$Kendriya Vidyalaya Sangathan, Bhopal\ Region$

Pre Board Exam – 1 (2025 - 26)

Mathematics - Class X (SET 2)

Time: 3 hours

Maximum Marks: 80

MARKING SCHEME

Q.No.	Section A	Marks
1	(d) 7	1
2	(a) 4	1
3	(b) 12/11	1
4	(d) 2	1
5	(a) 84	1
6	(a) 10m	1
7	(a) 4/11	1
8	c) $x^2 + 2x + 5$	1
9	c) – 2	1
10	(b) $3, -3$	1
11	(b) (2,5)	1
12	(c) $\sqrt{119}$ cm	1
13	(d) 3	1
14	(c) 12·5 cm	1
15	(b) 12°	1
16	b) 24	1
17	(b) 4 cm	1
18	(d) Y	1
19	(d) Assertion (A) is false but reason (R) is true.	1
20	(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of	1
	assertion (A)	
	Section B	
21 (A)	$\triangle ABC \sim \triangle PQR = > \frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR} = \frac{8}{6} = \frac{4}{3}$	1/2
	$PQ = \frac{3}{4} \times AB = \frac{3}{4} \times 6 = \frac{9}{2} = 4.5$	1/2
	$QR = \frac{3}{4} \times BC = \frac{3}{4} \times 4 = 3$	1/2
	PQ + QR = 7.5 (or 15/2)	1/2
21 (B)	OA OB OC OD > OA OD	1/2
	OA . OB = OC . OD => $\frac{oA}{oc} = \frac{oD}{oB}$	1/2
	And $\angle AOD = \angle COB$ (vertically opposite angles)	1/2
	By SAS similarity criterion, $\triangle AOD \sim \triangle COB$	1/2
	Corresponding angles of similar triangles are equal,	
22	$\angle A = \angle C$ and $\angle B = \angle D$	1/
22	Let the two numbers be 4x and 5x. $HCF = 11 \implies x = 11$	1/2
	Numbers are $4x = 44$, $5x = 55$ LCM = $44 \times 55 / 11 = 220$	1/ ₂ 1
23		1/2
23	$4k = (\sqrt{3})^2 - 2(2)^2 - 2\left(\frac{1}{\sqrt{3}}\right)^2$	1/2
	$= 3 - (2 \times 4) - 2/3 = 3 - 8 - 2/3$	/2
	=-5-2/3	
	$=\frac{-15-2}{3}=\frac{-17}{3}$	1/2
	3 3	1/2
	, -17 -17	
	$k = \frac{-17}{3 \times 4} = \frac{-17}{12}$	

24 (A)	the area of grass field that can be grazed by them = $\frac{A}{360} \times \pi r^2 + \frac{B}{360} \times \pi r^2 + \frac{C}{360} \times \pi r^2$	
	$= \frac{(A+B+C)}{360} \times \pi r^2$	1/2
	360 1802	1/2
	$=\frac{180}{360} \times \pi r^2$, 2
	$=\frac{1}{2}\times\pi r^2$	1/2
	$=\frac{1}{2}\times\frac{22}{7}\times14\times14$	
	= 22 X 14	1/2
24	= 308 sq. m angle at the centre, $\theta = 60^{\circ}$,	
(B)	Area of minor sector = $\frac{\theta}{360} \times \pi r^2 = \frac{60}{360} \times \pi r^2$	1/2
	$= \frac{1}{6} \times \pi r^2 = \frac{1}{6} \times 3.14 \times 10^2$ $= 314/6 = 52.33 \text{ cm}^2$	1/4
	triangle formed is an equilateral triangle	1/2
	Area of corresponding triangle = $\frac{\sqrt{3}}{4}$ r ² = $\frac{1.73}{4}$ x 100 = 173/4 = 43.25cm ²	
	Area of minor segment = $52.33 - 43.25 = 9.08 \text{ cm}^2$	1/2
25	TP and TQ are two tangents => in Δ TPQ, TP = TQ	1/2
25	=> \angle TPQ = \angle TQP (Angles opposite to equal sides of triangle)	1/2
	= 65° by angle sum of triangle	1/2
	$\angle TPO = 90^{\circ},$	1/
	$\angle OPQ = 90 - 65 = 25^{\circ}$	1/2
	Section C	
26	Let assume that $\sqrt{3}$ is not an irrational number	
	$\Rightarrow \sqrt{3}$ is rational number $\Rightarrow \sqrt{3} = \frac{a}{b}$	
	b	1/2
	where a and b are non - zero integers such that a and b are co-primes, i.e $HCF(a, b) = 1$	
	\Rightarrow a = $\sqrt{3}$ b	
	On squaring both sides, we get $a^2 = 3b^2 (1)$	
	⇒ a² is divisible by 3 ⇒ a is divisible by 3 (2)	1/2
	\Rightarrow a is divisible by $3 (2)$	1/2
	Let assume that a = 3m {where m is natural number}	
	On squaring both sides, we get	
	$a^2 = 9m^2$ $3b^2 = 9m^2$ [:: using (1)]	
	$b^2 = 3m^2$ $b^2 = b^2 = divisible by 2$	
	\implies b ² is divisible by 3	1/2
	\implies b is divisible by $3 (3)$	/ 4 .
	Thus, from equation (2) and (3), we concluded that both a and b are divisible by 3, which	1/2
	is contradiction to the fact that HCF(a, b) is 1.	
	Hence, our assumption is wrong.	1/2
27(A)	$\Rightarrow \sqrt{3}$ is an irrational number Parallelogram ABCD circumscribes a circle as shown in figure.	
21(A)	Tangents drawn to a circle from an external point are equal.	1/2
	<u> </u>	

	So, $AP = AS$, $PB = BQ$, $CR = CQ$, $DR = DS$ On adding the above equations, (AP+PB)+(CR+RD) = (AS+BQ)+(CQ+DS)	1/2
	$\Rightarrow AB+CD = AD+BC$ $\Rightarrow 2AB=2BC \text{ (Opposite sides of parallelogram are}$	1
	equal)	1/2
	Thus, AB = BC	1.0
	Since, in Parallelogram ABCD a pair of adjacent sides are equal.	1/2
	Hence, ABCD is a rhombus.	
27(B)	Proof: OA = OC [radius]	1/2
	In ΔOAC , angles opposite to equal sides are equal.	1/2
	$\angle OAC = \angle OCA \dots (i)$	72
	∠OCD = 90° [tangent is radius are perpendicular at point of contact]	
	$\angle ACD + \angle OCA = 90^{\circ}$	1
	∠ACD + ∠OAC = 90° [∵ ∠OAC = ∠BAC]	
	$\angle ACD + \angle BAC = 90^{\circ} \longrightarrow Hence proved$	1
28(A)	$\frac{\tan A}{\cos A} - \frac{\tan A}{\cos A} = 2 \csc A$	
	$1 + \sec A \frac{1}{\tan A} - \sec A$	
	$LHS = \frac{tanA}{1 + secA} - \frac{tanA}{1 - secA}$ $SinA SinA$	1/2
	$= \frac{\frac{5tA}{\cos A}}{1} = \frac{\frac{5tA}{\cos A}}{1}$	
	1+ _{cosA} 1- _{cosA} SinA SinA	1/2
	$=\frac{-cosA+1}{cosA-1}$ $SinA SinA SinA-SinAcosA+SinA+SinAcosA$	1
	$=\frac{1+cosA}{1+cosA}+\frac{1-cosA}{1-cos^2A}$	
	$=\frac{2SinA}{Sin^2A}=\frac{2}{SinA}=RHS$	1
28	$sin\theta + cos\theta = \sqrt{3}$ gives $(sin\theta + cos\theta)^2 = 3$.	1/2
(B)	Hence $1+2\sin\theta\cos\theta=3$	1/2
	So $2\sin\theta\cos\theta=2$	1
	$\Rightarrow \sin\theta\cos\theta = 1$ $\Box \tan\theta + \cot\theta = \frac{\sin\theta}{\cot\theta} + \frac{\cos\theta}{\cot\theta}$	1
	$\Box \tan\theta + \cot\theta = \frac{\sin\theta}{\cos\Theta} + \frac{\cos\Theta}{\sin\Theta}$	
	sin ² A+ cas ² A	1
	$= \frac{\sin^2\Theta + \cos^2\Theta}{\sin\Theta \cdot \cos\Theta} = 1/1 = 1$	
20		1
29	x 0 6 x 0 3	1
	$y = \frac{6-x}{2}$ 2 0 $y = \frac{2x-12}{2}$ -4 -2	
	3 3	

	Y A (0, 2) 1- X -1 0 1 2 -1- -2- Q(3, -2 -3-	3) = 6 B (6, 0)	X			1
	P (0, -4)					
	Area of triangle = $\frac{1}{2}$ x	5 v 6 – 36/2 – 18	l ea unite			
30	P(Vidhi drives the car)	2		UUT TUU UUU		1
		0				_
	P(Unnati drives the car	$=\frac{1}{8}$ as favourab	le outcomes ar	е ГНТ, ГНН, НТН,	ГТН	1
	As $\frac{4}{8} > \frac{3}{8}$					
	=>Unnati has gre	eater probability t	o drive the car			1
31	$p(x) = 3x^2 - 2x - 1$					
	$=3x^2-3x+x-1$					
	= (3x + 1) (x - 1) Zeroes are -1/3 and 1					1
	Sum = $-1/3 + 1 = -1 + 3$	3 / 3 = 2/3				
	-b/a = 2/3					1
	Product = $-1/3 \times 1 = -1$	/3				
	c/a = -1/3		Section D			1
32	Given, to prove, figur		bection D			1
	Correct proof					2
	$\frac{AO}{BO} = \frac{CO}{DO}$ and $\angle AOB = \frac{1}{2}$	∠COD (vertically	opposite angle	es)		1/2
	By SAS similarity crite	rion, ΔAOB ~Δ0	COD			1/2
	Corresponding angles	of similar triangle	s are equal,			1/2
	$\angle OAB = \angle OCD$ they are alternate interi	or angles and equ	a 1			
	they are alternate interior angles and equal. Hence AB is parallel to DC			1/2		
	And ABCD is a trapez	um. Proved.				
33(A)	For Median,					
33(A)		LASS FR	EQUENCY	CF		
		0 -10	8	8		
		0 – 20	7	15		
		0 - 30	15	30 = cf		
		$\frac{0-40}{0-50}$	$\frac{20 = f}{12}$	50 62		
		0-60	8	70		
		0 - 70	10	80		1
	N = 80 $N/2 = 40$ Madian alog	n – (20 40) 1	20 of = 20 4	? - 2 0 h - 10		1/2
	N/2 = 40, Median class		30 , c1 = 30, 1	$\mathbf{I} = 20, \mathbf{\Pi} = 10$		
	$\mathbf{Median} = 1 + \frac{(\frac{N}{2} - cf)}{f}$	× h				1/2
	,					

$ \begin{array}{c} = 30 + \frac{(40-30)}{20} \times 100 \\ = 30 + 10/20 \\ = 30 + 10/20 \\ = 30 + 0.5 = 30.5 \end{array} $ $ \begin{array}{c} 11 \\ 12 \\ 30 + 0.5 = 30.5 \\ \end{array} $ $ \begin{array}{c} 13 + \frac{(40-30)}{2} \times 100 \\ = 30 + 0.5 = 30.5 \\ \end{array} $ $ \begin{array}{c} 13 + \frac{(20-15)}{2} \times 100 \\ = 30 + \frac{(20-15)}{2} \times 10 \\ = \frac{(20-15)}{2} \times 1$		(40 - 30)	
$ \begin{array}{c} = 30 + 10/20 \\ = 30 + 0.5 = 30.5 \\ \\ \text{Highest frequency } f_1 = 20 \\ & & & \text{Modal class} = (30 - 40), 1 = 30, \\ & & & f_1 = 15, f_2 = 12, h = 10 \\ \\ \text{Mode} = 1 + \frac{(J_1 - f_0)}{2f_1 - f_0 - f_2} \times h \\ \\ = \frac{30 + \frac{(20 - 15)}{2f_1 - f_0 - f_2} \times h}{2f_2 - f_0 - f_2} \times 10 \\ \\ = \frac{30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85}{2f_2 - 20 + x + y = 30} \\ & & & & & & & & & & & & & & & & & & $		$=30+\frac{(40-30)}{20}\times10$	
$ \begin{array}{c} = 30 + 0.5 = 30.5 \\ \\ \text{Highest frequency } f_1 = 20 \\ \Rightarrow \text{ Modal class} = (30 - 40) \ , 1 = 30, \\ f_0 = 15, f_2 = 12, h = 10 \\ \\ \text{Mode} = 1 + \frac{O_1 - f_0}{2J_1 - f_0 - f_2} \times h \\ \\ = 30 + \frac{(28 - 15)}{2 \times 20 - 15 - 12} \times 10 \\ \\ = 30 + \frac{(28 - 15)}{2 \times 20 - 15 - 12} \times 10 \\ \\ \text{Y_2} \\ \\ \hline \\ 33(B) \begin{array}{c} \sum_{j=1}^{2} 20 + x + y = 30 \\ \text{X} + y = 10 \\ \text{Mean} = \frac{\sum_{j=1}^{2} 2J_1 + y + 20}{2J_2 + 10x + 22y} \\ \text{Mean} = \frac{\sum_{j=1}^{2} 2J_1 + y + 20}{2J_2 + 10x + 22y} \\ \text{Mean} = \frac{\sum_{j=1}^{2} 2J_2 + y + y + 30}{2J_2 + y + 10x + 22y} \\ \text{Mean} = \frac{\sum_{j=1}^{2} 2J_1 + y + 20}{2J_2 + y + 20} \\ \text{Mean} = \frac{\sum_{j=1}^{2} 2J_2 + y + y + 20}{2J_2 + y + 20} \\ \text{Mean} = \frac{\sum_{j=1}^{2} 2J_2 + y + y + 20}{2J_2 + y + 20} \\ \text{Mode} = \frac{J_2}{J_2} \\ Mode$			
Highest frequency $f_1 = 20$ ⇒ Modal class = $(30 - 40)$, $1 = 30$, $f_0 = 15$, $f_2 = 12$, $h = 10$ Mode $= 1 + \frac{(f_1 - f_0)}{2f_1 - f_0 - f_2} \times h$ $= 30 + \frac{(20 - 15)}{2f_2 - f_0 - f_2} \times 10$ $= 30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85$ 33(B)			1
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$ \begin{array}{c} \Rightarrow \text{ Modal class} = (30-40), 1=30, \\ f_0=15, f_2=12, h=10 \\ \hline \text{ Mode} = 1 + \frac{(f_1-f_0)}{2f_1-f_0-f_2} \times h \\ \hline = 30 + \frac{(20-15)}{2\sqrt{2}-0-15-12} \times 10 \\ \hline = 30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85 \\ \hline 33(B) \\ \sum F = 20 + x + y = 30 \\ X + y = 10 \\ \hline \text{ Finding class marks} \\ \hline \text{ Finding class marks} \\ \hline \text{ Finding s Af} \\ \sum \text{ Kr} = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y \\ \hline \text{ Mean} = \frac{y_0}{2} \\ \hline \text{ 12} \times 30 = 224 + 10x + 22y / 30 \\ 12 \times 30 = 224 + 10x + 22y \\ 360 = 224 = 10x + 22y \\ 360 = 224 = 10x + 22y \\ 360 = 5x + 11y \\ \hline \text{ Color of the work of the two given squares be x and y,} \\ \hline \text{ According to the question, } x^2 + y^2 = 2650 \\ \hline \text{ Gives } x + y = 70 \\ \hline \text{ Or } y = 70 - x \\ \hline \text{ Put if in eq. 1, we get } x^2 + (70 - x)^2 = 2650 \\ \hline \text{ Simplifying we get, } 2x^2 - 140x + 2250 = 0 \\ \hline \text{ $x^2 - 70x + 1125 = 0$} \\ \hline \text{ $x - 45$ or 25} \\ \hline \text{ Then } y = 25 \text{ or } 45. \\ \hline \text{ Hence, sides of the two given squares are 45 cm and 25 cm.} \\ \hline 34(B) \\ \hline \text{ $2x^2 + kx + 3 = 0$ has real and equal roots } \\ \hline \text{ $k^2 = 24$} \\ \hline \text{ $k = \sqrt{24} = + 2\sqrt{6}$} \\ \hline \text{ the equation is } 2x^2 + 2\sqrt{6}x + 3 = 0 \\ \hline \text{ $x = \frac{-b}{2} - \frac{2\sqrt{6}}{2x^2} - \frac{\sqrt{6}}{2}} \\ \hline \text{ for } k = 2\sqrt{6} \\ \hline \text{ the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline \text{ $x = \frac{-b}{2} - \frac{2\sqrt{6}}{2x^2} - \frac{\sqrt{6}}{2}} \\ \hline \text{ for } k = 2\sqrt{6} \\ \hline \text{ the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline \text{ $x = \frac{-b}{2} - \frac{2\sqrt{6}}{2x^2} - \frac{\sqrt{6}}{2}} \\ \hline \text{ 10} \\ \hline \text{ 35} \\ \hline \text{ Cone and hemisphere have the same radii } \Rightarrow_{r,=r_0=r}$			
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$\begin{array}{c} f_0=15,f_2=12,h=10\\ \text{Mode}=1+\frac{(f_1-f_0)}{\delta I_1-f_0-f_2}\times h & y_2'\\ =30+\frac{(20-15)}{5I_2-16-12}\times 10 & y_2'\\ =30+50/13=30+3.846=33.846\approx 33.85 & y_2'\\ \hline & =30+50/13=30+3.846=33.846\approx 33.85 & y_2'\\ \hline & =30+50/13=30+3.846=33.846\approx 33.85 & y_2'\\ \hline & =30+50/13=30& (1) & 1\\ \hline & Finding class marks & Finding x f & y_2'\\ \hline & & & & & & & & & & & & \\ \hline & & & & $			72
Mode = 1 + $\frac{(J_3 - J_6)}{2J_4 - J_6 - J_6} \times h$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6} \times 10$ = 30 + $\frac{(20 - 15)}{2\sqrt{2}J_6 - J_6} \times 10$ = 31. 33(B) ∑F = 20 + x + y = 30			
$ \begin{array}{c} = 30 + \frac{(20 - 15)}{2(20 - 15 - 12)} \times 10 \\ = 30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85 \\ \hline \\ 33(B) \sum f = 20 + x + y = 30 \\ X + y = 10 \\ \text{Finding class marks} \\ \hline \text{Finding x f} \\ \sum xf = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y \\ \text{Mean } = \frac{\sum f}{y} \\ 12 = (224 + 10x + 22y)/30 \\ 12 \times 30 = 224 + 10x + 22y \\ 360 - 224 + 10x + 22y \\ 366 = 5x + 11y \\ \text{Solving equation (1) and (2), we get, x = 7} \\ \text{and } y = 3 \\ \hline 34(A) \text{Let the sides of the two given squares be x and y,} \\ \text{According to the question, } x^2 + y^2 = 2650 \\ \text{Gives } x + y = 70 \\ \text{Or } y = 70 - x \\ \text{Put it in eq. 1, we get } x^2 - 140x + 225 = 0 \\ \text{Simplifying we get, 2 } x^2 - 140x + 225 = 0 \\ \text{X} = 45 \text{ or } 25 \\ \text{Then } y = 25 \text{ or } 45. \\ \text{Hence, sides of the two given squares are 45 cm and 25 cm.} \\ \hline 34(B) 2x^2 + xx + 3 = 0 \text{ has real and equal roots} \\ y^2 + 3x = 24 \\ x = 24 \\ x = 24 \\ x = 2\sqrt{6} \\ \text{the equation is } 2x^2 + 2\sqrt{6}x + 3 = 0 \\ x = \frac{-2\sqrt{6}}{2x^2} = \frac{-\sqrt{6}}{2} \\ \text{for } k = 2\sqrt{6} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ x = \frac{-2}{2x} = \frac{2\sqrt{6}}{2x^2} = \frac{5}{2} \\ 1 \\ 35 \text{Cone and hemisphere have the same radii } = rc$			
$ \begin{array}{c} = 30 + \frac{(20 - 15)}{2(20 - 15 - 12)} \times 10 \\ = 30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85 \\ \hline \\ 33(B) \sum f = 20 + x + y = 30 \\ X + y = 10 \\ \text{Finding class marks} \\ \hline \text{Finding x f} \\ \sum xf = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y \\ \text{Mean } = \frac{\sum f}{y} \\ 12 = (224 + 10x + 22y)/30 \\ 12 \times 30 = 224 + 10x + 22y \\ 360 - 224 + 10x + 22y \\ 366 = 5x + 11y \\ \text{Solving equation (1) and (2), we get, x = 7} \\ \text{and } y = 3 \\ \hline 34(A) \text{Let the sides of the two given squares be x and y,} \\ \text{According to the question, } x^2 + y^2 = 2650 \\ \text{Gives } x + y = 70 \\ \text{Or } y = 70 - x \\ \text{Put it in eq. 1, we get } x^2 - 140x + 225 = 0 \\ \text{Simplifying we get, 2 } x^2 - 140x + 225 = 0 \\ \text{X} = 45 \text{ or } 25 \\ \text{Then } y = 25 \text{ or } 45. \\ \text{Hence, sides of the two given squares are 45 cm and 25 cm.} \\ \hline 34(B) 2x^2 + xx + 3 = 0 \text{ has real and equal roots} \\ y^2 + 3x = 24 \\ x = 24 \\ x = 24 \\ x = 2\sqrt{6} \\ \text{the equation is } 2x^2 + 2\sqrt{6}x + 3 = 0 \\ x = \frac{-2\sqrt{6}}{2x^2} = \frac{-\sqrt{6}}{2} \\ \text{for } k = 2\sqrt{6} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ x = \frac{-2}{2x} = \frac{2\sqrt{6}}{2x^2} = \frac{5}{2} \\ 1 \\ 35 \text{Cone and hemisphere have the same radii } = rc$		$Mode = 1 + \frac{(f_1 - f_0)}{1 + \frac{1}{2}} \times h$	1/2
$ \begin{array}{c} = 30 + \frac{(x_0 - 1)^2 \times 10}{(x_0 - 1)^2 \times 10^{-1}} \times 10 \\ \\ = 30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85 \\ \hline \\ 33(B) \sum f = 20 + x + y = 30 \\ X + y = 10 \\ \hline \text{Inding class marks} \\ \hline \text{Finding x f} \\ \hline \sum x f = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y \\ \hline \text{Mean} = \frac{\sum x'}{y} \\ 12 = (224 + 10x + 22y)/30 \\ 12 \times 30 = 224 + 10x + 22y \\ 360 - 224 = 10x + 22y \\ 368 - 5x + 11y \\ \hline \text{and } y = 3 \\ \hline \text{34(A)} \text{Let the sides of the two given squares be x and y,} \\ According to the question, x^2 + y^2 = 2650 \\ \hline \text{Gives x + y = 70} \\ \hline \text{Or } y = 70 - x \\ \hline \text{Put it in eq. 1, we get, } x^2 + 70 - x)^2 = 2650 \\ \hline \text{Simplifying we get, } 2 \times x^2 - 140x + 2250 = 0 \\ \hline \text{X} = 45 \text{ or } 25 \\ \hline \text{Then } y = 25 \text{ or } 45. \\ \hline \text{Hence, sides of the two given squares are } 45 \text{ cm and } 25 \text{ cm.} \\ \hline 34(B) b^2 - 4ax = 0 \text{ for real and equal roots} \\ b^2 - 4ax = 0 \text{ for real and equal roots} \\ b^2 - 4ax = 0 \text{ for real and equal roots} \\ b^2 - 4ax = 0 \text{ for real and equal roots} \\ c^2 - 2\sqrt{6} - 4x \ge 2\sqrt{6} \\ \text{the equation is } 2x^2 + 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{-2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{-2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{-2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{11} \\ \hline 35 \text{ Cone and hemisphere have the same radii = >r_c = r_b = r} \\ \hline \end{array}$		$2f_1 - f_0 - f_2$, -
$ \begin{array}{c} = 30 + \frac{(x_0 - 1)^2 \times 10}{(x_0 - 1)^2 \times 10^{-1}} \times 10 \\ \\ = 30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85 \\ \hline \\ 33(B) \sum f = 20 + x + y = 30 \\ X + y = 10 \\ \hline \text{Inding class marks} \\ \hline \text{Finding x f} \\ \hline \sum x f = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y \\ \hline \text{Mean} = \frac{\sum x'}{y} \\ 12 = (224 + 10x + 22y)/30 \\ 12 \times 30 = 224 + 10x + 22y \\ 360 - 224 = 10x + 22y \\ 368 - 5x + 11y \\ \hline \text{and } y = 3 \\ \hline \text{34(A)} \text{Let the sides of the two given squares be x and y,} \\ According to the question, x^2 + y^2 = 2650 \\ \hline \text{Gives x + y = 70} \\ \hline \text{Or } y = 70 - x \\ \hline \text{Put it in eq. 1, we get, } x^2 + 70 - x)^2 = 2650 \\ \hline \text{Simplifying we get, } 2 \times x^2 - 140x + 2250 = 0 \\ \hline \text{X} = 45 \text{ or } 25 \\ \hline \text{Then } y = 25 \text{ or } 45. \\ \hline \text{Hence, sides of the two given squares are } 45 \text{ cm and } 25 \text{ cm.} \\ \hline 34(B) b^2 - 4ax = 0 \text{ for real and equal roots} \\ b^2 - 4ax = 0 \text{ for real and equal roots} \\ b^2 - 4ax = 0 \text{ for real and equal roots} \\ b^2 - 4ax = 0 \text{ for real and equal roots} \\ c^2 - 2\sqrt{6} - 4x \ge 2\sqrt{6} \\ \text{the equation is } 2x^2 + 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{-2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{-2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{-2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{the equation is } 2x^2 - 2\sqrt{6}x + 3 = 0 \\ \hline x = \frac{-b}{2a} - \frac{2\sqrt{6}}{2\sqrt{2}} - \frac{\sqrt{6}}{2} \\ \text{11} \\ \hline 35 \text{ Cone and hemisphere have the same radii = >r_c = r_b = r} \\ \hline \end{array}$			1/
$\begin{array}{c} 30+50/13=30+3.846=33.846\approx 33.85 \\ \hline 33(B) & \sum f=20+x+y=30 \\ X+y=10 & (1) \\ \hline Finding class marks \\ \hline Finding class marks \\ \hline Finding x f \\ \hline \Sigma xf=2+48+10x+84+90+22y=224+10x+22y \\ \hline Mean=\frac{2xf}{yT} & \frac{1}{\sqrt{2}} \\ \hline 12=(224+10x+22y)/30 \\ 12\times 30=224+10x+22y \\ \hline 360-224=10x+22y \\ \hline 136=10x+22y \\ \hline 136=10x+22y \\ \hline 136=0x+22y \\ \hline 14x+2x+2x+2x+2x+2x+2x+2x+2x+2x+2x+2x+2x+2x$		20 (20 - 15)	1/2
$ \begin{array}{c} = 30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85 \\ \hline 33(B) & \sum f = 20 + x + y = 30 \\ X + y = 10 & 1 \\ \hline Finding class marks & Finding x f \\ \sum xf = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y & 1 \\ \hline Mean = \frac{2xf}{y} & \frac{1}{\sqrt{2}} \\ \hline 12 = (224 + 10x + 22y)/30 & 12 \times 30 = 224 + 10x + 22y & 360 - 224 = 10x + 22y \\ \hline 360 - 224 = 10x + 22y & 366 = 5x + 11y & 2 \\ \hline 80x = 5x + 11y & 2 & 1 \\ \hline 80x = 3x + 1y & 2x + 2x$		$= 30 + \frac{10}{2 \times 20 - 15 - 12} \times 10$	
$ \begin{array}{c} = 30 + 50/13 = 30 + 3.846 = 33.846 \approx 33.85 \\ \hline 33(B) & \sum f = 20 + x + y = 30 \\ X + y = 10 & 1 \\ \hline Finding class marks & Finding x f \\ \sum xf = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y & 1 \\ \hline Mean = \frac{2xf}{y} & \frac{1}{\sqrt{2}} \\ \hline 12 = (224 + 10x + 22y)/30 & 12 \times 30 = 224 + 10x + 22y & 360 - 224 = 10x + 22y \\ \hline 360 - 224 = 10x + 22y & 366 = 5x + 11y & 2 \\ \hline 80x = 5x + 11y & 2 & 1 \\ \hline 80x = 3x + 1y & 2x + 2x$			1/2
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		$-30 \pm 50/13 - 30 \pm 3.846 - 33.846 \approx 33.85$, -
$ \begin{array}{ c c c c }\hline X+y=10 & (1) \\ \hline Finding class marks \\ \hline Finding x f \\ \hline \Sigma xf=2+48+10x+84+90+22y=224+10x+22y & 1\\ \hline Mean = \frac{\Sigma xf}{\Sigma} & \frac{1}{2}\\ \hline 12=(224+10x+22y)/30 & 12\times30=224+10x+22y \\ \hline 360-224=10x+22y & 360-224=10x+22y \\ \hline 360-234=10x+22y & 360-234=10x+22y \\ \hline 68=5x+11y & (2) & 1\\ \hline Solving equation (1) and (2), we get, x=7 & 1\\ \hline and y=3 & \frac{1}{1}\\ \hline 34(A) & \text{Let the sides of the two given squares be x and y,} \\ \hline According to the question, x^2+y^2=2650 & (1) & \frac{1}{2}\\ \hline And 4x+4y=280 & \frac{1}{2}\\ \hline Gives x+y=70 & 0ry=70-x \\ \hline Put it in eq. 1, we get x^2+(70-x)^2=2650 & 1 x=45 \text{ or } 25 & 1\\ \hline X=45 \text{ or } 25 & 1\\ \hline Then y=25 \text{ or } 45. \\ \hline Hence, sides of the two given squares are 45 cm and 25 cm. \\ \hline 34(B) & 2x^2+kx+3=0 \text{ has real and equal roots} \\ \hline b^2-4ac=0 \text{ for real and equal roots} \\ b^2-4ac=0 \text{ for real and equal roots} \\ \hline b^2-4x=2\sqrt{6} & 1\\ \hline for k=2\sqrt{6} & 1\\ \hline the equation is 2x^2+2\sqrt{6}x+3=0 & 1/2 x=\frac{b}{2a}=\frac{2\sqrt{6}}{2x^2}=\frac{\sqrt{6}}{2} & 1\\ \hline 1 \text{ for } k=2\sqrt{6} & 1\\ \hline the equation is 2x^2-2\sqrt{6}x+3=0 & 1/2 x=\frac{b}{2a}=\frac{2\sqrt{6}}{2x^2}=\frac{\sqrt{6}}{2} & 1\\ \hline 35 & \text{ Cone and hemisphere have the same radii} =>r_c=r_h=r \\ \hline \end{array}$	22(D)		
Finding class marks Finding x f $\sum xf = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y$ $1 + 48 + 10x + 22y / 30$ $12 \times 30 = 224 + 10x + 22y / 30$ $12 \times 30 = 224 + 10x + 22y$ $136 = 10x + 22y$ $136 = 10x + 22y$ $68 = 5x + 11y $	33(B)		
Finding x f		X + y = 10(1)	1
Finding x f			
$\begin{array}{c} \sum xf = 2 + 48 + 10x + 84 + 90 + 22y = 224 + 10x + 22y \\ Mean = \frac{\sum xf}{yf} \\ 12 = (224 + 10x + 22y)/30 \\ 12 \times 30 = 224 + 10x + 22y \\ 360 - 224 = 10x + 22y \\ 136 = 10x + 22y \\ 68 = 5x + 11y $			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			1 1
Nickaria $\frac{y}{12}$ 12 = (224 + 10x + 22y) / 30 12 × 30 = 224 + 10x + 22y 360 - 224 = 10x + 22y 136 = 10x + 22y 68 = 5x + 11y (2) (2) (2) (3) (2) (3) (2) (3) (2) (3) (4) (2) (2) (3) (4) (2) (2) (3) (4) (2) (2) (3) (4) (2) (3) (4) (2) (3) (4) (2) (4) (, -	
		Mean = $\frac{\Delta^{\text{Al}}}{N}$	1/2
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		Δ^{1}	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		$12 \times 30 = 224 + 10x + 22y$	
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Solving equation (1) and (2), we get, $x = 7$ and $y = 3$ $\frac{1}{1\sqrt{2}}$ 34(A) Let the sides of the two given squares be x and y , According to the question, $x^2 + y^2 = 2650$ [1) $\frac{1}{2\sqrt{2}}$ And $4x + 4y = 280$ $\frac{1}{2\sqrt{2}}$ Gives $x + y = 70$ Or $y = 70 - x$ Put it in eq. 1, we get $x^2 + (70 - x)^2 = 2650$ 1 Simplifying we get, $2x^2 - 140x + 2250 = 0$ $2x^2 - 70x + 1125 = 0$ 1 $2x^2 + 3x + 3x = 0$ has real and equal roots be an analogous of the two given squares are 45 cm and 25 cm. 34(B) $2x^2 + 4x + 3 = 0$ has real and equal roots $2x^2 + 4x + 3 = 0$ has real and equal roots $2x^2 + 4x + 3 = 0$ has real and equal roots $2x^2 + 4x + 3 = 0$ has real and equal roots $2x^2 + 2x + 3 = 0$ $2x^2 + 3x + 3 = 0$ $2x + 3x + 3$			
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34(A) Let the sides of the two given squares be x and y,			1
34(A) Let the sides of the two given squares be x and y, According to the question, $x^2 + y^2 = 2650$		and $y = 3$	
According to the question, $x^2 + y^2 = 2650$	34(A)	Let the sides of the two given squares he y and y	,-
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$x = \frac{-b}{2a} = \frac{2\sqrt{6}}{2\times 2} = \frac{\sqrt{6}}{2}$ 35 Cone and hemisphere have the same radii =>r _c = r _h = r		the equation is $2x^2 - 2\sqrt{6}x + 3 = 0$	1/2
35 Cone and hemisphere have the same radii $=>r_c=r_h=r$			
35 Cone and hemisphere have the same radii $=>r_c=r_h=r$		$X = \frac{1}{2a} = \frac{1}{2} = \frac{1}{2} = \frac{1}{2}$	1
<u> </u>	35		
Radius of the conical part is Jelli – Zic– Jelli – Ih	33		1
	L	radius of the comean part is J cm -/1c- J cm - 1h	1

	Height of the conical part of the toy is equal to the diameter of its	
	base	1
	$ = > h_c = 2 \times r_c = 2 \times 5 \text{ cm} = 10 \text{ cm}$	
	Volume of the toy = volume of cone + volume of hemisphere	1
	$= \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$	
	$= \frac{1}{3} \pi r^2 (h + 2r)$	
	3 10 (11 - 21)	1
	$\frac{1}{2} - (5)^2 (10 + 2) = 5$	
	$= \frac{1}{3}\pi(5)^2 (10 + 2x5)$ $= \frac{1}{3} \times 3.14 \times 25 \times 20$	1
	$=\frac{1}{3} \times 3.14 \times 25 \times 20$	•
	$=\frac{1}{2} \times 1570 = 523.33 \text{ cm}^3$	
	Section E	
36	i) $Tan45^\circ = \frac{CD}{BD}$	1/2
	$\begin{array}{ccc} & & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & \\ & & \\ & & \\ &$	1/2
	$1 = \frac{h}{BD} - BD = h \text{ metres}$	
	$ii) Sin 45^{\circ} = \frac{CD}{RC}$	1/2
	$\frac{1}{\sqrt{2}} = \frac{h}{BC}$	
		1/2
	$->$ BC = $h\sqrt{2}$ metres	
	CE CE	1/2
	$iii) (A) Tan 60° = \frac{CE}{AE}$	/2
	40 + 1	
	$\sqrt{3} = \frac{40+h}{h} \text{ (AE = BD = h)}$	1
	$h\sqrt{3} = 40 + h$	
	$h = \frac{40}{\sqrt{3}-1} = \frac{40(\sqrt{3}+1)}{2} = 20(\sqrt{3}+1) \text{ m}$	1/2
	1 75 1 2	
	OR AE	1/
	$(B) COS 60° = \frac{AE}{AC}$	$\frac{1/_{2}}{1}$
	$\frac{1}{2} = \frac{AE}{100}$	1/2
	AE = 50 m	/2
37	i) Forradius of the 13^{th} spiral, $a = 50$, $d = 100 - 50 = 50$, $n = 13$	
	$a_{13} = a + 12d$	1/2
	$= 50 + 12 \times 50 = 50 + 600 = 650$ cm	1/2
	ii) $a_n = a + (n-1) d$	
	$500 = 50 + (n-1) \times 50$	1/2
	10 = 1 + n - 1	17
	iii) $n = 10$ (\mathbf{A}) No. of saplings in spiral $1 = a_1 = 10$	1/2
	No. of saplings in spiral $1 = a_1 = 10$ No. of saplings in spiral $2 = a_2 = 20$, and so on .	
	d = 10,	
	for total no. of saplings till 11^{th} spiral, $n = 11$,	1/2
	$S_n = \frac{n}{2} (2a + (n-1) d)$	1/2
	$S_{11} = \frac{11}{2} (2 \times 10 + (11 - 1) 10)$	
	4	1
	$= \frac{11}{2} \times (20 + 100) = \frac{11}{2} \times 120 = 11 \times 60 = 660$	1
	Total no. of saplings till 11 th spiral is 660	
	OR (B) $S_n = 450$, $a = 10$, $d = 10$	1/2
	$S_n = \frac{n}{2} (2a + (n-1) d)$	1/2
	$450 = \frac{n}{2} (2 \times 10 + (n-1) \ 10)$	
1	· · · · · · · · · · · · · · · · · · ·	

	$45 = \frac{n}{2}(2 + (n-1))$ on dividing the equation by 10		
	90 = n (n + 1)		
	Gives $n^2 + n - 90 = 0$	1/2	
	$n^2 + 10n - 9n - 90 = 0$		
	(n+10)(n-9) = 0		
	Gives $n = -10$ (rejected) or 9		
		1/2	
	Till 9 th spiral, there be a total of 450 saplings		
38	i) P(2,5) and R(8,3)		
	$PR = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{6^2 + (-2)^2}$	1/2	
	$= \sqrt{36 + 4} = \sqrt{40} = 2\sqrt{10} \text{ units}$	1/2	
	, , , , , , , , , , , , , , , , , , , ,		
	ii) Coordinates of Q are (4, 4)	1/2	
	Mid point of PR = $\left(\frac{2+8}{2}, \frac{5+3}{2}\right) = (5,4)$	1/2	
	No, Q is not the mid point of PR.	, 2	
	iii) (A) Let the point on $x - axis$ be $A(a,0)$	1/2	
	PA = QA or PA ² = QA ²	/2	
	$(a-2)^2 + 5^2 = (a-4)^2 + 4^2$	1/2	
	$a^{2} + 4 - 4a = a^{2} + 16 - 8a + 16$	1/2	
	8a - 4a = 32 - 4	72	
	4a = 28	1/	
	a = 7,	1/2	
	the required point on $x - axis$ is $(7,0)$		
	OR (B) correct section formula with m:n = 2:3		
	X coordinate = $\frac{2 \times 4 + 3 \times 2}{2 + 3} = \frac{8 + 6}{5} = \frac{14}{5}$		
	y coordinate $=\frac{2 \times 4 + 3 \times 5}{2 + 3} = \frac{8 + 15}{5} = \frac{23}{5}$		
	coordinates of S are $\left(\frac{14}{5}, \frac{23}{5}\right)$		
	I		