

23	Given/TPT Correct proof/similar criteria	$\frac{1}{2}$ $1\frac{1}{2}$
24	Given/TPT/Construction Correct proof	1 1
25	Correct Formula /Identification of sector angle and radius. Simplification and correct Area of the shaded portion that horse can graze = 616m^2 OR Correct Formula /Identification of sector angle and radius. Simplification and correct Area= 51.31cm^2	1 1 1 1
SECTION C		
26	Let us assume, to the contrary, that $\sqrt{5}$ is rational. So, we can find integers a and b such that $\sqrt{5} = \frac{a}{b}$ where a and b are coprime. So, $b\sqrt{5} = a$. Squaring both sides, we get $5b^2 = a^2$. Therefore, 5 divides a^2 and so 5 divides a. So, we can write $a = 5c$ for some integer c. Substituting for a, we get $5b^2 = 25c^2$, that is, $b^2 = 5c^2$. This means that 5 divides b^2 , and so 5 divides b. Therefore, a and b have at least 5 as a common factor. But this contradicts the fact that a and b have no common factors other than 1. This contradiction has arisen because of our incorrect assumption that $\sqrt{5}$ is rational. So, we conclude that $\sqrt{5}$ is irrational.	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
27	For correct graph and point of intersection (1,0),(2,2) (3,0) the solution is $x=2, y=2$ Area=2 sq. units	2 $\frac{1}{2}$ $\frac{1}{2}$
28	Finding s =21 using area. $S = \frac{(x+6)+(x+8)+(6+8)}{2}$ $21 = \frac{(2x+28)}{2}$ $x=7$ $AB=7+6=13\text{cm}$ $AC=7+8=15\text{cm}$ OR Tangents drawn to a circle from an external point are equal. So, $AP = AS, PB = BQ, CR = CQ, DR = DS$ On adding the above equations, $(AP+PB) + (CR+RD) = (AS+BQ) + (CQ+DS)$ $\Rightarrow AB+CD = AD+BC$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $1\frac{1}{2}$ 1 $\frac{1}{2}$
29	$p(x) = 2x^2 - x - 6$ $= 2x^2 - 4x + 3x - 6$ $= 2x(x-2) + 3(x-2)$ $= (x-2)(2x+3)$ Zeroes are: $x-2=0$ or $2x+3=0$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

	$x = 2$ or $x = -32$ Correct Verification: $a = 2, b = -1, c = -6$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
30	For correct expansion with proper use of algebraic identity For correct use of trigonometric identities Correct Result OR L.H.S. = $x^2 - y^2$ $= (p \sec \theta + q \tan \theta)^2 - (p \tan \theta + q \sec \theta)^2$ $= p^2 \sec^2 \theta + q^2 \tan^2 \theta + 2pq \sec^2 \theta \tan^2 \theta - (p^2 \tan^2 \theta + q^2 \sec^2 \theta + 2pq \sec \theta \tan \theta)$ $= p^2 \sec^2 \theta + 2 \tan^2 \theta + 2pq \sec \theta \tan \theta - p^2 \tan^2 \theta - q^2 \sec^2 \theta - 2pq \sec \theta \tan \theta$ $= p^2(\sec^2 \theta - \tan^2 \theta) - q^2(\sec^2 \theta - \tan^2 \theta) =$ $= p^2 - q^2 \dots [\sec^2 \theta - \tan^2 \theta = 1]$ $= \text{R.H.S.}$	1 1 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
31	$\therefore$ Maximum frequency = 12 $\therefore$ Modal class = 40 – 60 Now, $l = 40, f_0 = 10, f_1 = 12, f_2 = 6, h = 20$ $\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h = 40 + \frac{12 - 10}{2 \times 12 - 10 - 6} \times 20 = 40 + \frac{2}{8} \times 20 = 45$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$
SECTION D		
32	Correct given, figure and construction Correct Proof For the correct proof of second part	2 1 2
33	Let the present age of the son be x years. Then, the present age of the man is $(2x^2)$ years. Age of the son 8 years hence $= (x+8)$ years. Age of the man 8 years hence $(2x^2+8)$ years. $\therefore (2x^2+8)=3(x+8)+4$ $2x^2-3x-20=0 \Rightarrow 2x^2-8x+5x-20=0$ $2x(x-4)+5(x-4)=0 \Rightarrow (x-4)=0 \Rightarrow (x-4)(2x+5)=0$ $x-4=0$ or $2x+5=0$ $x=4$ or $x=-52$ $x=4$ [$\because$ age cannot be negative]. $\therefore$ son's present age = 4 years, and man's present age $= (2 \times 4^2)$ years = 32 years.	1 1 1 1 1
34	Height (h) of the cone = 8 cm radius (r) of the cone = 5 cm $\therefore$ Volume of water flows out = $\frac{1}{4} \times$ volume of cone $= \frac{1}{4} \times \frac{1}{3} \times \pi r^2 h = \frac{1}{12} \times 25 \times 8$ $\therefore$ Volume of water flows out = $100 \times$ volume of spherical ball $\frac{1}{12} \times 25 \times 8 = 100 \times \frac{4}{3} \times \pi R^3$ $\Rightarrow \pi R^3 = \frac{1}{8} \Rightarrow R = \frac{1}{2} \text{cm} = 0.5 \text{cm}$ OR	$\frac{1}{2}$ 1 1 1 1 $\frac{1}{2}$

	Radius of the cylindrical tent (r) = 14 m Total height of the tent = 13.5 m Height of the cylinder = 3 m Height of the Conical part = 10.5 m Slant height of the cone (l) = $\sqrt{(110.25 + 196)} = \sqrt{306.25} = 17.5$ m Curved surface area of cylindrical portion = $2\pi rh = 264 \text{ m}^2$ Curved surface area of conical portion = $\pi rl = 770 \text{ m}^2$ Total curved surface area = $264 \text{ m}^2 + 770 \text{ m}^2 = 1034 \text{ m}^2$ Provision for stitching and wastage = 26 m^2 Area of canvas to be purchased = 1060 m^2 Cost of canvas = Rate $\times$ Surface area = $500 \times 1060 = ₹ 5,30,000/-$	$\frac{1}{2}$ 1 1 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$																																																					
35	<table><tr><th>Class interval</th><th>f_i</th><th>Class mark x_i</th><th>$f_i x_i$</th></tr><tr><td>20 – 60</td><td>7</td><td>40</td><td>280</td></tr><tr><td>60 – 100</td><td>5</td><td>80</td><td>400</td></tr><tr><td>100 – 140</td><td>16</td><td>120</td><td>1920</td></tr><tr><td>140 – 180</td><td>12</td><td>160</td><td>1920</td></tr><tr><td>180 – 220</td><td>2</td><td>200</td><td>400</td></tr><tr><td>220 – 260</td><td>3</td><td>240</td><td>720</td></tr><tr><td>Total</td><td>$\sum f_i = 45$</td><td></td><td>$\sum f_i x_i = 5640$</td></tr></table> $\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{5640}{45} = 125.33$ <table><tr><th></th><th></th><th>Cumulative Frequency</th></tr><tr><td>20 – 60</td><td>7</td><td>7</td></tr><tr><td>60 – 100</td><td>5</td><td>12</td></tr><tr><td>100 – 140</td><td>16</td><td>28</td></tr><tr><td>140 – 180</td><td>12</td><td>40</td></tr><tr><td>180 – 220</td><td>2</td><td>42</td></tr><tr><td>220 – 260</td><td>3</td><td>45</td></tr></table> $n = 45$ $\Rightarrow \frac{n}{2} = \frac{45}{2} = 22.5$ Median class = 100 – 140 Median = $l + \frac{\left(\frac{n}{2} - cf\right)}{f} \times h$ $l = 100, \frac{n}{2} = 22.5, cf = 12, f = 16, h = 40$ Median = $100 + \frac{22.5 - 12}{16} \times 40$ $= 100 + 26.25$ $= 126.25$ OR	Class interval	f_i	Class mark x_i	$f_i x_i$	20 – 60	7	40	280	60 – 100	5	80	400	100 – 140	16	120	1920	140 – 180	12	160	1920	180 – 220	2	200	400	220 – 260	3	240	720	Total	$\sum f_i = 45$		$\sum f_i x_i = 5640$			Cumulative Frequency	20 – 60	7	7	60 – 100	5	12	100 – 140	16	28	140 – 180	12	40	180 – 220	2	42	220 – 260	3	45	$\frac{1}{2}$ $\frac{1}{2}$ 1 1 1
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	SECTION E																												
36	(i) $PR = \sqrt{(8 - 2)^2 + (3 - 5)^2} = 2\sqrt{10}$ (ii) Co-ordinates of Q (4,4). The mid-point of PR is (5,4) $\therefore$ Q is not the mid-point of PR (iii) (A) Let the point be (x,0) So, $\sqrt{(2 - x)^2 + 25} = \sqrt{(4 - x)^2 + 16}$ Hence $x = \frac{3}{4}$. Therefore the point is $(\frac{3}{4}, 0)$. OR (B) The coordinates of S will be $\left(\frac{2 \times 4 + 3 \times 2}{2 + 3}, \frac{2 \times 4 + 3 \times 5}{2 + 3} \right)$ $= \left(\frac{14}{5}, \frac{23}{5} \right)$	1 $\frac{1}{2} \frac{1}{2}$ 1 1 1 1																											

37	(i) $\sin 60^\circ = PC/PA$ $\Rightarrow \sqrt{3}/2 = 18/PA$ $\Rightarrow PA = 12\sqrt{3} \text{ m}$ (ii) $\sin 30^\circ = PC/PB$ $\Rightarrow 1/2 = 18/PB$ $\Rightarrow PB = 36 \text{ m}$ (iii) $\tan 60^\circ = PC/AC$ $\Rightarrow \sqrt{3} = 18/AC$ $\Rightarrow AC = 6\sqrt{3} \text{ m}$ $\tan 30^\circ = PC/CB$ $\Rightarrow 1/\sqrt{3} = 18/CB$ $\Rightarrow CB = 18\sqrt{3} \text{ m}$ Width $AB = AC + CB = 6\sqrt{3} + 18\sqrt{3} = 24\sqrt{3} \text{ m}$ OR $RB = PC = 18 \text{ m}$ & $PR = CB = 18\sqrt{3} \text{ m}$ $\tan 30^\circ = QR/PR$ $\Rightarrow 1/\sqrt{3} = QR/18\sqrt{3}$ $\Rightarrow QR = 18 \text{ m}$ $QB = QR + RB = 18 + 18 = 36 \text{ m}$. Hence height BQ is 36m	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$
38	(i) Savings of Ananya are Rs. 24, Rs. 30, Rs. 36, ... Since it is uniformly increasing by Rs. 6, therefore it forms an AP. Here, $a = 24$, $d = 30 - 24 = 6$ (ii) $a_{15} = a + 14d = 24 + 14 \times 6 = 24 + 84 = \text{Rs. } 108$ (iii) $a_n = 66$ $\Rightarrow a + (n - 1)d = 66$ $\Rightarrow 24 + (n - 1)6 = 66$ $\Rightarrow n - 1 = 42/6 = 7$ $\Rightarrow n = 8$ OR $a_n = 8 - 5n$ $a_1 = 8 - 5 = 3$ $a_2 = 8 - 10 = -2$ $\Rightarrow d = a_2 - a_1 = -2 - 3 = -5$	1 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
