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UIMO
Unified International Mathematics Olympiad

UNIFIED INTERNATIONAL MATHEMATICS OLYMPIAD (UPDATED)

CLASS - 10
Question Paper Code : 40119

KEY

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D	C	B	A	A	D	C	A	B	B
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
B	B	C	B	C	C	A	B	A	D
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
D	A	B	D	B	C	C	A	C	A
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A,C,D	A,B,C,D	B,C	B,D	A,B,C	B	A	A	C	B
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D	C	A	C	B	D	D	C	C	D

EXPLANATIONS

MATHEMATICS

01. (D) Given $\cos^2\theta - 3\cos\theta + 2 = \sin^2\theta$

$\cos^2\theta - 3\cos\theta + 2 = 1 - \cos^2\theta$

$\cos^2\theta + \cos^2\theta - 3\cos\theta + 2 - 1 = 0$

$2\cos^2\theta - 2\cos\theta - \cos\theta + 1 = 0$

$2\cos\theta(\cos\theta - 1) - 1(\cos\theta - 1) = 0$

$(\cos\theta - 1)(2\cos\theta - 1) = 0$

$\therefore$ $\cos\theta - 1 = 0$ and $2\cos\theta - 1 = 0$

$\cos\theta = 1 = \cos 0°$ and $2\cos\theta = 1$

$\cos\theta = \frac{1}{2} = \cos 60°$

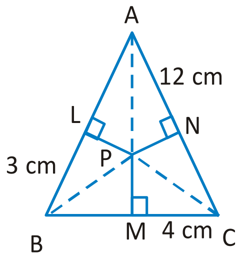
$\therefore$ $\theta = 60°$

[$\theta = 0°$ is rejected because in the question denominator = $\sin\theta = \sin 0° = 0$]

02. (C) Construction :- Join PA, PS & PC

$AL^2 + BM^2 + CN^2 = AP^2 - PL^2 + BP^2 - PM^2 + CP^2 - PN^2$

$= BP^2 - PL^2 + CP^2 - PM^2 + AP^2 - PN^2$



$= BL^2 + CM^2 + AN^2 = (3\text{ cm})^2 + (4\text{ cm})^2 + (12\text{ cm})^2$

$= 9\text{ cm}^2 + 16\text{ cm}^2 + 144\text{ cm}^2 = 169\text{ cm}^2$

03. (B) LHS = (1 + 2 + 3 – 4) + (5 + 6 + 7 – 8) + (9 + 10 +11 – 12) + ... +(197 + 198 + 199 – 200)

= 2 + 10 +18 + 26 + ... + 394

[∵ They are in AP $l_n = \frac{n}{2}(a + l)$]

$= \frac{50}{2}[2 + 394] = 396 \times \frac{100}{4} = 9900$

04. (A) Given LCM + ~~HCF~~ = 1,94,292______ (1)

LCM – ~~HCF~~ = 1,93,788_______ (2)

(–) (–)

2 LCM = 388080

$LCM = \frac{388080}{2} = 1,94,040$

1,94,040 + HCF = 1,94,292

HCF = 1,94,292 – 1,94,040

= 252

But product of two numbers

= LCM × HCF

$2520 \times x = 194040 \times 252$

$x = \frac{194040 \times 252}{2520} = 19404$

05. (A) 7 × 15 + 1, 7 × 16 + 1, 7 × 17 + 1, ... are in AP.

106, 113, 120,......... 995 are in AP

$a = 106, d = a_2 - a_1 = 113 - 106 = 7$

$a_n = 995$

a + (n – 1)d = 995

106 + (n – 1) × 7 = 995

(n – 1) × 7 = 995 – 106

$(n - 1) = \frac{889}{7} = 127$

n = 127 + 1

n = 128

$S_n = \frac{n}{2}(a + l)$

$S_{128} = \frac{128}{2}(106 + 995)$

= 64 × 1101

= 70,464

06. (D) Given 2(AB + BC) = 82 cm

$AB + BC = \frac{82}{2}$ cm

AB + BC = 41

squaring on both sides

$(AB + BC)^2 = 41^2$

$AB^2 + BC^2 + 2AB \times BC = 1681$

$AC^2 + 2AB \times BC = 1681$

[∵ $AB^2 + BC^2 = AC^2$]

$29^2 + 2AB \times BC = 1681$

841 + 2AB × BC = 1681

2AB × BC = 1681 – 841

$AB \times BC = \frac{\cancel{840}^{420}}{\cancel{2}}$ cm

∴ Area of the rectangle = AB × BC = 420 cm^2

07. (C) If $\cos\theta = \frac{1}{2}$ then $\sec\theta = 2$

$\Rightarrow \sec\theta + \cos\theta = 2 + \frac{1}{2} = \frac{5}{2}$

$\therefore \cos\theta = \frac{1}{2} = \cos 60° \Rightarrow \theta = 60°$

$\therefore \sin^2\theta = \sin^2 60° = \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{3}{4}$

(or)

Given $\frac{1}{\cos\theta} + \cos\theta = \frac{5}{2}$

$\Rightarrow \frac{1+\cos^2\theta}{\cos\theta} = \frac{5}{2}$

$\Rightarrow 2\cos^2\theta - 5\cos\theta + 2 = 0$

$\Rightarrow 2\cos^2\theta - 4\cos\theta - \cos\theta + 2 = 0$

$\Rightarrow 2\cos\theta(\cos\theta - 2) - 1(\cos\theta - 2) = 0$

$\therefore \cos\theta = 2$ (or) $\cos\theta = \frac{1}{2}$

But $\cos\theta$ never be greater than 1

$\therefore \cos\theta = 2$ is refected

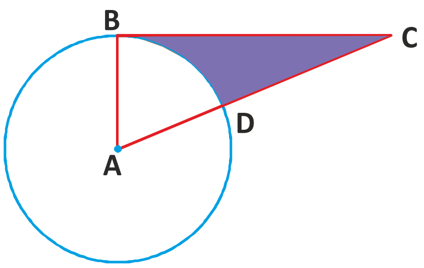
$\therefore \cos\theta = \frac{1}{2} = \cos 60°$

$\therefore \theta = 60°$

$\sin^2\theta = (\sin 60°)^2$

$= \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{3}{4}$

08. (A)



Given $\angle ACB = 30°$ and $\angle ABC = 90°$

$\tan C = \frac{AB}{BC}$

$\tan 30° = \frac{AB}{6\,cm}$

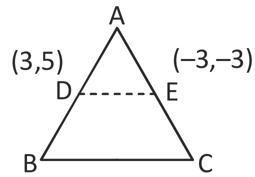
$AB = \frac{6\ cm}{\sqrt{3}} = 2\sqrt{3}\,cm$

Area of the shaded region = Area of ΔABC – Area of the sector ABD

$= \frac{1}{\not 2} = \not 2\sqrt{3} \times 6cm^2 - \frac{1}{6} \times \pi \times \left(2\sqrt{3}\right)^2$

$= (6\sqrt{3} - 2\pi)\ cm^2$

09. (B) Length of BC = 2(length of DE)



$\Rightarrow BC = 2\sqrt{(-3-3)^2 + (-3-5)^2}$

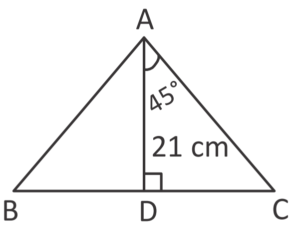
$= 2\sqrt{36+64} = 2\sqrt{100}$

$= 2\ (10) = 20$

$\therefore$ The length of BC is 20

10. (B) ADC is an isosceles right angled triangle

$\therefore AD = DC = r = 21$ cm



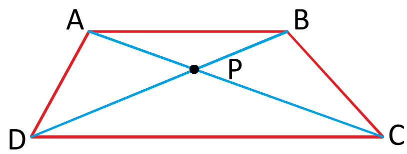
$\therefore$ Volume of the cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 21 \times 21 \times 21\ cm^3$

$= 9702\ cm^3$

11. (B) $\Delta APB \sim \Delta CPD$ [$\because$ A – A similarity]

$\therefore \frac{AP}{CP} = \frac{PB}{PD}$



$\frac{4}{4(x-1)} = \frac{2x-1}{(2x+4)}$

$2x + 4 = (2x - 1)(x - 1)$

$2x + 4 = 2x^2 - 2x - x + 1$

$2x^2 - 5x - 3 = 0$

$2x^2 - 6x + x - 3 = 0$

$2x(x - 3) + 1(x - 3) = 0$

$(x - 3)(2x + 1) = 0$

$\therefore x = 3$ or $x = \frac{-1}{2}$

12. (B) Given side of ABCD touches the circle,

$\therefore$ AB + CD = AD + BC

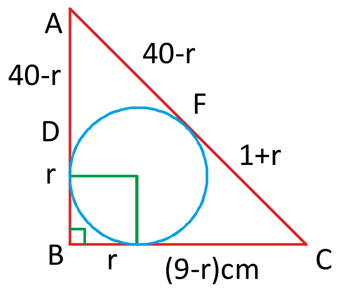
9 cm + 12 cm = 8 cm + AD

$\therefore$ AD = 21 cm – 8 cm = 13 cm

13. (C) Given $\angle B = 90°$

$AC^2 = AB^2 + BC^2$

$= 40^2 + 9^2$



$AC = \sqrt{1681} = 41$

Let the radius of the circle be 'r'

$\therefore$ BD = r & AD = 40 – r AF = 40 – r

BE = r

CE = 9 – r

CF = AC – AF = 41 cm – (40 – r)cm = (41 – 40 + r)cm

CF = (1 + r)cm

But CE = CF

9 – r = 1 + r

2r = 8

r = 4 cm (or)

$\Delta = rs$

$$r = \frac{\Delta}{s} = \frac{\frac{1}{2}\times 40\times 9\,cm^2}{\frac{1}{2}(40+41+9)cm}$$

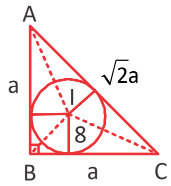
$$= \frac{40\times 9\text{ cm}}{90} = 4\text{ cm}$$

14. (B) Mode = 3 median – 2 mean

45 = 3 median – 2 × 27

$45 + 54 = 3\text{ median} \Rightarrow \text{media} = \frac{99}{3} = 33$

15. (C) If 'I' is the centre of the circle and AB = BC = a cm then



$AC = \sqrt{2}\,a$ ($\because$ pythagorus theorem)

Area of Δ ABC = Area of Δ AIB + Area of Δ BIC + Area of Δ AIC

$$\frac{1}{2}a^2 = \frac{1}{2}\times a\times 8\text{ cm} + \frac{1}{2}\times a\times 8\text{ cm} + \frac{1}{2}\times\sqrt{2}\,a\times 8\text{ cm}$$

$$\frac{1}{2}a\times a = \frac{1}{2}a(8+8+8\sqrt{2})\text{ cm}$$

$a = (16 + 8\sqrt{2})$ cm

Perimeter $= 2a + \sqrt{2}\,a$

$= [2(16+8\sqrt{2}) + \sqrt{2}(16+8\sqrt{2})]$ cm

$= (32 + 16\sqrt{2} + 16\sqrt{2} + 16)$ cm

$= (48 + 32\sqrt{2})$ cm

16. (C) Given slant height of cone = radius of semicircle = 21 cm

$$\text{Given } \pi\times r\times 21\text{ cm} = \frac{1}{2}\times\pi\times 21\times 21\text{ cm}$$

$$\therefore r = \frac{21}{2}\text{ cm}$$

$$h = \sqrt{l^2 - r^2} = \sqrt{21^2 - \left(\frac{21}{2}\right)^2}$$

$$= \sqrt{\frac{4\times 441 - 441}{4}}$$

$$= \sqrt{\frac{3\times 441}{4}} = \frac{21}{2}\sqrt{3}\text{ cm}$$

$$= \frac{21}{2}\times 1.732 = 18.186\text{ cm}$$

Volume of cone = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times 18.186\ cm^3$

$= 2100.483\ cm^3$

17. (A) Let the point of y-axis be P(0, y)

If P(0, y) divides the join on A(–2, 3) and B(5, –7) in the ratio m : n

$\therefore P(0, y) = \left(\frac{5m-2n}{m+n}, \frac{m-6n}{m+n}\right)$

$\therefore \frac{5m-2n}{m+n} = 0$

$5m - 2n = 0$

$5m = 2n \Rightarrow m = \frac{2n}{5}$

$\therefore y = \frac{m-6n}{m+n} = \frac{\frac{2}{5}n - 6n}{\frac{2}{5}n + n}$

$= \frac{\left(\frac{2n-30n}{5}\right)}{\left(\frac{2n+5n}{5}\right)}$

$= \frac{-28n}{7n} = -4$

18. (B) Let α, β, γ are the zeros of $ax^3 + bx^2 + cx + d$

Given $\alpha + \beta + \gamma = -\frac{b}{a} = \frac{1}{4} = \frac{4}{16}$

$\Rightarrow$ a = 16 & b = – 4

$\alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a} = -\frac{3}{2} = \frac{24}{16}$

$\Rightarrow$ c = – 24

$\alpha\beta\gamma = -\frac{d}{a} = \frac{9}{16} \Rightarrow d = -9$

$\therefore$ Required polynomial

$= 16x^3 - 4x^2 - 24x - 9$

19. (A) Area of $\Delta ABC = \frac{1}{2} \times 6\ cm \times 8\ cm$

$= \frac{1}{2}\ AC \times BD$

$48\ cm^2 = 10\ cm \times BD$

BD = 4.8 cm

In ΔABD, $\angle D = 90°$

$\Rightarrow 6\ cm^2 = (4.8\ cm)^2 + x^2$

$x^2 = 36\ cm^2 - 23.04\ cm^2$

$x = \sqrt{12.96\ cm^2}$

= 3.6 cm

20. (D) N = (555 + 445) [2 × (555–445)] + 30

[By N = dq + r]

= 1000 × 220 + 30 = 220030

21. (D) Given $8 \times \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times 8 \times 8 \times 8\ cm^3$

$r^3 = \frac{4}{3} \times \pi \times 8 \times 8 \times 8 \times \frac{3}{32} \times \frac{1}{\pi}$

$r^3 = 64$

$r^3 = 4^3$

r = 4 cm

22. (A) Both pot are similar

$\therefore$ Heights ratio = diameters ratio

$\frac{5\ cm}{15\ cm} = \frac{x}{7cm}$

$x = \frac{5\ cm \times 7\ cm}{15\ cm} = 2\frac{1}{3}\ cm$

23. (B) Total cases = 6^2 = 36

Favourable cases = {(5, 1), (5, 2), (5, 3), (5, 4), (5, 6), (1, 5), (2, 5), (3, 5), (4, 5), (6, 5)} = 10

$\therefore$ Probability = $\frac{10}{36} = \frac{5}{18}$

24. (D) Required number = (LCM of 10, 9, 8 & 7) –1

= 2520 – 1 = 2519

(OR)

Find from options

25. (B) In ABC, AD, BE, CF are the medians

∴ $3(AB^2 + BC^2 + CA^2) = 4(AD^2 + BE^2 + CF^2)$

∴ $4(AD^2 + BE^2 + CF^2) = 3(12^2 + 16^2 + 20^2)$

$4(AD^2 + BE^2 + CF^2) = 3(144 + 256 + 400)$

$$AD^2 + BE^2 + CF^2 = \frac{3 \times 800}{4} = 600\,cm^2$$

26. (C) Given an = 4n + 3

$a_1 = 41(1) + 3 = 7 = a$

$a_2 = 4(2) + 3 = 11$

$d = a_2 - a_1 = 11 - 7 = 4$

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

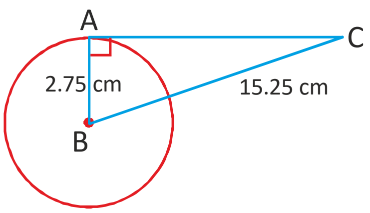
$$= \frac{n}{2}\left[2(7) + (n-1)(4)\right]$$

$$= \frac{n}{2} \times 2\left[7 + 2(n-1)\right]$$

$= n(7 + 2n - 2)$

$= n(2n + 5)$

27. (C)



In ΔABC, $\angle BAC = 90°$

[∵ A tangent is perpendicular to radius]

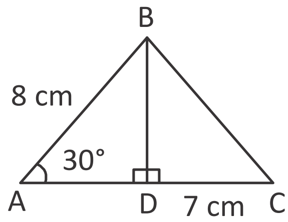
$AC^2 = \sqrt{BC^2 - AB^2}$

$= \sqrt{(15.25)^2 - (2.75)^2}$

$= \sqrt{232.5625 - 7.5625}$

$= \sqrt{225}$ cm $= 15$ cm

28. (A)



Construction : BD ac

In ΔABD, D = 90°

$$\sin 30° = \frac{BD}{AD}$$

$$\frac{1}{2} = \frac{BD}{8\text{ cm}}$$

BD = 4 cm

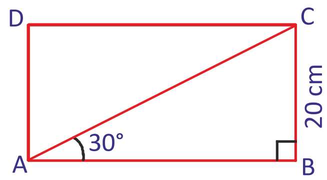
$$\text{Area of } \Delta ABC = \frac{1}{2} \times AC \times BD$$

$$= \frac{1}{2} \times 7\text{ cm} \times 4\text{ cm} = 14\text{ cm}^2$$

29. (C) In ΔABC, $\angle B = 90°$ & $\angle BAC = 30°$

$$\therefore \tan 30° = \frac{BC}{AB}$$

$$\frac{1}{\sqrt{3}} = \frac{20\text{ cm}}{AB}$$



$AB = 20 \times \sqrt{3}$ cm $= 20 \times 1.73$ cm $= 34.6$ cm

∴ Area of rectangle = $lb = 34.6 \times 20\text{ cm}^2$

$= 692\text{ cm}^2$

30. (A) $S_n = (2 + 4 + 6 + \ldots.. + 110) + (5 + 10 + 15 + 20 + 25 + \ldots.. + 110) - (10 + 20 + 30 + \ldots.. + 100 + 110)$

$= 2(1 + 2 + 3 + \ldots.. + 55) + (5 + 15 + 25 + \ldots.. + 105)$

$$= \cancel{2} \times \frac{55 \times 56}{\cancel{2}} + \frac{11}{2}[5 + 105]$$

$= 3080 + 605$

$S_n = 3685$

MATHEMATICS - 2

31. (A,C,D)

Given

$P(x) = x^4 - 16x^3 + 86x^2 - 176x + 105$

$P(1) = 1^4 - 16 \times 1^3 + 86 \times 1^2 - 176(1) + 105$

$P(1) = 0 \Rightarrow$ '1' is the zero of $p(x)$

$P(5) = 625 - 16 \times 125 + 86 \times 25 - 176 \times 5 + 105$

$= 625 - 2000 + 2150 - 880 + 105$

$P(5) = 0 \Rightarrow$ '5' is the zero of $P(x)$

$P(7) = 2401 - 16 \times 343 + 86 \times 49 - 176 \times 7 + 105$

$= 2401 - 5488 + 4214 - 1232 + 105$

$= 0$

$P(-3) = (-3)^4 - 16(-3)^3 + 86(-3)^2 - 176(-3) + 105$

$= 81 - 16(-27) + 86 \times 9 + 176 \times 3 + 105$

$= 81 + 432 + 774 + 528 + 105$

$P(-3) \neq 0$

32. (A,B,C,D)

Given $a_1 = 3$, $b_1 = 4$, $c_1 = -1$

Option A $a_2 = 3$, $b_2 = 1$, $c_2 =$

$$\frac{a_1}{a_2} = 1, \frac{b_1}{b_2} = 4 \Rightarrow \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

Option 'A' line is consitant with the given line

Option"B" $a_3 = 4$, $b_3 = 7$, $c_3 = -8$

$$\frac{a_1}{a_3} = \frac{3}{4}, \frac{b_1}{b_4} = \frac{4}{3} \Rightarrow \frac{a_1}{a_3} + \frac{b_1}{b_3}$$

$\therefore$ Option is 'B' is consistent with the given line

Option 'C' $a_4 = 4$, $b_4 = 3$, $c_4 = 8$

$$\frac{a_1}{a_4} = \frac{3}{4}, \frac{b_1}{b_4} = \frac{4}{3} \Rightarrow \frac{a_1}{a_4} \neq \frac{b_1}{b_4} \Rightarrow \text{option}$$

'c' line is consistent with the given lines

option 'D' $a_5 = 1.5$, $b_5 = 2$, $c_5 = 0.5$

$$\frac{a_1}{a_5} = \frac{3}{1.5}, \frac{b_1}{b_5} = \frac{4}{2} = 2,$$

$$\left(\frac{18-3}{3}, \frac{10+2}{3}\right) = \frac{-1}{-0.5} = 2$$

$\therefore \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \Rightarrow$ option 'D' line is consistent to the given line

33. (B,C)

a = 1. b = – 6. c = 1

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{(-6) \pm \sqrt{(-6)^2 - 4 \times 1 \times 1}}{2 \times 1}$$

$$= \frac{6 \pm \sqrt{36-4}}{2} = \frac{6 \pm \sqrt{32}}{2}$$

$$= \frac{6 \pm 4\sqrt{2}}{2} = 3 \pm 2\sqrt{2}$$

34. (B,D)

Let P & Q be the points of trisection of A(–3,2) and B(9,5)

Let P divides the join of A(–3,2) and B(9,5) in the ration 1 : 2

$$\therefore P = \left(\frac{1 \times 9 + 2(-3)}{1+2}, \frac{1 \times 5 + 2 \times 1}{1+2}\right)$$

$$= \left(\frac{9-6}{3}, \frac{5+4}{3}\right)$$

= (1,3)

Let Q divides the join pf A(–3,2) B(9,5) in the ratio 2 : 1

$$Q = \left(\frac{2 \times 9 + (-3) \times 1}{2+1}, \frac{2 \times 5 + 2 \times 1}{2+1}\right)$$

$$= \left(\frac{18-3}{3}, \frac{10+2}{3}\right) = (5,4)$$

$\therefore$ (1,3) & (5,4) are the points of trisection of the join of A(-3,2) and B(9,5)

35. (A,B,C)

Given $\angle A + \angle C = 180°$ & $\angle B + \angle D = 180°$

$3x + 3° + 2y + 19° = 180°$

$3x + 2y = 158° \rightarrow 1$

$2y + 32° + 2x + 18° = 180°$

$2x + 2y = 180° - 50° = 130°$

eq 1 – eq2 $\Rightarrow 3x + 2y - 2x - 2y = 158° - 130° = 28°$

$x = 28°$ & $3(28°) + 2y = 158° \rightarrow 1$

$84° + 2y = 158°$

$2y = 158° - 84° = 74°$

$y = \frac{74°}{2} = 37°$

$\therefore \angle A = 3x + 3° = 3(28°) + 3°$

$= 84° + 3° = 87°$

$\angle B = 2y + 32° = 2(37°) + 32°$

$= 74° + 32° = 106°$

$\angle C = 2y + 19° = 74° + 19° = 93°$

$\angle D = 2x + 18° = 56° + 18° = 74°$

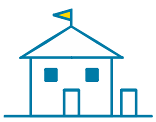
$\angle B + \angle C = 106° + 93° = 199°$,

$\angle C + \angle D = 93° + 74° = 167°$

$\angle A + \angle D = 87° + 74° = 161°$

REASONING

36. (B)



37. (A) From (i) and (ii) statements, the code for 'old' will be '5'.

From (i) and (ii) statements, the code for 'books' will be '3'.

Thus, in the statement (i) the code for 'are is '2'.

38. (A) 6380

The numbers inside the brackets are the squares of the numbers outside the brackets with 1 deducted. Alternatively. multiply 2, 4, 6, 8 and 10 respectively and put the number at the end of the figure in the brackets, and multiply 3, 5, 7 and 9 by 1, 3, 5 and 7 repsectively and put these numbers first.

39. (C) G @ H $\rightarrow$ G is father of H

F # G $\rightarrow$ F is sister of G

40. (B) F is the sister of the father of H

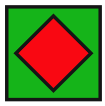
Two places to the left of D is B. A is to the immediate left of B.

Four places to the right of a is E. D is to the immediate left of E.

Two places to the left of D is B.

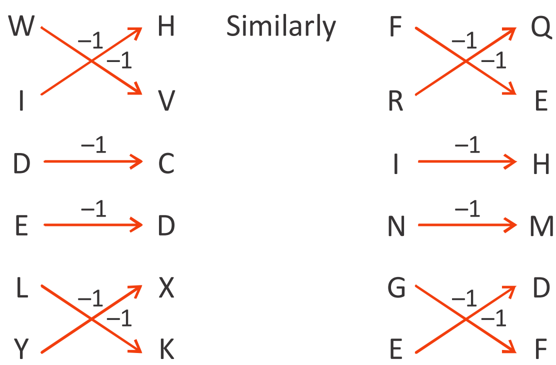
Hence, option B is correct.

41. (D)

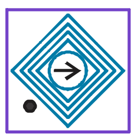


42. (C) From figures (ii) and (iii), we conclude that the alphabets C, D, B and F appear adjacent to the alphabet E. Therefore, the alphabet A appears opposite E. Conversely, E appears opposite A.

43. (A)



44. (C)



45. (B)

<u>**CRITICAL THINKING**</u>

46. (D) Let the number 8 be replaced by any positive number x and check if the value stays the same.

Option (A) : $(x + x - x) \div x = x \div x = 1 \rightarrow$ unchanged

Option (B) : $x + (x \div x) - x = 1 \rightarrow$ unchanged

Option (D) : $x - (x \div x) + x = 2x - 1 \rightarrow$ depends on x

Option (C) : $x \div (x + x + x) = x \div 3x = \frac{1}{3}$

unchanged

47. (D) Let the boats be x

$x \times 8 + 6 = x \times 10 - 8$

$8x + 6 = 10x - 8$

$10x - 8x = 6 + 8$

$2x = 14$

$x = 7.$

number of boats '7'

$7 \times 8 = 56 + 6 \Rightarrow 62$

$7 \times 10 = 70 - 8 \Rightarrow 62$

Total number of students are 62

48. (C) • Since R is second from one end and 2 people sit between P and R, P must be 4th from the same end.

• K is second to the left of P, so K is 2 positions left of P. Also, K is third to the right of N, fixing N's position.

• 3 people sit between M and N, so M is fixed relative to N.

• Only 3 people sit to the left of L, so L is 4th from the left.

• 6 people sit between L and J, fixing J's position.

• The condition "number of people between M and P equals number between M and L" fits only one arrangement.

8 people sit between M and P.

49. (C) • In figure 1, there is 1 green square surrounded by white squares → total squares = 3 × 3 = 9, so white squares = 9 – 1 = 8

• In figure 2, there are 2 green squares in a row → grid becomes 3 × 4 = 12, white squares = 12 – 2 = 10

• In figure 3, there are 3 green squares in a row → grid becomes 3 × 5 = 15, white squares = 15 – 3 = 12

Pattern :

If there are n green squares in a row, total squares = 3 × (n + 2) white squares = 3(n + 2) – n = 2n + 6

Set white squares = 50

2n + 6 = 50 → 2n = 44 → n = 22

So, figure 22 will have 50 white squares.

50. (D) Schools being closed (Statement I) can happen due to reasons like strikes, weather, or government orders.

• Parents withdrawing children (Statement II) can happen due to different reasons such as relocation, finances, or preference for other schools.

• Neither statement directly causes the other; both are effects of separate, independent causes.