

CBSE Class 10 Maths Solutions

30/1

QUESTION PAPER CODE 30/1

EXPECTED ANSWER/VALUE POINTS

SECTION A

1. For
- $\angle ACB = 90^\circ$

 $\frac{1}{2}$

$$\angle PCA = 60^\circ$$

 $\frac{1}{2}$

- 2.
- $2(2k - 1) = k + 9 + 2k + 7$

 $\frac{1}{2}$

$$k = 18$$

 $\frac{1}{2}$

- 3.
- $\frac{l}{2.5} = 2$

 $\frac{1}{2}$

$$l = 5 \text{ m}$$

 $\frac{1}{2}$

4. No. of red cards and queens: 28

 $\frac{1}{2}$

$$\text{Required Probability: } \frac{24}{52} \text{ or } \frac{6}{13}$$

 $\frac{1}{2}$

SECTION B

- 5.
- $2(-5)^2 + p(-5) - 15 = 0 \Rightarrow p = 7$

1

$$7x^2 + 7x + k = 0 \text{ gives } 49 - 28k = 0 \Rightarrow k = \frac{7}{4}$$

1

- 6.
- 

P divides AB in 1 : 2

 $\frac{1}{2}$ $\therefore$ Coords of P are: $(-1, 0)$

1

Q is mid-point of PB

 $\therefore$ Coords of Q are: $(-4, 2)$ $\frac{1}{2}$

- 7.
- $AP = AS$
- ,
- $BP = BQ$
- ,
- $CR = CQ$
- and
- $DR = DS$

1

$$AP + BP + CR + DR = AS + BQ + CQ + DS \Rightarrow AB + CD = AD + BC$$

1

30/1

8. Let the point be A(3, 0), B(6, 4), C(-1, 3)

$$AB = \sqrt{9+16} = 5, BC = \sqrt{49+1} = 5\sqrt{2}, AC = \sqrt{16+9} = 5 \quad 1\frac{1}{2}$$

$$AB = AC \text{ and } AB^2 + AC^2 = BC^2: \Delta ABC \text{ isosceles, right } \Delta \quad \frac{1}{2}$$

9. $a + 3d = 0 \Rightarrow a = -3d$ $\frac{1}{2}$

$$a_{25} = a + 24d = 21d \quad \frac{1}{2}$$

$$3a_{11} = 3(a + 10d) = 3(7d) = 21d \quad 1$$

10. Let $\angle TOP = \theta \therefore \cos \theta = \frac{OT}{OP} = \frac{r}{2r} = \frac{1}{2} \therefore \theta = 60^\circ$ Hence $\angle TOS = 120^\circ$ 1

$$\text{In } \Delta OTS, OT = OS \Rightarrow \angle OTS = \angle OST = 30^\circ \quad 1$$

SECTION C

11. $BC^2 = AB^2 - AC^2 = 169 - 144 = 25 \therefore BC = 5\text{cm}$ 1

Area of the shaded region = Area of semicircle - area of rt. ΔABC

$$= \frac{1}{2} (3.14) \left(\frac{13}{2} \right)^2 - \frac{1}{2} \cdot 12 \times 5 \quad 1$$

$$= 66.33 - 30 = 36.33 \text{ cm}^2 \quad 1$$

12. Area of canvas needed $= 2 \times \frac{22}{7} \times (1.5) \times 2.1 + \frac{22}{7} \times 1.5 \times 2.8$ $1\frac{1}{2}$

$$= \frac{22}{7} [6.3 + 4.2] = \frac{22}{7} \times 10.5 = 33 \text{ m}^2 \quad 1$$

$$\text{cost} = 33 \times 500 = ₹ 16500 \quad \frac{1}{2}$$

13. $PA = PB$ or $(PA)^2 = (PB)^2$ 1

$$(a + b - x)^2 + (b - a - y)^2 = (a - b - x)^2 + (a + b - y)^2 \quad 1$$

$$(a + b)^2 + x^2 - 2ax - 2bx + (b - a)^2 + y^2 - 2by + 2ay$$

$$= (a - b)^2 + x^2 - 2ax + 2bx + (a + b)^2 + y^2 - 2ay - 2by$$

$$\Rightarrow 4ay = 4bx \text{ or } bx = ay \quad 1$$

30/1

$$14. \text{ Shaded area} = \pi(14^2 - 7^2) \times \frac{320}{360} \quad 2$$

$$= \frac{22}{7} \times 147 \times \frac{8}{9} \quad \frac{1}{2}$$

$$= \frac{1232}{3} = 410.67 \text{ cm}^2 \quad \frac{1}{2}$$

$$15. \frac{S_n}{S'_n} = \frac{n/2(2a + (n-1)d)}{n/2(2a' + (n-1)d')} = \frac{7n+1}{4n+27} \quad 1$$

$$= \frac{a + \frac{n-1}{2}d}{a' + \frac{n-1}{2}d'} = \frac{7n+1}{4n+27} \quad \dots(i) \quad \frac{1}{2}$$

$$\text{Since } \frac{t_m}{t'_m} = \frac{a + (m-1)d}{a' + (m-1)d'}, \text{ So replacing } \frac{n-1}{2} \text{ by } m-1 \text{ i.e. } n = 2m-1 \text{ in (i)} \quad 1$$

$$\frac{t_m}{t'_m} = \frac{a + (m-1)d}{a' + (m-1)d'} = \frac{7(2m-1)+1}{4(2m-1)+27} = \frac{14m-6}{8m+23} \quad \frac{1}{2}$$

$$16. \text{ Here } 3(x-3+x-1) = 2(x-1)(x-2)(x-3) \quad 1 \frac{1}{2}$$

$$\Rightarrow 3(2x-4) = 2(x-1)(x-2)(x-3) \quad \frac{1}{2}$$

$$\Rightarrow 3 = (x-1)(x-3) \text{ i.e. } x^2 - 4x = 0$$

$$\therefore x = 0, x = 4 \quad 1$$

$$17. \text{ Volume of water in conical vessel} = \frac{1}{3} \times \frac{22}{7} \times 25 \times 24 \text{ cm}^2 \quad 1$$

$$\therefore \frac{1}{3} \times \frac{22}{7} \times 25 \times 24 = \frac{22}{7} \times 10 \times 10 \times h \quad 1 \frac{1}{2}$$

$$\Rightarrow h = 2 \text{ cm} \quad \frac{1}{2}$$

$$18. \text{ Volume of sphere} = \frac{4}{3} \pi (6)^3 \text{ cm}^3 \quad 1$$

30/1

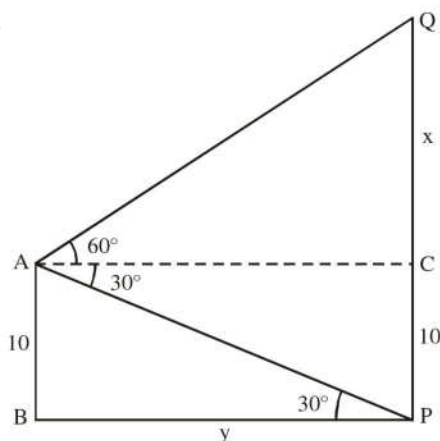
$$\therefore \pi r^2 \frac{32}{9} = \frac{4}{3} \pi (6)^3$$

 $1\frac{1}{2}$

$$\Rightarrow r = 9 \text{ cm.}$$

 $\frac{1}{2}$

19.



Correct Figure

 $\frac{1}{2}$

$$\text{In } \triangle ABP, \frac{y}{10} = \cot 30^\circ = \sqrt{3}$$

$$\therefore y = 10\sqrt{3} \text{ m}$$

1

$$\text{In } \triangle ACQ, \frac{x}{y} = \tan 60^\circ = \sqrt{3}$$

$$x = \sqrt{3} (10\sqrt{3}) = 30 \text{ m}$$

1

$$\therefore \text{Height of hill} = 30 + 10 = 40 \text{ m}$$

 $\frac{1}{2}$

20. Set of possible outcomes is

{HHH, HHT, HTH, THH, HTT, THT, TTH, TTT}

$$(i) \quad P(\text{exactly 2 heads}) = 3/8$$

1

$$(ii) \quad P(\text{at least 2 heads}) = 4/8 \text{ or } 1/2$$

1

$$(iii) \quad P(\text{at least 2 tails}) = 4/8 \text{ or } 1/2$$

1

SECTION D

$$21. \text{ Slant height of conical part} = \sqrt{(2.8)^2 + (2.1)^2} = 3.5 \text{ m}$$

 $\frac{1}{2}$

$$\begin{aligned} \text{Area of canvas/tent} &= 2 \times \frac{22}{7} \times 2.8 \times 3.5 + \frac{22}{7} \times 2.8 \times 3.5 \text{ m}^2 \\ &= 92.4 \text{ m}^2 \end{aligned}$$

1

$$\text{Cost of 1500 tents} = 1500 \times 92.4 \times 120 = ₹ 16632000$$

1

$$\text{Share of each school} = \frac{1}{50} \times 1663200$$

$$= ₹ 332640 \text{ /-}$$

 $\frac{1}{2}$

“Helping the needy”

1

(4)

30/1

30/1

22. Correct Given, To prove, Construction and Figure

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

Correct proof

2

23. Correct construction

4

24. AC is tangent to circle with centre O,

Thus $\angle ACO = 90^\circ$

1

 $\therefore \Delta AO'D \sim \Delta AOC$

1

$$\Rightarrow \frac{AO'}{AO} = \frac{DO'}{CO}$$

1

$$\therefore \frac{DO'}{CO} = \frac{r}{3r} = \frac{1}{3}$$

1

25. $(x + 4)(x + 2 + 2x + 2) = 4(x + 1)(x + 2)$

1

$$(x + 4)(3x + 4) = 4(x^2 + 3x + 2)$$

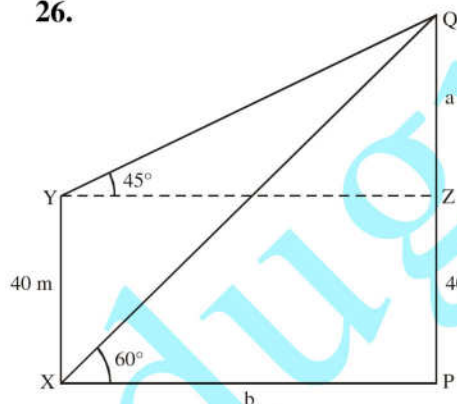
$$\Rightarrow x^2 - 4x - 8 = 0$$

$$1 \frac{1}{2}$$

$$\Rightarrow x = \frac{4 \pm \sqrt{16 + 32}}{2} = 2 \pm 2\sqrt{3}$$

$$1 \frac{1}{2}$$

26.



Correct Figure

1

$$\text{In } \Delta YZQ, \frac{a}{YZ} = \tan 45^\circ = 1$$

$$\Rightarrow YZ = a \text{ i.e. } a = b$$

1

$$\text{In } \Delta QPX, \frac{a + 40}{b} = \frac{a + 40}{a} = \tan 60^\circ = \sqrt{3}$$

$$\therefore (\sqrt{3} - 1)a = 40 \text{ or } a = \frac{40}{\sqrt{3} - 1} = 20(\sqrt{3} + 1)$$

$$= 20(2.73) = 54.60 \text{ m}$$

1

$$\therefore PX = 54.6 \text{ m}$$

$$PQ = 54.6 + 40 = 94.6 \text{ m}$$

1

30/1

27. Sum of numbers preceeding X

$$= \frac{(X-1)X}{2} \quad 1\frac{1}{2}$$

$$\text{Sum of numbers following X} = \frac{(49)(50)}{2} - \frac{(X-1)}{2} - X$$

$$= \frac{2450 - X^2 - X}{2} \quad 1\frac{1}{2}$$

$$\therefore \frac{(X-1)X}{2} = \frac{2450 - X^2 - X}{2}$$

$$\Rightarrow 2X^2 = 2450$$

$$X^2 = 1225$$

$$X = 35$$

1

[Since there is a typographic error in the question, which makes it unsolvable, hence 4 marks be given to each student]

$$28. \text{ Coords of D are: } \left(\frac{1(1) + 2(4)}{3}, \frac{1(5) + 2(6)}{3} \right) \text{ i.e. } \left(3, \frac{17}{3} \right) \quad \frac{1}{2}$$

$$\text{Coords of E are: } \left(\frac{1(7) + 2(4)}{3}, \frac{1(2) + 2(6)}{3} \right) \text{ i.e. } \left(5, \frac{14}{3} \right) \quad \frac{1}{2}$$

$$\text{ar. } \triangle ADE = \frac{1}{2} \left[4(1) + 3 \left(\frac{14}{3} - 6 \right) + 5 \left(6 - \frac{17}{3} \right) \right] = \frac{5}{6} \quad 1$$

$$\text{ar. } \triangle ABC = \frac{1}{2} [4(3) + 1(-4) + 7(1)] = \frac{15}{2} \quad 1$$

$$\text{ar. } \triangle ADE : \text{ar. } \triangle ABC = \frac{5}{6} : \frac{15}{2} \text{ or } 1:9 \quad 1$$

29. x can be any one of 1, 2, 3 or 4.

y can be any one of 1, 4, 9 or 16

$$\text{Total number of cases of } xy = 16 \quad 1\frac{1}{2}$$

$$\text{Number of cases, where product is less than 16} = 8 \quad 1\frac{1}{2}$$

(6)

30/1

30/1

$$\{1, 4, 9, 2, 8, 3, 12, 4\}$$

$$\therefore \text{ Required Probability} = \frac{8}{16} \text{ or } \frac{1}{2} \quad 1$$

$$30. \text{ Length of arc } \widehat{AP} = 2\pi r \frac{\theta}{360} \text{ or } \frac{\pi r \theta}{180} \quad \dots(i) \quad 1$$

$$\frac{AB}{r} = \tan \theta \Rightarrow AB = r \tan \theta \quad \dots(ii) \quad \frac{1}{2}$$

$$\frac{OB}{r} = \sec \theta \Rightarrow OB = r \sec \theta \quad \frac{1}{2}$$

$$PB = OB - r = r \sec \theta - r \quad \dots(iii) \quad 1$$

$$\text{Perimeter} = AB + PB + \widehat{AP}$$

$$= r \tan \theta + r \sec \theta - r + \frac{\pi r \theta}{180} \quad 1$$

$$\text{or } r \left[\tan \theta + \sec \theta - 1 + \frac{\pi \theta}{180} \right]$$

$$31. \text{ let } x \text{ km/h be the speed of the stream}$$

$$\therefore \frac{32}{24-x} - \frac{32}{24+x} = 1 \quad 2$$

$$\Rightarrow 32(2x) = (24-x)(24+x)$$

$$x^2 + 64x - 576 = 0 \quad 1$$

$$(x+72)(x-8) = 0 \Rightarrow x = 8$$

$$\therefore \text{ Speed of stream} = 8 \text{ km/h.} \quad 1$$