CBSE Class 10 Maths Solutions

QUESTION PAPER CODE 30/1

EXPECTED ANSWERS/VALUE POINTS

SECTION - A

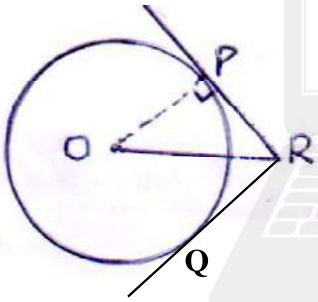
1. $p = 3$ — 1 m

2. 30° — 1 m

3. $\frac{1}{9}$ — 1 m

4. 120° — 1 m

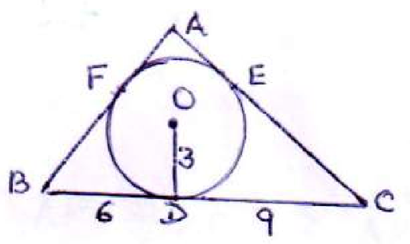
SECTION - B

5. 

$\angle POR = 90 - 60 = 30^{\circ}$ — ½ m

$\frac{PR}{OR} = \sin 30^{\circ} = \frac{1}{2} \Rightarrow OR = 2\,PR$

$= PR + QR$ — ½ 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 cm, AC = 12 cm ½ m

and BC = 15 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 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. $a_{14} = 2a_8 \Rightarrow a + 13d = 2(a + 7d) \Rightarrow a = -d$ 1 m

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

solving to get $a = 2, \quad d = -2$ ½ m

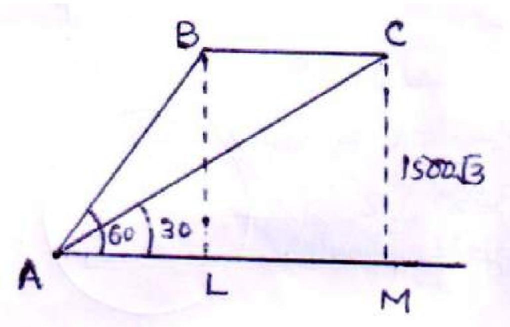
$S_{20} = 10(2a + 19d) = 10(4 - 38) = -340$ 1 m

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

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

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

13.



Let $AL = x \quad \therefore \frac{BL}{x} = \tan 60^0$ Fig. ½ m

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

$\frac{CM}{AL + LM} = \tan 30^0 = \frac{1}{\sqrt{3}}$

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

$\Rightarrow LM = 3000$ m.

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

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

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

$$y = \frac{-12-8}{7} = -\frac{20}{7}$$ ½ m

$$P\left(-\frac{2}{7}, -\frac{20}{7}\right)$$ ½ m

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

$\Rightarrow P(\text{orange}) = 1 - \frac{1}{4} - \frac{1}{3} = \frac{5}{12}$ 1½ m

$\Rightarrow \frac{5}{12}(\text{Total no. of balls}) = 10$ ½ m

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

16. $r = 14$ cm. $\theta = 60^0$

Area of minor segment $= \pi r^2 \frac{\theta}{360} - \frac{1}{2} r^2 \sin\theta$ ½ m

$= \frac{22}{7} \times 14 \times 14 \times \frac{60}{360} - \frac{1}{2} \times 14 \times 14 \times \frac{\sqrt{3}}{2}$ ½ m

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

Area of Major segment

$$= \pi r^2 - \left(\frac{308}{3} - 49\sqrt{3}\right)$$ ½ m

$$= \left(\frac{1540}{3} + 49\sqrt{3}\right) cm^2 \text{ or } 598.10\ cm^2$$ ½ m

or $598\ cm^2$ Approx.

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

$\therefore$ Area of canvas for one tent = $2 \times \frac{22}{7} \times (2.1) \times 4 + \frac{22}{7} \times 2.1 \times 3.5$

$= 6.6\ (8 + 3.5) = 6.6 \times 11.5\ m^2$ ½ m

$\therefore$ Area for 100 tents $= 66 \times 115\ m^2$

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 = $\frac{2}{3} \cdot \pi \cdot (18)^3\ cm^3$ ½ m

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

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

$\Rightarrow h = \dfrac{\frac{2}{3}\pi (18)^3 \cdot \frac{9}{10}}{\pi (3)^2 \cdot 72} = 5.4$ cm. ½ + 1 m

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

$\therefore$ radius = 5 cm.

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

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

$\therefore \frac{4}{3} \times \frac{22}{7} \times r^3 = 504 \times \frac{1}{3} \times \frac{22}{7} \times \frac{35}{20} \times \frac{35}{20} \times 3$ ½ m

r = 10.5 cm. $\therefore$ diameter = 21 cm. ½ m

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

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

$\therefore$ length of diagonal = (x + 16) m ½ m

and, length of longer side = (x + 14) m ½ m

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

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

$\therefore$ length of sides are 10m and 24m. ½ + ½ m

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

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

$t_{51} = 8 + 50 (2) = 108$ ½ m

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

= 1170 ½ m

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

$\therefore \frac{54}{x} + \frac{63}{x+6} = 3$ 1½ m

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

$\Rightarrow x^2 - 33x - 108 = 0$ 1 m

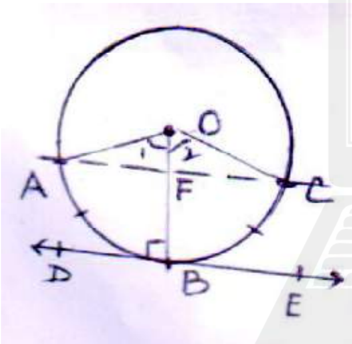
Solving to get $x = 36$ 1 m

$\therefore$ First speed of train = 36 km/h. ½ m

24. For correct Given, To Prove, const. and figure ½ x 4=2 m

For correct proof 2 m

25.



B is mid point of arc (ABC) Correct Fig. 1 m

$\therefore \angle 1 = \angle 2$ ½ m

$\therefore \Delta OAF \cong \Delta OCF$ SAS. ½ m

$\therefore \angle AFO = \angle CFO = 90^0$ ½ m

$\Rightarrow \angle AFO = \angle DBO = 90^0$ ½ m

But these are corresponding angles ½ m

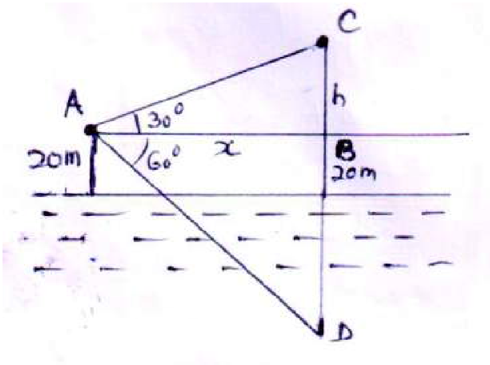
$\therefore AC \parallel DE$ ½ m

26. Constructing ΔABC 1½ m

Constructing $\Delta AB'C'$ 2 ½ m

27. correct figure 1 m

$\frac{h}{x} = \tan 30^0 = \frac{1}{\sqrt{3}} \Rightarrow x = \sqrt{3}h.$ ½ m



$\frac{40+h}{x} = \tan 60^0 = \sqrt{3} \Rightarrow x = \frac{40+h}{\sqrt{3}}$ ½ m

$\therefore \sqrt{3}\, h = \frac{40+b}{\sqrt{3}} \Rightarrow h = 20$ m. ½ m

$\therefore x = 20\sqrt{3}$ m ½ m

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

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

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

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

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

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

$\Rightarrow 2k^2 + 3k - 27 = 0$ 1 m

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

30. Radius of circle with centre O is OR

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

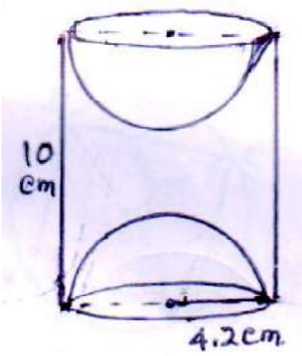
Area of one flower bed = Area of segment of circle with centre angle 90^0

$$= \frac{22}{7} \times 21\sqrt{2} \times 21\sqrt{2} \times \frac{90}{360} - \frac{1}{2} \times 21\sqrt{2} \times 21\sqrt{2}$$ 1 m

$$= 693 - 441 = 252 \text{ m}^2$$ ½ + ½ + ½ m

$\therefore$ Area of two flower beds $= 2 \times 252 = 504 \text{ m}^2$ ½ m

31.



Total Volume of cylinder $= \frac{22}{7} \times \frac{42}{10} \times \frac{42}{10} \times 10 \text{ cm}^3$ ½ m

$= 554.40$ cm. ½ m

Volume of metal scooped out $= \frac{4}{3} \times \frac{42}{7} \times \left(\frac{42}{10}\right)^3$ ½ m

$= 310.46 \text{ cm}^3$ ½ m

$\therefore$ Volume of rest of cylinder $= 554.40 - 310.46$

$= 243.94 \text{ cm}^3$ ½ m

If ℓ is the length of wire, then

$$\frac{22}{7} \times \frac{7}{10} \times \frac{7}{10} \times \ell = \frac{24394}{100}$$ 1 m

$\Rightarrow \ell = 158.4$ cm. ½ m