

# CLASS X – MATHEMATICS

## ANSWER KEY

### (SET-9)

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#### \* SECTION – A (1 × 20 = 20 Marks)

**Q1.** HCF of 144 and 216

$$= 72 \checkmark \text{ (d)}$$

**Q2.**  $20x - 80 = 0$

$$x = 4 \checkmark \text{ (c)}$$

**Q3.**

$$3x - y = 5$$

$$6x - 2y = 10$$

Second equation is multiple of first

⇒ **Infinitely many solutions**  $\checkmark$  (c)

**Q4.**  $a = 6, d = 4$

$$a_{35} = a + 34d$$

$$= 6 + 136$$

$$= 142 \checkmark \text{ (a)}$$

**Q5.** Numbers  $> 2 = \{3, 4, 5, 6\}$

$$\text{Probability} = 4/6 = 2/3 \checkmark \text{ (c)}$$

**Q6.**  $\cos 30^\circ = \sqrt{3}/2 \checkmark$  (b)

$$\text{Q7. Distance} = \sqrt{[(7-2)^2 + (15-3)^2]}$$

$$= \sqrt{(25 + 144)}$$

$$= \sqrt{169} = 13 \checkmark \text{ (d)}$$

**Q8.**  $x^2 - 3x + 2 = 0$

$$D = 9 - 8 = 1 > 0$$

⇒ **Real & distinct**  $\checkmark$  (a)

$$\begin{aligned}\text{Q9. Area} &= \pi r^2 \\ &= 22/7 \times 784 \\ &= \mathbf{2464 \text{ cm}^2} \checkmark \text{ (a)}\end{aligned}$$

$$\begin{aligned}\text{Q10. Mean} &= (8+16+24+32+40)/5 \\ &= 120/5 \\ &= \mathbf{24} \checkmark \text{ (b)}\end{aligned}$$

$$\text{Q11. Area ratio} = (4/9)^2 = \mathbf{16:81} \checkmark \text{ (b)}$$

$$\text{Q12. Tangent} \perp \mathbf{\text{Radius}} \checkmark \text{ (b)}$$

$$\begin{aligned}\text{Q13. Volume} &= \pi r^2 h \\ &= 22/7 \times 196 \times 15 \\ &= \mathbf{9240 \text{ cm}^3} \checkmark \text{ (a)}\end{aligned}$$

$$\begin{aligned}\text{Q14. } \sin \theta &= 1/2 \\ \theta &= \mathbf{30^\circ} \checkmark \text{ (a)}\end{aligned}$$

$$\begin{aligned}\text{Q15. Median} &= (15+20)/2 \\ &= \mathbf{17.5} \checkmark \text{ (b)}\end{aligned}$$

$$\text{Q16. Mode} = \mathbf{3} \checkmark \text{ (b)}$$

$$\text{Q17. } \sec^2 \theta - \tan^2 \theta = \mathbf{1} \checkmark \text{ (b)}$$

$$\begin{aligned}\text{Q18. Surface Area} &= 6a^2 \\ &= 6 \times 121 \\ &= \mathbf{726 \text{ cm}^2} \checkmark \text{ (a)}\end{aligned}$$

$$\text{Q19. Both true \& R correct explanation} \checkmark \text{ (a)}$$

$$\text{Q20. A false, R true} \checkmark \text{ (d)}$$

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### \* SECTION – B (2 × 5 = 10 Marks)

#### Q21. HCF by Euclid's Division Algorithm (2 Marks)

$$510 = 92 \times 5 + 50$$

$$92 = 50 \times 1 + 42$$

$$50 = 42 \times 1 + 8$$

$$42 = 8 \times 5 + 2$$

$$8 = 2 \times 4 + 0$$

$$\therefore \text{HCF} = \mathbf{2}$$

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**Q22. 45th Term of AP (2 Marks)**

$$a = 3, d = 5$$

$$a_{45} = a + 44d$$

$$= 3 + 220$$

$$= \mathbf{223}$$

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**Q23. Solve  $x^2 - 12x + 35 = 0$  (2 Marks)**

$$(x - 5)(x - 7) = 0$$

$$\therefore x = 5, 7$$

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**Q24. Mean (2 Marks)**

$$\text{Mean} = (11+22+33+44+55)/5$$

$$= 165/5$$

$$= \mathbf{33}$$

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**Q25. Area of Sector (2 Marks)**

$$= (90/360) \times \pi \times 35^2$$

$$= 1/4 \times 3850$$

$$= \mathbf{962.5 \text{ cm}^2}$$

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**\* SECTION – C (3 × 6 = 18 Marks)**

**Q26. Solve Linear Equations (3 Marks)**

$$3x + 2y = 16$$

$$5x - y = 9$$

Multiply second by 2:

$$10x - 2y = 18$$

Add:

$$13x = 34$$

$$x = 34/13$$

Substitute:

$$5(34/13) - y = 9$$

$$y = 53/13$$

$$\text{Solution} = (34/13, 53/13)$$

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**Q27. Diagonals of Rhombus Bisect at Right Angle (3 Marks)**

In rhombus,

Diagonals bisect each other and form  $90^\circ$ .

Hence proved.

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**Q28. Median (3 Marks)**

$$\text{Total } N = 40$$

$$N/2 = 20$$

$$\text{Median class} = 20-30$$

$$l = 20$$

$$f = 13$$

$$cf = 13$$

$$h = 10$$

$$\text{Median} = 20 + [(20-13)/13] \times 10$$

$$= 20 + 5.38$$

$$= \mathbf{25.38}$$

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**Q29. Horizontal Distance (3 Marks)**

$$\tan 30^\circ = 120/x$$

$$1/\sqrt{3} = 120/x$$

$$x = 120\sqrt{3}$$

$$= \mathbf{207.85 \text{ m}}$$

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**Q30. Sum of 70 Terms (3 Marks)**

$$a = 2, d = 5$$

$$\begin{aligned}S_{70} &= 70/2 [4 + 69 \times 5] \\ &= 35 (4 + 345) \\ &= 35 \times 349 \\ &= \mathbf{12215}\end{aligned}$$

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**Q31. Curved Surface Area of Cone (3 Marks)**

$$\begin{aligned}l &= \sqrt{(14^2 + 24^2)} \\ &= \sqrt{(196 + 576)} \\ &= \sqrt{772}\end{aligned}$$

$$\begin{aligned}\text{CSA} &= \pi r l \\ &= 22/7 \times 14 \times \sqrt{772} \\ &= \mathbf{44\sqrt{772} \text{ cm}^2}\end{aligned}$$

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**\* SECTION – D (5 × 4 = 20 Marks)**

**Q32. Quadratic Formula (5 Marks)**

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

$$\begin{aligned}x &= [5 \pm \sqrt{(25 + 24)}]/4 \\ &= [5 \pm 7]/4\end{aligned}$$

$$x = 3 \text{ or } -1/2$$

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**Q33. Basic Proportionality Theorem (5 Marks)**

If a line parallel to one side divides other two sides proportionally,

$$\text{Then } AD/DB = AE/EC$$

Hence proved.

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**Q34. Probability (5 Marks)**

Total balls = 20

(i) Green =  $5/20 = \mathbf{1/4}$

(ii) Not red =  $12/20 = \mathbf{3/5}$

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### Q35. Sphere into Cylinders (5 Marks)

$$\begin{aligned}\text{Volume sphere} &= \frac{4}{3} \pi 28^3 \\ &= 91981.7 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Volume cylinder} &= \pi r^2 h \\ &= \frac{22}{7} \times 4 \times 7 \\ &= 88 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Number} &= 91981.7 / 88 \\ &\approx \mathbf{1045 \text{ cylinders}}\end{aligned}$$

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### \* SECTION – E (Case Study)

#### Q36. Circular Park

$$\text{Radius} = 70 \text{ m}$$

$$\begin{aligned}\text{(i) Circumference} &= 2\pi r \\ &= \mathbf{440 \text{ m}}\end{aligned}$$

$$\begin{aligned}\text{(ii) Area} &= \pi r^2 \\ &= \mathbf{15400 \text{ m}^2}\end{aligned}$$

$$\begin{aligned}\text{(iii) Cost} &= 440 \times 250 \\ &= \mathbf{₹1,10,000}\end{aligned}$$

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#### Q38. Ladder Problem

$$\begin{aligned}\text{Height} &= 75 \sin 45^\circ \\ &= \mathbf{53.03 \text{ m}}\end{aligned}$$

$$\begin{aligned}\text{Distance} &= 75 \cos 45^\circ \\ &= \mathbf{53.03 \text{ m}}\end{aligned}$$

Verification:

$$1 + \tan^2 \theta = \sec^2 \theta \quad \checkmark \text{ Verified}$$