



Techno ACE

## Illustrated Answer for Model Question Paper

# Mathematics

Class : IX going to X

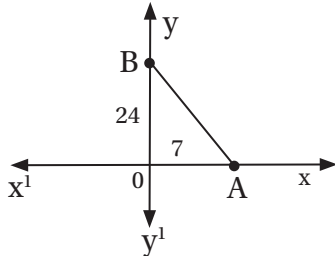
1.  $(a - b - c)^3 - a^3 + b^3 + c^3$   
 $= a^3 - b^3 - c^3 + 3(a-b)(-b-c)(-c+a) - a^3 + b^3 + c^3$   
 $= 3(a - b)(b + c)(c - a)$  which is divisible by  $3(a - b)$ .

Ans. ©

2.  $x = 95^\circ - 60^\circ = 35^\circ$   
 $\angle ACD = 95^\circ - 30^\circ = 65^\circ$   
 $\therefore y + z = 180^\circ - 65^\circ = 115^\circ$   
 $\therefore x + y + z = 150^\circ$

Ans. Ⓑ

3.  $24x + 7y = 168$



For  $y = 0, x = \frac{168}{24} = 7 \therefore A(7, 0)$

For  $x = 0, y = \frac{168}{7} = 24 \therefore B(0, 24)$

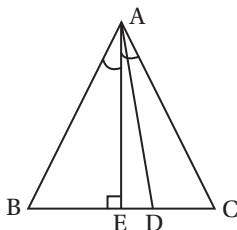
$AB = \sqrt{7^2 + 24^2} = 25$  units

Ans. Ⓐ

4.  $p(x) = ax^{198} + bx^{195} + cx^{192} + dx^{187} + e$   
 $p(1) = a + b + c + d + e = 0$   
 $p(-1) = a - b + c - d + e = 0$   
 $\therefore a + b + c + d + e = a - b + c - d + e$   
 $\Rightarrow b + d = 0$

Ans. ©

5.



$\angle BAD = \angle CAD = x^\circ$

$\therefore \angle BAE = x^\circ - 10^\circ$

$\therefore \angle B = 90^\circ - (x^\circ - 10^\circ) = 100^\circ - x^\circ$

$\angle C = 90^\circ - (x^\circ + 10^\circ) = 80^\circ - x^\circ$



$$\therefore \frac{100-x}{80-x} = \frac{2}{1} \Rightarrow 100-x = 160-2x \Rightarrow x = 60$$

$$\therefore \angle ACB = (80 - 60)^\circ = 20^\circ$$

Ans. (B)

$$6. \quad 7^{2025} - 7^{2024} - 7^{2023} + 7^{2022} = K7^{2022}$$

$$\Rightarrow 7^{2022}(7^3 - 7^2 - 7 + 1) = K7^{2022}$$

$$\Rightarrow (343 - 49 - 7 + 1) = K$$

$$\Rightarrow K = 288$$

$$\therefore \sqrt{K+1} = \sqrt{289} = 17$$

Ans. (D)

$$7. \quad x = \frac{7}{8-5\sqrt{2}} \Rightarrow x = \frac{7(8+5\sqrt{2})}{64-50} = \frac{7(8+5\sqrt{2})}{14} = \frac{8+5\sqrt{2}}{2}$$

$$\Rightarrow 2x - 8 = 5\sqrt{2} \Rightarrow x - 4 = \frac{5}{\sqrt{2}} \Rightarrow (x-4)^2 = \frac{25}{2}$$

$$\Rightarrow x^2 - 8x + 16 = \frac{25}{2} \Rightarrow 2x^2 - 16x + 32 = 25$$

$$\Rightarrow 2x^2 - 16x + 7 = 0$$

$$\Rightarrow 2x^3 - 16x^2 + 7x = 0 \Rightarrow 2x^3 - 24x^2 + 71x + 8x^2 - 64x = 0$$

$$\Rightarrow 2x^3 - 24x^2 + 71x + 4(2x^2 - 16x) = 0$$

$$\Rightarrow 2x^3 - 24x^2 + 71x + 4(-7) = 0$$

$$\Rightarrow 2x^3 - 24x^2 + 71x - 28 = 0$$

$$\Rightarrow 2x^3 - 24x^2 + 71x + 47 - 75 = 0$$

$$\Rightarrow 2x^3 - 24x^2 + 71x + 47 = 75$$

Ans. (C)

$$8. \quad 7x + 11y = 77 \Rightarrow x = \frac{77-11y}{7} = 11 - \frac{11}{7}y$$

$\therefore x$  and  $y$  are natural numbers

$\therefore y$  will be multiple of 7.

So values of  $x$  are 0, -11, -22 etc. which are not natural numbers.

$\therefore$  No solution

Ans. (B)

$$9. \quad a = 62, b = 66, c = 68$$

$$a^2 + b^2 + c^2 - ab - bc - ca = \frac{1}{2}[(a-b)^2 + (b-c)^2 + (c-a)^2]$$

$$= \frac{1}{2}[16 + 4 + 36] = \frac{56}{2} = 28$$

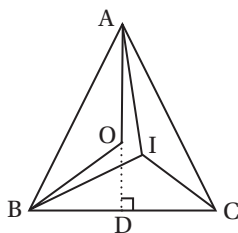
Ans. (C)

10. Let the shopkeeper mixes  $x$  kg sugar costing ₹54/kg.

$$\begin{aligned} \therefore \frac{45 \times 12 + 54 \times x}{x + 12} &= 50 \\ \Rightarrow 540 + 54x &= 50x + 600 \\ \Rightarrow 4x &= 60 \Rightarrow x = 15 \end{aligned}$$

Ans. (B)

11.  $\angle A : \angle B : \angle C = 3 : 4 : 2 \Rightarrow \angle A = 60^\circ, \angle B = 80^\circ, \angle C = 40^\circ$



$$\begin{aligned} \angle BAI &= \frac{1}{2} \angle A = 30^\circ \\ \angle BAD &= 90^\circ - \angle B = 90^\circ - 80^\circ = 10^\circ \\ \therefore \angle IAO &= 30^\circ - 10^\circ = 20^\circ \end{aligned}$$

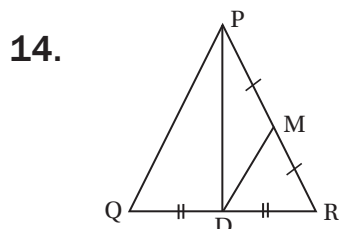
Ans. (B)

12.  $(2^a - 4)^3 + (4^a - 2)^3 = (4^a + 2^a - 6)^3$   
 $= (2^a - 4)^3 + (4^a - 2)^3 = (2^a - 4 + 4^a - 2)^3$   
 Let  $2^a - 4 = a, 4^a - 2 = b$   
 $\therefore a^3 + b^3 = (a + b)^3$   
 $\Rightarrow a^3 + b^3 = a^3 + b^3 + 3ab(a + b)$   
 $\Rightarrow 3ab(a + b) = 0 \Rightarrow ab = 0 \quad (\because a + b \neq 0)$   
 $\Rightarrow a = 0 \quad \text{or} \quad b = 0$   
 $\Rightarrow 2^a - 4 = 0 \quad \text{or} \quad 4^a - 2 = 0$   
 $\Rightarrow 2^a = 4 \quad \text{or} \quad 4^a = 2$   
 $\Rightarrow a = 2 \quad \text{or} \quad a = \frac{1}{2}$   
 $\therefore$  Greatest value of  $a = 2$

Ans. (D)

13.  $2^{2021} 5^{2024} = (10)^{2021} \times 5^3 = 125 \times 10^{2021}$   
 $\therefore$  sum of digits = 8

Ans. (D)



$$\begin{aligned} DM &= \sqrt{\frac{PR^2 - PM^2 - MR^2}{2}} \\ &= \sqrt{\frac{PR^2 - 2PM^2}{2}} \quad (\because PM = MR) \\ &= \sqrt{\frac{PR^2 - 2 \times \frac{1}{4} PR^2}{2}} \\ &= \sqrt{\frac{PR^2}{4}} \end{aligned}$$

$$\Rightarrow 4DM^2 = PR^2$$

$$\Rightarrow \cancel{A} \times \frac{1}{\cancel{A}} PQ^2 = PR^2$$

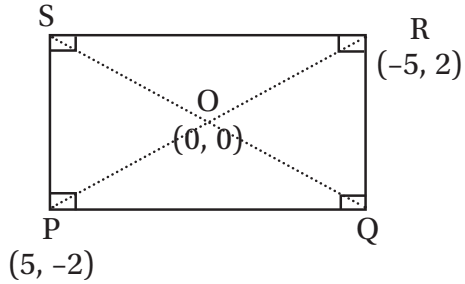
$$\Rightarrow PR = PQ$$

$$\therefore PR = PQ = 36 \text{ cm}, QR = 16 \text{ cm}$$

$$\therefore \text{Perimeter} = (36 + 36 + 16) \text{ cm} = 88 \text{ cm}$$

Ans. (B)

15.



O is mid-point of PR and SQ.

$$\therefore Q(5, 2), S(-5, -2)$$

Ans. (A)