrt{(-3)^2}}{\sqrt[3]{(-3)^2} \sqrt{(-3)^2}} = ?$$

A) -4

B) -2

C) 2

D) 4

E) 6

$$15. \frac{\sqrt{4,4} + \sqrt{1,1} + \sqrt{9,9}}{\sqrt{1,1}} = ?$$

A) 14

B) 13

C) 9

D) 8

E) 6

16. If  $P(x - 1) = 2x^3 - 2x^2 + 3x + 4$ , what is the remainder when  $P(x)$  is divided by  $(x - 2)$ ?

A) 49

B) 18

C) 7

D) -18

E) -49

17.  $f(x) = 2x + m \Rightarrow (f \circ f \circ f)(x) = ?$

A)  $6x + 3m$

B)  $6x + m$

C)  $8x + m$

D)  $8x + 3m$

E)  $8x + 7m$

18.  $f(x, y) = x^y - y^x \Rightarrow f(f(3, 1), 2) = ?$

A) 0

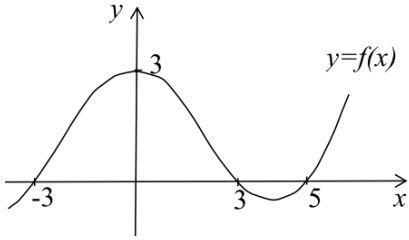
B) 1

C) 2

D) 3

E) 4

19.



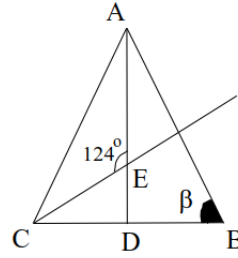
$$(g \circ f)(x) = x^2 - 7x + 10 \Rightarrow g(3) = ?$$

- A) -2    B) 0    C) 2    **D) 10**    E) 40

20.  $1 + 4 \cos^2 x \sin^2 x + \cos^2 2x = ?$

- A) 2**    B)  $1 + 2 \cos^2 2x$   
 C)  $2 \sin^2 2x$     D) 0  
 E)  $2 + \cos^2 2x$

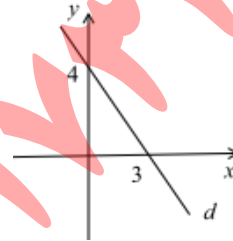
21.



If  $|AC|=|AB|$ ,  
 $[AD]$  is median,  
 $[CE]$  is bisector, and  
 $m(\angle CEA)=124^\circ$ ,  
 Then  $\beta = ?$

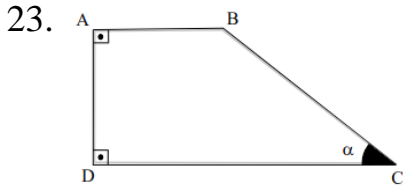
- A)  $28^\circ$     B)  $34^\circ$   
 C)  $56^\circ$     **D)  $68^\circ$**   
 E)  $124^\circ$

22.



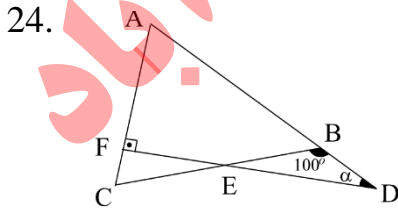
Which of the following  
 is the equation of line  $d$   
 in the figure?

- A)  $x + y - 3 = 0$   
 B)  $x + y - 4 = 0$   
 C)  $3x + 4y - 12 = 0$   
 D)  $4x + 3y - 3 = 0$   
**E)  $4x + 3y - 12 = 0$**



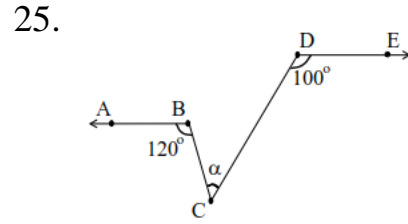
ABCD is a trapezoid,  
 $|AB| = 3\text{cm},$   
 $|DC| = 7\text{cm},$   
 $A(ABCD) = 20\text{cm}^2$  }  $\Rightarrow \alpha = ?$

- A)  $20^\circ$                       B)  $30^\circ$   
**C)  $45^\circ$**                       D)  $60^\circ$   
 E)  $75^\circ$



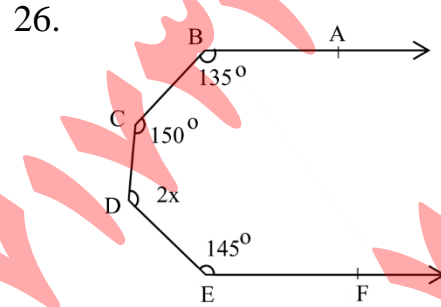
$|AB| = |BC|,$   
 $[DF] \perp [AC],$   
 $m(\widehat{DBC}) = 100^\circ$  }  $\Rightarrow \alpha = ?$

- A)  $20^\circ$                       B)  $30^\circ$   
**C)  $40^\circ$**                       D)  $50^\circ$   
 E)  $60^\circ$



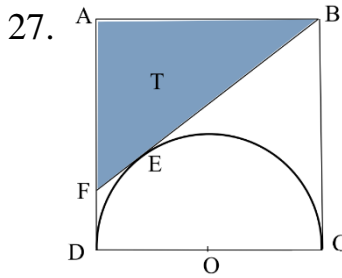
$[AB] // [DE]$   
 $m(\widehat{ABC}) = 120^\circ$   
 $m(\widehat{CDE}) = 100^\circ$  }  $\Rightarrow \alpha = ?$

- A)  $20^\circ$                       **B)  $40^\circ$**                       C)  $100^\circ$   
 D)  $120^\circ$                       E)  $220^\circ$



$[BA] // [EF]$   
 $m(\widehat{ABC}) = 135^\circ$   
 $m(\widehat{BCD}) = 150^\circ$   
 $m(\widehat{DEF}) = 145^\circ$   
 $m(\widehat{CDE}) = 2x$  }  $\Rightarrow x = ?$

- A)  $40^\circ$                       B)  $45^\circ$                       C)  $50^\circ$   
**D)  $55^\circ$**                       E)  $110^\circ$



The figure displays the ABCD square with a side length of 4 cm. The line segment [BF] is tangent at the E point to the semicycle with the O center.

What is the area of the shaded region [T] in  $\text{cm}^2$ ?

- A)  $4 - \pi$       B) 4      **C) 6**  
 D)  $16 - \pi$       E)  $16 - 4\pi$

28.  $\log_3 2 = a \Rightarrow \log_6 4 = ?$

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

29.  $\log_4 [14 + \log_5 (6x + 1)] = 2 \Rightarrow x = ?$

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

30.  $z = -2 + i \Rightarrow |z^4| = ?$

- A) 3      B) 5      C) 9      **D) 25**  
 E) 36

31.  $z = 1 - i \Rightarrow \frac{z^2 - 1}{\bar{z} - 2i} = ?$

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

32.  $\lim_{x \rightarrow 1} \frac{\ln x}{x - 1} = ?$

- A) -1      B) 0      **C) 1**      D) 2      E)  $\ln 2$

33. Which of the following is the slope of the tangent line of the curve  $f(x) = \ln(x^2 + 2x + 1)$  at  $x = 1$  point?

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

34.  $\left. \begin{array}{l} x = 2 \cos 2t \\ y = e^t - t^2 \end{array} \right\} \Rightarrow \frac{dy}{dx} = ?$

- A)  $\frac{e^t - 2t}{2 \sin 2t}$     B)  $e^t - 2t$   
 C) 2    D)  $-4 \sin 2t$   
 E)  $-\frac{e^t - 2t}{4 \sin 2t}$

35.  $f(x) = 3x^2 - \sin x \Rightarrow f'(0) = ?$

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

36.  $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 0 \\ 1 & -2 & 0 \end{bmatrix} \Rightarrow A^2 = ?$

A)  $\begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 0 \\ 1 & -2 & 0 \end{bmatrix}$     B)  $\begin{bmatrix} 0 & 6 & -1 \\ 0 & 1 & 0 \\ 1 & -2 & 0 \end{bmatrix}$

C)  $\begin{bmatrix} 0 & 6 & -1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$     D)  $\begin{bmatrix} 0 & 6 & -1 \\ 0 & 1 & 0 \\ 1 & 0 & -1 \end{bmatrix}$

E)  $\begin{bmatrix} 0 & 6 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

37.  $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix} \Rightarrow 2A^{-1} + A = ?$

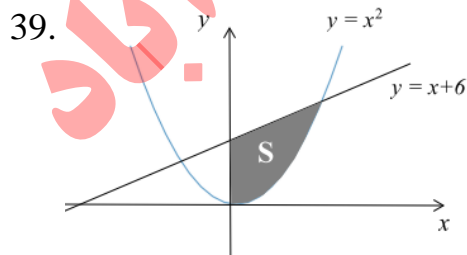
A)  $\begin{bmatrix} -1 & 1 \\ -2 & 1 \end{bmatrix}$     B)  $\begin{bmatrix} 1 & -1 \\ -2 & 1 \end{bmatrix}$

C)  $\begin{bmatrix} -1 & -1 \\ -2 & 1 \end{bmatrix}$     D)  $\begin{bmatrix} -1 & 1 \\ -2 & -1 \end{bmatrix}$

E)  $\begin{bmatrix} 0 & 1 \\ -2 & 1 \end{bmatrix}$

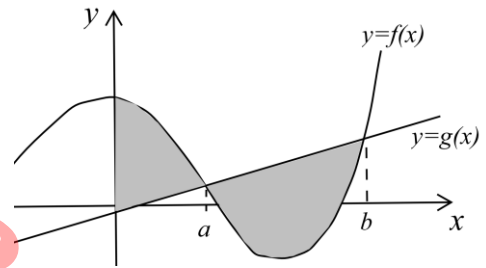
38.  $\int_1^e (\ln x + 1) dx = ?$

- A) 1                      **B) e**                      C)  $e - 1$   
 D)  $1 - e$                 E)  $2e - 1$



- A) 3                      B)  $\frac{9}{2}$                       C) 9  
**D)  $\frac{27}{2}$**                       E) 27

40.



Which of the following represents the shaded area in the figure?

- A)  $\int_0^a [f(x) - g(x)] dx$   
 B)  $\int_0^b [f(x) - g(x)] dx$   
 C)  $\int_0^a |f(x) - g(x)| dx$   
**D)  $\int_0^b |f(x) - g(x)| dx$**   
 E)  $\int_a^b |f(x) - g(x)| dx$

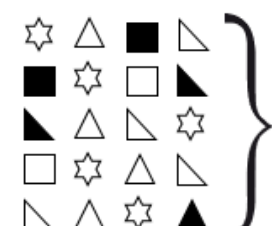


1. ~~275~~  
~~372~~  
~~476~~  
~~573~~  
~~641~~

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

2. 3Δ4  
 3Δ2  
 4Δ2  
 5Δ4  
 6Δ3

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

3.  3274 5238  
 4726  
 8742 2754

☆ □ ▽ ■ = ?

A) 5342 B) 3254 C) 4352  
**D) 2345** E) 2453

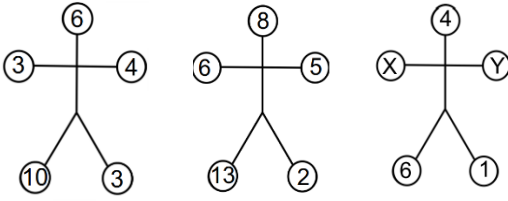
4.  3265  
 6417  
 2574  
 6425  
 2141

○ ☆ ■ ◇ = ?

A) 5432 B) 6435 **C) 5462**  
 D)5461 E)6542

## C

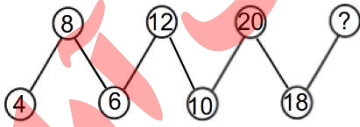
5.



X+Y=?

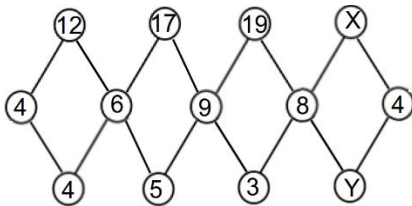
- A) 3    B) 4    **C) 5**    D) 6    E) 7

6.



- A) 32    B) 34    **C) 36**    D) 38    E) 40

7.



X-Y=?

- A) 5    B) 6    **C) 8**    D) 10    E) 12

8.

- I. 142 → 10  
 II. 253 → 21  
 III. 318 → 32  
 IV. 474 → 44  
 V. 584 → ?

- A) 36    B) 40    C) 44    D) 48    **E) 52**

9.

- I. 152 → 4  
 II. 342 → 5  
 III. 325 → 0  
 IV. 543 → 6  
 V. 617 → 0  
 VI. 825 → ?

- A) 5**    B) 3    C) 1    D) 0    E) -1

10.

- I. 1052 → 8  
 II. 3142 → 10  
 III. 3405 → 12  
 IV. 3424 → 13  
 V. 4154 → 14  
 VI. 4355 → ?

- A) 16    **B) 17**    C) 18    D) 19    E) 20

11.

25716 → 65172

10 34621 → 14263

47837 → ?

- A) 83747      B) 74783      **C) 77384**  
 D) 48737      E) 77834

12. 5, 6, 8, 11, 15, 20, 26, X, ...

X=?

- A) 32      **B) 33**      C) 34      D) 35      E) 36

13. 1, 5, 3, 8, 12, 10, 15, 19, 17, X, ...

X=?

- A) 13      B) 15      C) 20      D) 21      **E) 22**

14.

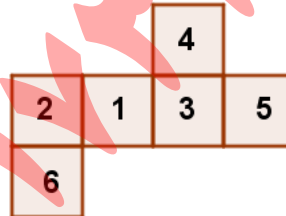
+	x	y	z
x			
y	z+5		
z		x-1	

·	x	y	z
x		$\frac{z}{2}$	
y			
z			

The tables above contain addition and multiplication of integers, where x, y, z each refers to a unique integer. Then,  $\frac{x}{z} = ?$

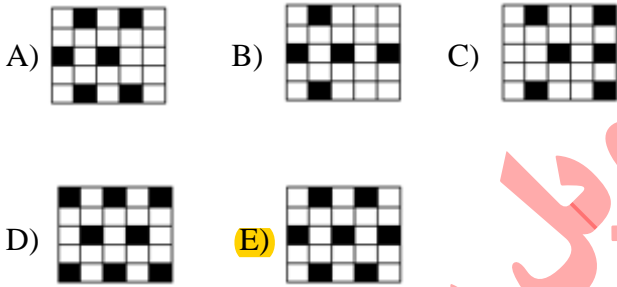
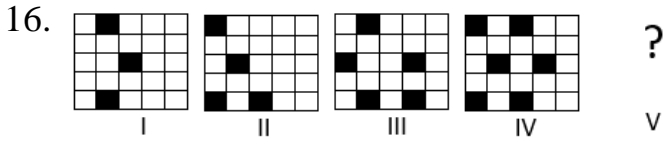
- A)  $-\frac{1}{2}$       B)  $-\frac{1}{4}$       **C)  $\frac{1}{4}$**       D)  $\frac{1}{2}$       E) 1

15.



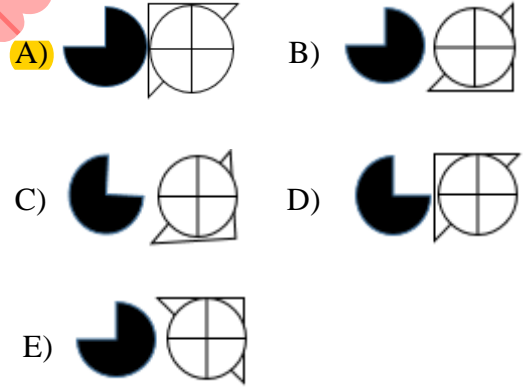
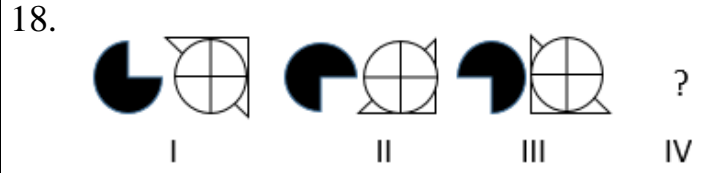
If the shape above is folded into a cube, what is the sum of numbers next to number "5"?

- A) 5      B) 10      C) 13      D) 14      **E) 15**



17.  $\triangle + \triangle + \star = 30$   
 $\star + \star - \square = 12$   
 $\square + \square + \square = 12$   
 $\triangle + \star - \square = ?$

- A) 5    B) 10    C) 13    D) 14    E) 15



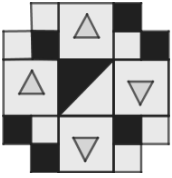
19. 

<i>ELMA</i>	3454
<i>MASA</i>	8474
<i>LEKE</i>	5489
<i>YAKA</i>	1272
<i>SAYI</i>	2134

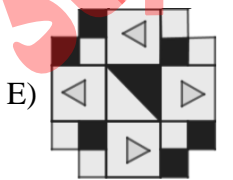
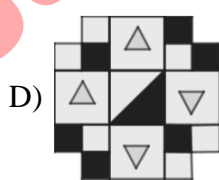
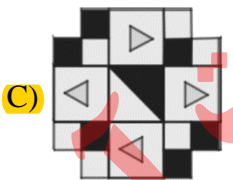
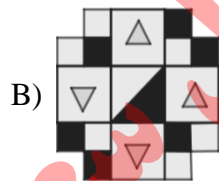
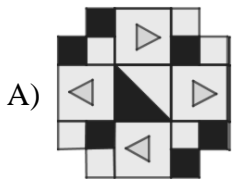
KAMELYA=?

- A) 7458154    B) 8458174    C) 7432184  
 D) 3458174    E) 7438154

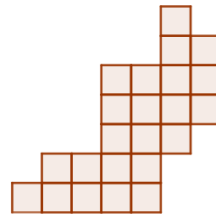
20.



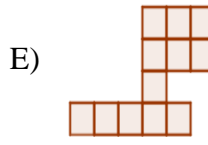
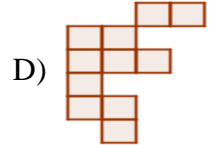
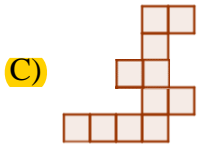
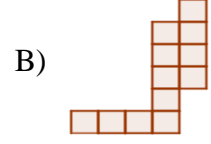
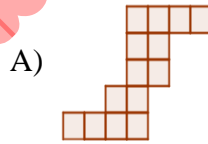
When the figure above is rotated by  $270^\circ$  degrees counterclockwise, which of the following will you get?



21.



Which of the following does not fit into this figure?



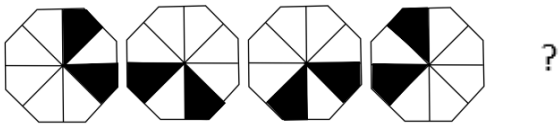
22.

3	5	8	1
4	2	3	5
2	X	5	6
5	6	1	4

X = ?

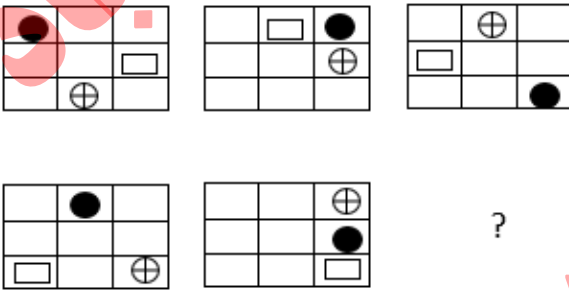
- A) 2    B) 3    C) 4    D) 5    E) 6

23.



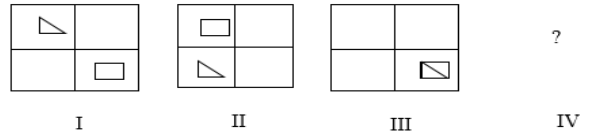
- A)
- B)
- C)
- D)
- E)

24.



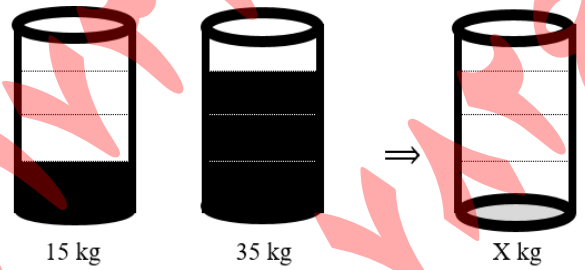
- A)
- B)
- C)
- D)
- E)

25.



- A)
- B)
- C)
- D)
- E)

26.

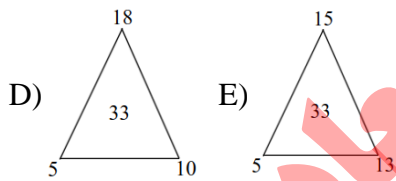
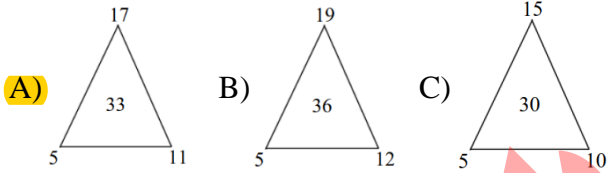
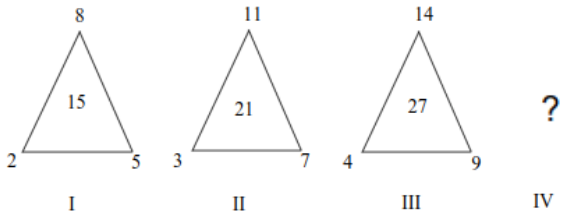


X = ?

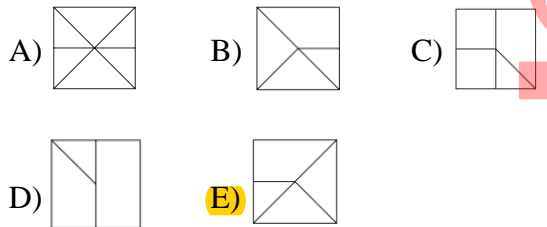
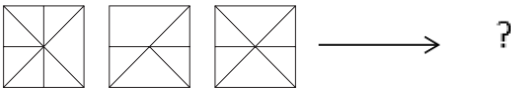
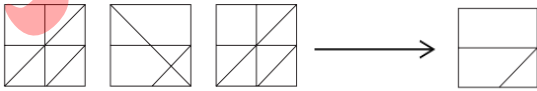
- A) 3
- B) 4
- C) 5
- D) 7
- E) 10

C

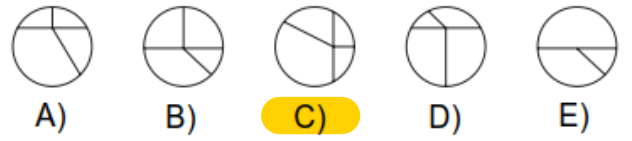
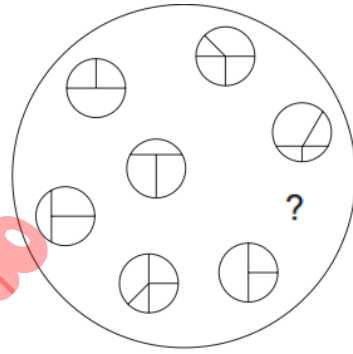
27.



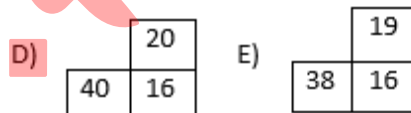
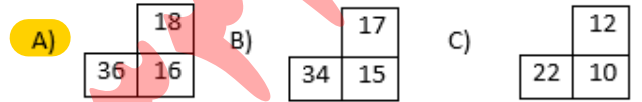
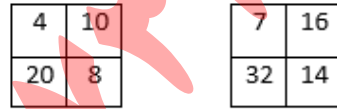
28.



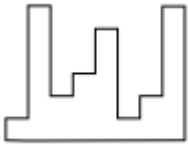
29.



30.



31.



Which of the following should fit in the figure above to make it a square?

- A)
- B)
- C)
- D)
- E)

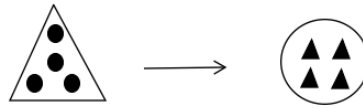
32.

5	1	3	9
3	2	7	12
2	1	5	8
4	2	X	9

X = ?

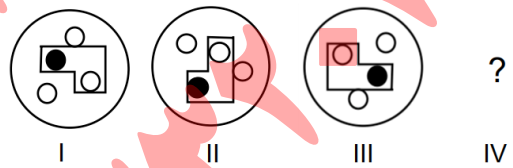
- A) 1
- B) 2
- C) 3
- D) 4
- E) 6

33.



- A)
- B)
- C)
- D)
- E)

34.



- A)
- B)
- C)
- D)
- E)

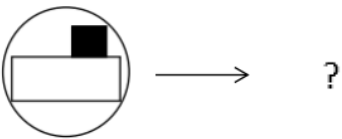
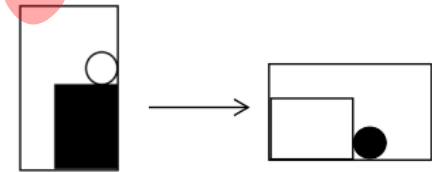


35.



- A)
- B)
- C)
- D)
- E)

36.



- A)
- B)
- C)
- D)
- E)

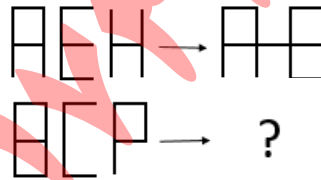
37.

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

X = ?

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






38.



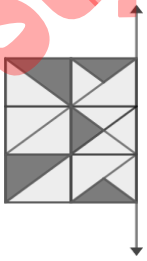
- A)
- B)
- C)
- D)
- E)

39.


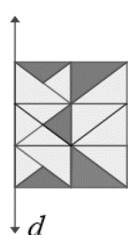
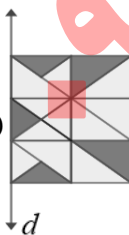
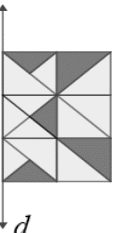


- A) 
- B) 
- C) 
- D) 
- E) 

40.



Which of the following is the symmetrical display of the shape according to line  $d$ ?

- A) 
- B) 
- C) 
- D) 
- E) 