

CBSE Class 10 Maths Solutions

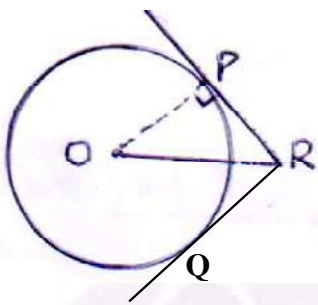
QUESTION PAPER CODE 30/1

EXPECTED ANSWERS/VALUE POINTS

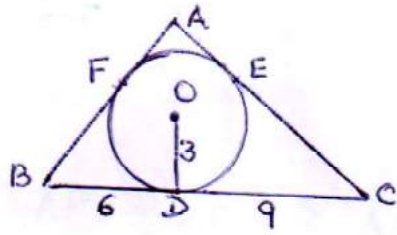
SECTION - A

1. $p = 3$ 1 m
2. 30° 1 m
3. $\frac{1}{9}$ 1 m
4. 120° 1 m

SECTION - B

5.  $\angle POR = 90 - 60 = 30^\circ$ $\frac{1}{2}$ m
- $\frac{PR}{OR} = \sin 30^\circ = \frac{1}{2} \Rightarrow OR = 2 PR$
- $= PR + QR$ $\frac{1}{2}$ m

6.



Let $AF = AE = x$

$\therefore AB = 6 + x, AC = 9 + x, BC = 15$ ½ m

$\frac{1}{2} [15 + 6 + x + 9 + x] \cdot 3 = 54$ 1 m

$\Rightarrow x = 3 \therefore AB = 9 \text{ cm}, AC = 12 \text{ cm}$ ½ m

and $BC = 15 \text{ cm}$

7. $4x^2 + 4bx + b^2 - a^2 = 0 \Rightarrow (2x + b)^2 - (a)^2 = 0$ ½ m

$\Rightarrow (2x + b + a)(2x + b - a) = 0$ ½ m

$\Rightarrow x = -\frac{a+b}{2}, x = \frac{a-b}{2}$ ½ + ½ m

8. $S_5 + S_7 = 167 \Rightarrow \frac{5}{2}[2a + 4d] + \frac{7}{2}[2a + 6d] = 167$

$24a + 62d = 334$ or $12a + 31d = 167$ (i) ½ m

$S_{10} = 235 \Rightarrow 5[2a + 9d] = 235$ or $2a + 9d = 47$ (ii) ½ m

Solving (i) and (ii) to get $a = 1, d = 5$. Hence AP is 1, 6, 11, ½ + ½ m

9. Here, $AB^2 + BC^2 = AC^2$ ½ m

$\Rightarrow (4)^2 + (p - 4)^2 + (7 - p)^2 = (3)^2 + (-4)^2$

$\Rightarrow p = 7$ or 4 1 m

since $p \neq 7 \therefore p = 4$ ½ m

10. Using $\text{ar}(\Delta ABC) = 0$ ½ m

$$\Rightarrow x(7-5) - 5(5-y) - 4(y-7) = 0$$
 1 m

$$2x - 25 + 5y - 4y + 28 = 0$$

$$2x + y + 3 = 0$$
 ½ m

SECTION - C

11. $a_{14} = 2 a_8 \Rightarrow a + 13d = 2(a + 7d) \Rightarrow a = -d$ 1 m

$$a_6 = -8 \Rightarrow a + 5d = -8$$
 ½ m

solving to get $a = 2, d = -2$ ½ m

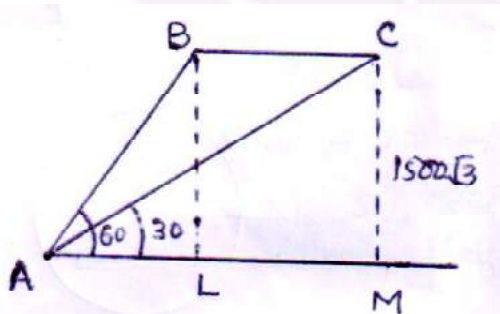
$$S_{20} = 10(2a + 19d) = 10(4 - 38) = -340$$
 1 m

12. $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$

$$\Rightarrow \sqrt{3}x^2 - 3\sqrt{2}x + \sqrt{2}x - 2\sqrt{3} = 0 \Rightarrow (x - \sqrt{6})(\sqrt{3}x + \sqrt{2}) = 0$$
 1+1 m

$$\Rightarrow x = \sqrt{6}, x = -\sqrt{\frac{2}{3}}$$
 ½ + ½ m

13.



Let $AL = x \therefore \frac{BL}{x} = \tan 60^\circ$ Fig. ½ m

$$\Rightarrow \frac{1500\sqrt{3}}{x} = \sqrt{3} \Rightarrow x = 1500 \text{ m.}$$
 1 m

$$\frac{CM}{AL + LM} = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

$$\Rightarrow 1500 + LM = 1500(3) = 4500$$
 1 m

$$\Rightarrow LM = 3000 \text{ m.}$$

$$\therefore \text{Speed} = \frac{3000}{15} = 200 \text{ m./s. or } 720 \text{ Km/hr.}$$
 ½ m

14. $AP = \frac{3}{7} AB \Rightarrow AP : PB = 3 : 4$ 1 m

$$\frac{A}{(-2, -2)} \quad \frac{P(x, y)}{3:4} \quad \frac{B}{(2, -4)} \quad \therefore x = \frac{6-8}{7} = -\frac{2}{7}$$
1 m

$$y = \frac{-12-8}{7} = -\frac{20}{7}$$
 $\frac{1}{2}$ m

$$P \left(-\frac{2}{7}, -\frac{20}{7} \right)$$
 $\frac{1}{2}$ m

15. $P(\text{Red}) = \frac{1}{4}, P(\text{blue}) = \frac{1}{3}$

$$\Rightarrow P(\text{orange}) = 1 - \frac{1}{4} - \frac{1}{3} = \frac{5}{12}$$
 $1\frac{1}{2}$ m

$$\Rightarrow \frac{5}{12} (\text{Total no. of balls}) = 10$$
 $\frac{1}{2}$ m

$$\Rightarrow \text{Total no. of balls} = \frac{10 \times 12}{5} = 24$$
1 m

16. $r = 14 \text{ cm. } \theta = 60^\circ$

$$\text{Area of minor segment} = \pi r^2 \frac{\theta}{360} - \frac{1}{2} r^2 \sin \theta$$
 $\frac{1}{2}$ m

$$= \frac{22}{7} \times 14 \times 14 \times \frac{60}{360} - \frac{1}{2} \times 14 \times 14 \times \frac{\sqrt{3}}{2}$$
 $\frac{1}{2}$ m

$$= \left(\frac{308}{3} - 49\sqrt{3} \right) \text{ cm}^2 \text{ or } 17.89 \text{ cm}^2 \text{ or } 17.9 \text{ cm}^2 \text{ Approx.}$$
1 m

Area of Major segment

$$= \pi r^2 - \left(\frac{308}{3} - 49\sqrt{3} \right)$$
 $\frac{1}{2}$ m

$$= \left(\frac{1540}{3} + 49\sqrt{3} \right) \text{ cm}^2 \text{ or } 598.10 \text{ cm}^2$$
 $\frac{1}{2}$ m

or 598 cm^2 Approx.

17. Slant height (ℓ) = $\sqrt{(2.8)^2 + (2.1)^2} = 3.5$ cm. ½ m

∴ Area of canvas for one tent = $2 \times \frac{22}{7} \times (2.1) \times 4 + \frac{22}{7} \times 2.1 \times 3.5$
 $= 6.6 (8 + 3.5) = 6.6 \times 11.5$ m² ½ m

∴ Area for 100 tents = 66×115 m²

Cost of 100 tents = Rs. $66 \times 115 \times 100$ ½ m

50% Cost = $33 \times 11500 =$ Rs. 379500 ½ m

Values : Helping the flood victims 1 m

18. Volume of liquid in the bowl = $\frac{2}{3} \cdot \pi \cdot (18)^3$ cm³ ½ m

Volume, after wastage = $\frac{2\pi}{3} \cdot (18)^3 \cdot \frac{90}{100}$ cm³ ½ m

Volume of liquid in 72 bottles = $\pi (3)^2 \cdot h \cdot 72$ cm³ ½ m

⇒ $h = \frac{\frac{2}{3} \pi (18)^3 \cdot \frac{90}{100}}{\pi (3)^2 \cdot 72} = 5.4$ cm. ½ + 1 m

19. Largest possible diameter = 10 cm. }
of hemisphere 1 m

∴ radius = 5 cm.

Total surface area = $6 (10)^2 + 3.14 \times (5)^2$ 1 m

Cost of painting = $\frac{678.5 \times 5}{100} = \frac{\text{Rs. } 3392.50}{100} = \text{₹ } 33.9250$ 1 m
= ₹ 33.93

20. Volume of metal in 504 cones = $504 \times \frac{1}{3} \times \frac{22}{7} \times \frac{35}{20} \times \frac{35}{20} \times 3$ cm. 1 m

$\therefore \frac{4}{3} \times \frac{22}{7} \times r^3 = 504 \times \frac{1}{3} \times \frac{22}{7} \times \frac{35}{20} \times \frac{35}{20} \times 3$ $\frac{1}{2}$ m

$r = 10.5$ cm. \therefore diameter = 21 cm. $\frac{1}{2}$ m

Surface area = $4 \times \frac{22}{7} \times \frac{21}{7} \times \frac{21}{2} \times \frac{21}{2} = 1386$ cm² 1 m

21. Let the length of shorter side be x m.

\therefore length of diagonal = $(x + 16)$ m $\frac{1}{2}$ m

and, length of longer side = $(x + 14)$ m $\frac{1}{2}$ m

$\therefore x^2 + (x + 14)^2 = (x + 16)^2$ 1 m

$\Rightarrow x^2 - 4x - 60 = 0 \Rightarrow x = 10$ m. 1 m

\therefore length of sides are 10m and 24m. $\frac{1}{2} + \frac{1}{2}$ m

22. $t_{60} = 8 + 59(2) = 126$ 1 m

sum of last 10 terms = $(t_{51} + t_{52} + \dots + t_{60})$ 1 m

$t_{51} = 8 + 50(2) = 108$ $\frac{1}{2}$ m

\therefore Sum of last 10 terms = $5 [108 + 126]$ 1 m

= 1170 $\frac{1}{2}$ m

23. Let the original average speed of (first) train be x km/h.

$$\therefore \frac{54}{x} + \frac{63}{x+6} = 3 \quad 1\frac{1}{2} \text{ m}$$

$$\Rightarrow 54x + 324 + 63x = 3x(x + 6)$$

$$\Rightarrow x^2 - 33x - 108 = 0 \quad 1 \text{ m}$$

$$\text{Solving to get } x = 36 \quad 1 \text{ m}$$

$$\therefore \text{First speed of train} = 36 \text{ km/h.} \quad \frac{1}{2} \text{ m}$$

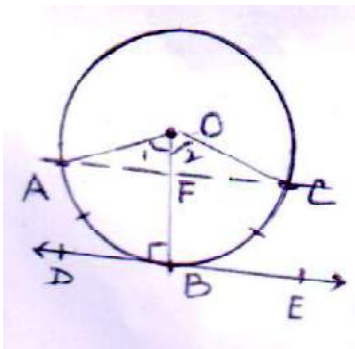
24. For correct Given, To Prove, const. and figure

$\frac{1}{2} \times 4 = 2 \text{ m}$

For correct proof

2 m

25.



B is mid point of arc (ABC)

Correct Fig.

1 m

$$\therefore \angle 1 = \angle 2$$

$\frac{1}{2} \text{ m}$

$$\therefore \triangle OAF \cong \triangle OCF \quad \text{SAS.}$$

$\frac{1}{2} \text{ m}$

$$\therefore \angle AFO = \angle CFO = 90^\circ$$

$\frac{1}{2} \text{ m}$

$$\Rightarrow \angle AFO = \angle DBO = 90^\circ$$

$\frac{1}{2} \text{ m}$

But these are corresponding angles

$\frac{1}{2} \text{ m}$

$$\therefore AC \parallel DE$$

$\frac{1}{2} \text{ m}$

26. Constructing $\triangle ABC$

$1\frac{1}{2} \text{ m}$

Constructing $\triangle AB'C'$

$2\frac{1}{2} \text{ m}$

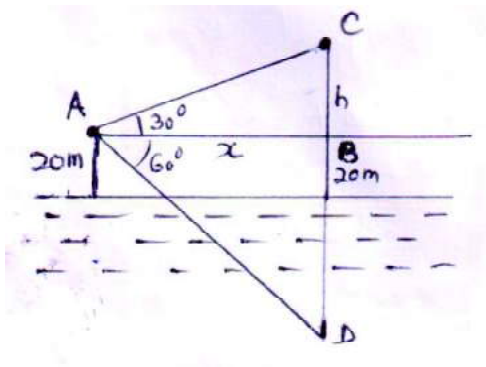
27.

correct figure

1 m

$$\frac{h}{x} = \tan 30^\circ = \frac{1}{\sqrt{3}} \Rightarrow x = \sqrt{3} h.$$

$\frac{1}{2} \text{ m}$



$$\frac{40+h}{x} = \tan 60^\circ = \sqrt{3} \Rightarrow x = \frac{40+h}{\sqrt{3}} \quad \frac{1}{2} \text{ m}$$

$$\therefore \sqrt{3} h = \frac{40+b}{\sqrt{3}} \Rightarrow h = 20 \text{ m.} \quad \frac{1}{2} \text{ m}$$

$$\therefore x = 20\sqrt{3} \text{ m} \quad \frac{1}{2} \text{ m}$$

$$\therefore AC = \sqrt{(20)^2 + (20\sqrt{3})^2} = 40 \text{ m.} \quad 1 \text{ m}$$

28. (i) $P(\text{spade or an ace}) = \frac{13+3}{52} = \frac{4}{13} \quad 1 \text{ m}$

(ii) $P(\text{a black king}) = \frac{2}{52} = \frac{1}{26} \quad 1 \text{ m}$

(iii) $P(\text{neither a jack nor a king}) = \frac{52-8}{52} = \frac{44}{52} = \frac{11}{13} \quad 1 \text{ m}$

(iv) $P(\text{either a king or a queen}) = \frac{4+4}{52} = \frac{8}{52} = \frac{2}{13} \quad 1 \text{ m}$

29. $\frac{1}{2} [1(2k+5) - 4(-5+1) - k(-1-2k)] = 24 \quad 2 \text{ m}$

$$\Rightarrow 2k^2 + 3k - 27 = 0 \quad 1 \text{ m}$$

Solving to get $k = 3, k = -\frac{9}{2} \quad 1 \text{ m}$

30. Radius of circle with centre O is OR

let $OR = x \therefore x^2 + x^2 = (42)^2 \Rightarrow x = 21\sqrt{2} \text{ m.} \quad 1 \text{ m}$

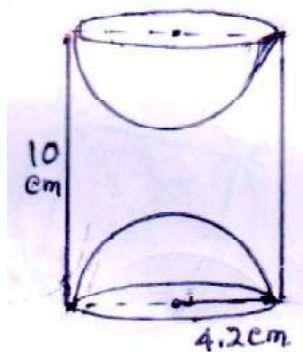
Area of one flower bed = Area of segment of circle with

$$= \frac{22}{7} \times 21\sqrt{2} \times 21\sqrt{2} \times \frac{90}{360} - \frac{1}{2} \times 21\sqrt{2} \times 21\sqrt{2} \quad \text{centre angle } 90^\circ \quad 1 \text{ m}$$

$$= 693 - 441 = 252 \text{ m}^2 \quad \frac{1}{2} + \frac{1}{2} + \frac{1}{2} \text{ m}$$

$$\therefore \text{Area of two flower beds} = 2 \times 252 = 504 \text{ m}^2 \quad \frac{1}{2} \text{ m}$$

31.



$$\text{Total Volume of cylinder} = \frac{22}{7} \times \frac{42}{10} \times \frac{42}{10} \times 10 \text{ cm}^3 \quad \frac{1}{2} \text{ m}$$

$$= 554.40 \text{ cm}^3 \quad \frac{1}{2} \text{ m}$$

$$\text{Volume of metal scooped out} = \frac{4}{3} \times \frac{42}{7} \times \left(\frac{42}{10}\right)^3 \quad \frac{1}{2} \text{ m}$$

$$= 310.46 \text{ cm}^3 \quad \frac{1}{2} \text{ m}$$

$$\therefore \text{Volume of rest of cylinder} = 554.40 - 310.46$$

$$= 243.94 \text{ cm}^3 \quad \frac{1}{2} \text{ m}$$

If l is the length of wire, then

$$\frac{22}{7} \times \frac{7}{10} \times \frac{7}{10} \times l = \frac{24394}{100} \quad 1 \text{ m}$$

$$\Rightarrow l = 158.4 \text{ cm} \quad \frac{1}{2} \text{ m}$$