

Answer Key

Class : IX

Subject : Mathematics

Semester : II

- ✓ 1. C
- ✓ 2. C
- ✓ 3. A
- ✓ 4. C
- ✓ 5. D
- ✓ 6. B
- ✓ 7. C
- ✓ 8. A
- ✓ 9. D
- ✓ 10. B
- ✓ 11. D
- ✓ 12. D
- ✓ 13. C
- ✓ 14. C
- ✓ 15. D
- ✓ 16. C
- ✓ 17. A
- ✓ 18. C
- ✓ 19. D
- ✓ 20. B

21. Consider triangles $\triangle AOB$ and $\triangle COD$,
 $OA=OC$ and $OB=OD$ (radii),
 and since the included angles $\angle AOB$ and $\angle COD$ are given equal,
 the triangles are congruent by SAS
 $AB = CD$ by CPCTC

22. **Given:**

Curved Surface Area (CSA) = 528 cm^2

Slant height (l) = 21 cm

(i) Radius of the base

$$CSA = \pi r l$$

$$528 = (22/7) \times r \times 21$$

$$528 = 66r$$

$$r = 528 \div 66$$

$$r = 8 \text{ cm}$$

(ii) Total Surface Area of the cone

$$\text{TSA} = \pi r l + \pi r^2$$

$$\text{TSA} = 528 + (22/7 \times 8^2)$$

$$\text{TSA} = 528 + (22/7 \times 64)$$

$$\text{TSA} = 528 + 1408/7$$

$$\text{TSA} = 5104/7 \text{ cm}^2$$

$$\text{TSA} = 729 \frac{1}{7} \text{ cm}^2$$

$$(\approx 729.14 \text{ cm}^2)$$

23. Let the radius and height of the cylinder be 'r' and 'h' respectively.

Curved Surface Area of a right circular cylinder = $2 \pi r h$

Diameter = $2 \times \text{radius}$

Height of the cylinder, $h = 14 \text{ cm}$

CSA of the cylinder = 88 cm^2

$$2 \pi r h = 88 \text{ cm}^2$$

$$2 \times 22/7 \times r \times 14 \text{ cm} = 88 \text{ cm}^2$$

$$r = (88 \text{ cm}^2 \times 7) / (2 \times 22 \times 14) \text{ cm}$$

$$= 1 \text{ cm}$$

Diameter = $2 \times \text{radius}$

$$= 2 \times 1 \text{ cm}$$

$$= 2 \text{ cm}$$

Thus, the diameter of the base of the cylinder is 2 cm.

OR

$$V = \pi r^2 h$$

$$= \pi \cdot 8^2 \cdot 12$$

$$= 2411.74316 \text{ cm}^3 \quad 2411.52 \text{ cm}^3$$

24.

I. (1,1)

II. 0

III. (0,0)

IV. 4

25.

Antilog 2.9441 is 978.9

Log 0.009324 is 3bar.9696 ($\bar{3}.9696$)

26. The logarithm of 26.79 is approximately **1.428**.

The antilogarithm of 0.4771 is approximately **3.001**.

27. $\angle AOB = 100^\circ$

The angle subtended by an arc at the center of a circle is double the angle subtended by the same arc at any point on the remaining part of the circumference.

Using Angle sum property of triangle for Triangle AOB

OA = OB ---radii of circle

$\angle OAB = 40^\circ$

28. Let the cost of pen be x and pencil be y

$$2x + 5y = 200$$

29. Given:

$$a = 7 \text{ cm}$$

$$b = 8 \text{ cm}$$

$$c = 9 \text{ cm}$$

$$s = 24 / 2$$

$$s = 12 \text{ cm}$$

$$\text{Area} = \sqrt{[s(s-a)(s-b)(s-c)]}$$

$$\text{Area} = \sqrt{[12(12-7)(12-8)(12-9)]}$$

$$\text{Area} = \sqrt{[12 \times 5 \times 4 \times 3]}$$

$$\text{Area} = \sqrt{720}$$

$$\text{Area} = \sqrt{(144 \times 5)}$$

$$\text{Area} = 12\sqrt{5}$$

$$\text{Area} = 12 \times 2.24$$

$$\text{Area} = \mathbf{26.88 \text{ cm}^2}$$

30. Given: 12, 14, 16, $x+2$, $x+4$, 28, 30, 32

$$\text{Median} = 23$$

Number of terms = 8 $\rightarrow$ Median = Average of 4th and 5th terms

$$\text{4th term} = x + 2$$

$$\text{5th term} = x + 4$$

Use Median Formula

$$\text{Median} = (\text{4th term} + \text{5th term})/2$$

$$23 = (x+2 + x+4)/2$$

$$23 = (2x + 6)/2$$

$$23 = x + 3$$

$$x = 23 - 3$$

$$x = 20$$

31. Sides in ratio 5 : 12 : 13

Let the sides be $5x$, $12x$, $13x$

Perimeter = sum of sides

$$5x + 12x + 13x = 60$$

$$30x = 60$$

$$x = 2$$

$$5x = 5 \times 2 = 10 \text{ cm}$$

$$12x = 12 \times 2 = 24 \text{ cm}$$

$$13x = 13 \times 2 = 26 \text{ cm}$$

$$s = \text{semi-perimeter} = (a+b+c)/2$$

$$s = (10 + 24 + 26)/2$$

$$s = 60/2 = 30 \text{ cm}$$

$$\text{Area} = \sqrt{[s(s-a)(s-b)(s-c)]}$$

$$\text{Area} = \sqrt{[30(30-10)(30-24)(30-26)]}$$

$$\text{Area} = \sqrt{[30 \times 20 \times 6 \times 4]}$$

$$\text{Area} = \sqrt{14400}$$

$$\text{Area} = 120 \text{ cm}^2$$

OR

Given: Area of triangle = 8 cm^2

It is an isosceles right triangle

Let the equal sides be $x \text{ cm}$

Area of triangle = $(1/2) \times \text{base} \times \text{height}$

$$8 = (1/2) \times x \times x$$

$$8 = (1/2) \times x^2$$

$$16 = x^2 \quad x = 4 \text{ cm}$$

In an isosceles right triangle:

$$\text{Hypotenuse}^2 = \text{side}^2 + \text{side}^2$$

$$\text{Hypotenuse}^2 = x^2 + x^2$$

$$\text{Hypotenuse}^2 = 4^2 + 4^2$$

$$\text{Hypotenuse}^2 = 32$$

$$\text{Hypotenuse} = 4\sqrt{2} \text{ cm}$$

32. (0,3) (2,2) (4,1) (6,0),... (Any three points)

Draw the line through the points, Draw x-axis and y-axis

Mark points, Join points with a straight line, Extend line in both directions

33. Sum of the opposite angles in cyclic quadrilateral is 180°

$$6y = 180^\circ$$

$$y = 30^\circ$$

$$4x = 180^\circ$$

$$x = 45^\circ$$

OR

I. $\angle ABC = 180 - 110$

$$= 70^\circ$$

II. $\angle ADC = 70^\circ$

Sum of the opposite angles in cyclic quadrilateral is 180°

34. Using Heron's formula, first find the semi-perimeter (s):

$$S = (10 + 24 + 26) / 2 = 30 \text{ cm.}$$

Now, calculate the area (A) using Heron's formula:

$$A = \sqrt{S(S-a)(S-b)(S-c)}$$

where $a = 10 \text{ cm}$, $b = 24 \text{ cm}$, and $c = 26 \text{ cm}$.

$$A = \sqrt{30(30-10)(30-24)(30-26)}$$

$$= \sqrt{30 \times 20 \times 6 \times 4}$$

$$= \sqrt{14400}$$

$$= 120 \text{ cm}^2.$$

35. Step 1: Find the radius

$$l^2 = r^2 + h^2$$

$$25^2 = r^2 + 24^2$$

$$625 = r^2 + 576$$

$$r^2 = 49$$

$$r = 7 \text{ cm}$$

$$V = (1/3)\pi r^2 h$$

$$V = (1/3) \times \pi \times 7^2 \times 24$$

$$V = (1/3) \times \pi \times 49 \times 24$$

$$V = 392\pi \text{ cm}^3$$

$$V \approx 392 \times 3.1416 \approx 1231.5 \text{ cm}^3$$

OR

Height, $h = 24 \text{ cm}$

Volume, $V = 1232 \text{ cm}^3$

Volume formula of cone:

$$V = (1/3) \pi r^2 h$$

$$1232 = (1/3) \times \pi \times r^2 \times 24$$

$$1232 = 8 \pi r^2 \quad (\text{since } 24 \div 3 = 8)$$

$$r^2 = 1232 / (8 \pi)$$

$$r^2 = 154 / \pi$$

$$r \approx \sqrt{(154 / 3.1416)}$$

$$r \approx \sqrt{49}$$

$$r \approx 7 \text{ cm}$$

$$\text{Diameter} = 2r = 2 \times 7 = 14 \text{ cm}$$

$$36) \quad h = 21 \text{ cm} \\ r = 7 \text{ cm}$$

$$\text{CSA of cylinder} = 2\pi rh \\ = 2 \times \frac{22}{7} \times 7 \times 21$$

$$= 44 \times 21$$

$$= 924 \text{ cm}^2$$

$$37. \quad | \quad h = 10 \text{ cm}$$

Each pillar is a cylinder:

$$\text{Volume of cylinder, } V = \pi r^2 h$$

$$r = 20 \text{ cm, } h = 10 \text{ cm}$$

Number of pillars = 14

$$V = \pi r^2 h = \pi \times (20)^2 \times 10$$

$$V = \pi \times 400 \times 10$$

$$V = 4000 \pi \text{ cm}^3$$

Step 2: Volume of 14 pillars

$$\text{Total Volume} = 14 \times 4000 \pi$$

$$\text{Total Volume} = 56000 \pi \text{ cm}^3$$

$$\text{Total Volume} \approx 56000 \times 3.1416$$

$$\text{Total Volume} \approx 175929.6 \text{ cm}^3 \approx 0.176 \text{ m}^3 \quad (\text{since } 1 \text{ m}^3 = 1,000,000 \text{ cm}^3)$$

37. Step 1: Mean Formula

$$\text{Mean} = \Sigma(fi \ x_i) / \Sigma fi$$

$$\text{Mean} = 147 / 25$$

$$\text{Mean} = 5.88$$

38.

Age Group	Tally marks	Number of people
0 - 10		5
10 - 20		4
20 - 30		3
30 - 40		4
40 - 50		6
50 - 60		2
60 - 70		6
Total		30

$$39. 40 \times 25 / 100$$

$$= 1000 / 100 = 10$$

$$\log(10) = 1$$

40.

$\angle BOD = 140^\circ$ (given)

By degree measure theorem: $\angle BOD = 2 \angle BAD$
 $140^\circ = 2 \angle BAD$
 $\angle BAD = \frac{140^\circ}{2} = 70^\circ$

Again, $\angle BAD + \angle BCD = 180^\circ$ [Sum of opposite angles of cyclic quadrilateral = 180°]
 $70^\circ + \angle BCD = 180^\circ$
 $\angle BCD = 180^\circ - 70^\circ$
 $\angle BCD = 110^\circ$

$\angle BCD + \angle DCP = 180^\circ$ [Linear pair of angles]
 $110^\circ + x = 180^\circ$
 $x = 180^\circ - 110^\circ = 70^\circ$

The value of x is 70°

$$41. \text{Volume of cone, } V_{\text{cone}} = (1/3) \pi r_1^2 h_1$$

$$= (1/3) \pi (5)^2 h_1$$

$$= (25/3) \pi h_1$$

$$\text{Volume of cylinder, } V_{\text{cyl}} = \pi r_2^2 h_2$$

$$= \pi (10)^2 (2)$$

$$= 200 \pi$$

Water from cone fills cylinder:

$$V_{\text{cone}} = V_{\text{cyl}}$$

$$(25/3) \pi h_1 = 200 \pi$$

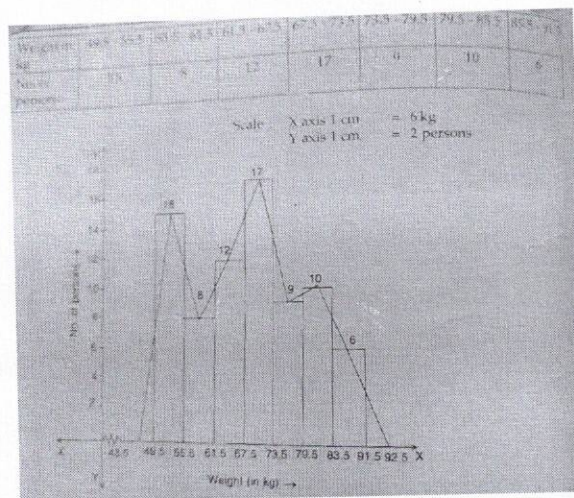
$$h = (200 \pi) / (25/3 \pi)$$

$$h = (200 \times 3) / 25$$

$$h = 600 / 25$$

$$h = 24 \text{ cm}$$

42.



43.

$$\begin{aligned}
 AC^2 &= AD^2 + DC^2 \\
 AC^2 &= 24^2 + 7^2 \\
 AC^2 &= 576 + 49 \\
 AC^2 &= 625 \\
 AC &= \sqrt{625} \\
 AC &= 25 \\
 \text{ar}(\triangle ADC) &= \frac{1}{2} \times AD \times DC \\
 &= \frac{1}{2} \times 24 \times 7 \\
 &= 12 \times 7 \\
 &= 84 \text{ cm}^2 \\
 a &= 27 \quad b = 25 \quad c = 26 \\
 s &= \frac{27 + 25 + 26}{2} = \frac{78}{2} = 39 \\
 \text{ar}(\triangle ABC) &= \sqrt{s(s-a)(s-b)(s-c)} \\
 &= \sqrt{39(39-27)(39-25)(39-26)} \\
 &= \sqrt{39 \times 12 \times 14 \times 13} \\
 &= \sqrt{3 \times 13 \times 3 \times 4 \times 14 \times 13} \\
 &= 3 \times 2 \times 13 \sqrt{14} \\
 &= 78 \sqrt{14} \text{ cm}^2 \\
 \therefore \text{Area} &= (84 + 78 \sqrt{14}) \text{ cm}^2
 \end{aligned}$$