CCE PR

ಕರ್ನಾಟಕ ಪ್ರೌಢ ಶಿಕ್ಷಣ ಪರೀಕ್ಷಾ ಮಂಡಳಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು – 560 003

KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD, MALLESWARAM, BANGALORE – 560 003

ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆ, ಜೂನ್ — 2017

S. S. L. C. EXAMINATION, JUNE, 2017

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 16. 06. 2017] ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Date : 16. 06. 2017] **CODE NO. : 81-E**

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಹೊಸ ಪಠ್ಯಕ್ರಮ / New Syllabus)

(ಪುನರಾವರ್ತಿತ ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / Private Repeater)

(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version)

[ಗರಿಷ್ಠ ಅಂಕಗಳು : 100

[Max. Marks : 100

Qn. Nos.	Ans. Key	Value Points	Marks allotted
I. 1.	B	$\{6, 7, 8\}$	1
2.	C	90	1
3.	A	5	1
4.	D	$\sqrt{x-y}$	1
5.	B	18	1
6.	C	an acute angle	1
7.	D	$12\sqrt{2}$ cm	1
8.	A	13 units	1

Qn. Nos.	Value Points			Marks allotted
II.				
9.	$^{100}P_0 = 1$			1
10.	Probability of a certain event is 1			1
11.	Mid-point of the			
	class-interval = $\frac{5 + 15}{2}$		½	
	$= \frac{20}{2} = 10$		½	1
12.	**Method : 1**	**Method : 2**		
	$\cos 48^\circ - \sin 42^\circ$	$\cos 48^\circ - \sin 42^\circ$		
	$= \sin 4\cancel{2}^\circ - \text{si}\cancel{\text{n}}\ 42^\circ$	$= \cos 4\cancel{8}^\circ - \text{co}\cancel{\text{s}}\ 48^\circ$	½	
	$= 0$	$= 0$	½	1
13.	$y = 3x$ comparing with $y = mx + c$			
	slope $m = 3$		½	
	y-intercept $= c = 0$		½	1
14.	Total surface area of a			
	solid hemi-sphere = $3\pi r^2$ sq.units			1
III.	Solution :			
15.	$n(A) = 37,\ n(B) = 26,\ \ n(A \cup B) = 51$			
	$n(A \cap B) = ?$			
	$n(A \cup B) = n(A) + n(B) - n(A \cap B)$		1	
	$51 = 37 + 26 - n(A \cap B)$		½	
	$\therefore\ n(A \cap B) = 63 - 51$			2
	$n(A \cap B) = 12$		½	
16.	a) Arithmetic mean A.M. = $\frac{a + b}{2}$		1	2
	b) Harmonic mean H.M. = $\frac{2ab}{a + b}$		1	

Qn. Nos.	**Value Points**	**Marks allotted**
17.	Solution : Here $a = 2$, $r = \frac{\frac{2}{3}}{2} = \frac{\cancel{2}}{3} \times \frac{1}{\cancel{2}} = \frac{1}{3}$ ½ $S_\infty = ?$ $S_\infty = \frac{a}{1-r}$ ½ $= \frac{2}{1-\frac{1}{3}} = \frac{2}{\frac{2}{3}}$ ½ $= \cancel{2} \times \frac{3}{\cancel{2}}$ ∴ $S_\infty = 3$ ½	2
18.	Let us assume, $3 + \sqrt{5}$ is a rational number $\Rightarrow 3 + \sqrt{5} = \frac{p}{q}$ where $p, q \in z, q \neq 0$ ½ $\Rightarrow -3 + \frac{p}{q} = \sqrt{5}$ $\Rightarrow \frac{-3q+p}{q} = \sqrt{5}$ ½ $\Rightarrow \sqrt{5}$ is a rational number $\because \frac{-3q+p}{q}$ is rational but $\sqrt{5}$ is not a rational number this gives us contradiction ½ ∴ our assumption $3 + \sqrt{5}$ is a rational number is wrong $\Rightarrow 3 + \sqrt{5}$ is an irrational number ½	2
19.	A triangle is formed by joining 3 non-collinear points. ∴ Total number of triangles that can be drawn out of 8 non-collinear points = ${}^{8}C_{3}$ ½ Here $n = 8$, $r = 3$ ${}^{n}C_{r} = \frac{n!}{(n-r)!\,r!}$ ½ ${}^{8}C_{3} = \frac{8!}{(8-3)!3!}$ ½ $= \frac{8 \times 7 \times \cancel{6} \times \cancel{5!}}{\cancel{5!} \times \cancel{3 \times 2}}$ $= 56$ ½	2

Qn. Nos.	**Value Points**		**Marks allotted**
	Alternate method :		
	Number of triangles $^nC_3 = \frac{n(n-1)(n-2)}{6}$	1	
	If $n = 8$		2
	$^8C_3 = \frac{8 \times 7 \times \cancel{6}}{\cancel{6}}$	½	
	$= 56$	½	
20.	Solution :		
	$\frac{1}{8\,!} + \frac{1}{9\,!} = \frac{x}{10\,!}$		
	$\frac{1}{8!} + \frac{1}{9 \times 8!} = \frac{x}{10 \times 9 \times 8!}$	½	
	$\frac{1}{\cancel{8!}}\left(1 + \frac{1}{9}\right) = \frac{x}{10 \times 9 \times \cancel{8!}}$	½	2
	$\frac{10}{\cancel{9}} = \frac{x}{10 \times \cancel{9}}$	½	
	$\therefore x = 100$	½	
21.	Solution :		
	There are 7 marbles, out of these 4 marbles can be drawn in $^7C_4 = 35$ ways		
	$\therefore n\,(\,S\,) = 35$	½	
	Two marbles out of 4 red marbles can be drawn in $^4C_2 = 6$ ways	½	
	The remaining 2 marbles must be black and they can be drawn in $^3C_2 = 3$ ways	½	2
	$\therefore n\,(\,A\,) = {}^4C_2 \times {}^3C_2 = 6 \times 3 = 18$		
	$\therefore \quad P\,(\,A\,) = \frac{n\,(A)}{n\,(S)} = \frac{18}{35}$	½	

Qn. Nos. | **Value Points** | **Marks allotted**

22. Direct method :

x	x^2
5	25
6	36
7	49
8	64
9	81
$\Sigma x = 35$	$\Sigma x^2 = 255$

$N = 5$

table ½

Standard deviation

$$\sigma = \sqrt{\frac{\Sigma x^2}{N} - \left(\frac{\Sigma x}{N}\right)^2}$$ ½

$$= \sqrt{\frac{255}{5} - \left(\frac{35}{5}\right)^2}$$

$$= \sqrt{51 - 49}$$ ½

$$= \sqrt{2}$$

$\sigma = 1.4$ ½

2

Actual mean method :

x	$d = x - \overline{x}$	d^2
5	– 2	4
6	– 1	1
7	0	0
8	1	1
9	2	4

$\Sigma x = 35$ $\Sigma d^2 = 10$

$$\text{Mean} = \overline{x} = \frac{\Sigma x}{N}$$

$$= \frac{35}{5}$$

$$= 7$$ 1

standard deviation = $\sigma = \sqrt{\frac{\Sigma d^2}{N}}$ ½

$$= \sqrt{\frac{10}{5}} = \sqrt{2}$$

$\sigma = 1.4$ ½

2

Qn. Nos.	Value Points	Marks allotted

Assumed mean method :

Assumed mean $A = 6$ (any score can be taken)

x	$d = x - A$	d^2
5	− 1	1
6	0	0
7	1	1
8	2	4
9	3	9

$N = 5 \qquad \Sigma d = 5 \qquad \Sigma d^2 = 15$ 1

Standard deviation $\sigma = \sqrt{\frac{\Sigma d^2}{N} - \left(\frac{\Sigma d}{N}\right)^2}$

$= \sqrt{\frac{15}{5} - \left(\frac{5}{5}\right)^2}$ ½ 2

$= \sqrt{3 - 1} = \sqrt{2}$

$\sigma = 1.4$ ½

Step deviation method :

Assumed mean $A = 7$, Common factor of the scores $= C = 1$

x	$d = \frac{x - A}{C}$	d^2
5	− 2	4
6	− 1	1
7	0	0
8	1	1
9	2	4

1 2

$N = 5 \qquad \Sigma d = 0 \qquad \Sigma d^2 = 10$

Standard deviation $= \sigma = \sqrt{\frac{\Sigma d^2}{N} - \left(\frac{\Sigma d}{N}\right)^2} \times C$ ½

$= \sqrt{\frac{10}{5} - 0 \times 1}$

$= \sqrt{2}$

$\sigma = 1.4$ ½

Qn. Nos.	**Value Points**	**Marks allotted**

23. The equation is in the form of $ax^2 + bx + c = 0$

where $a = 1$, $b = -2$, $c = -4$ ½

$$\therefore x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ ½

$$= \frac{-(-2) \pm \sqrt{(-2)^2 - 4 \times 1 \times -4}}{2 \times 1}$$

2

$$= \frac{2 \pm \sqrt{4 + 16}}{2}$$ ½

$$= \frac{2 \pm 2\sqrt{5}}{2}$$

$$= \frac{\cancel{2}\left(1 \pm \sqrt{5}\right)}{\cancel{2}}$$

$(1 + \sqrt{5})$ and $(1 - \sqrt{5})$ are the roots of the given quadratic equation ½

OR

This is in the form of $ax^2 + bx + c = 0$

where $a = 1$, $b = -2$, $c = -3$ ½

$\therefore \quad \Delta = b^2 - 4ac$

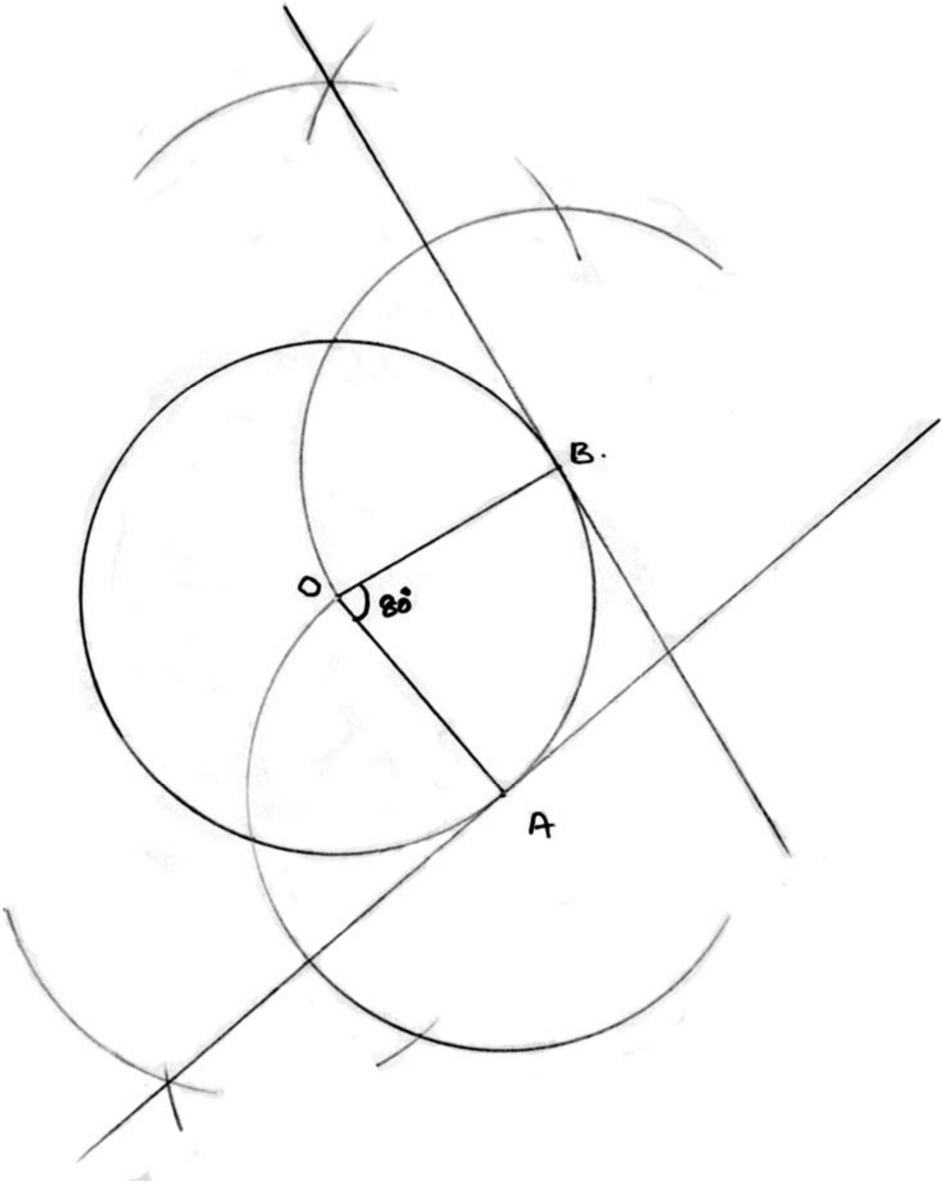
$= (-2)^2 - 4 \times 1 \times (-3)$ ½ 2

$= 4 + 12$

$= 16$ ½

$\Delta > 0 \;\therefore$ roots are real and distinct ½

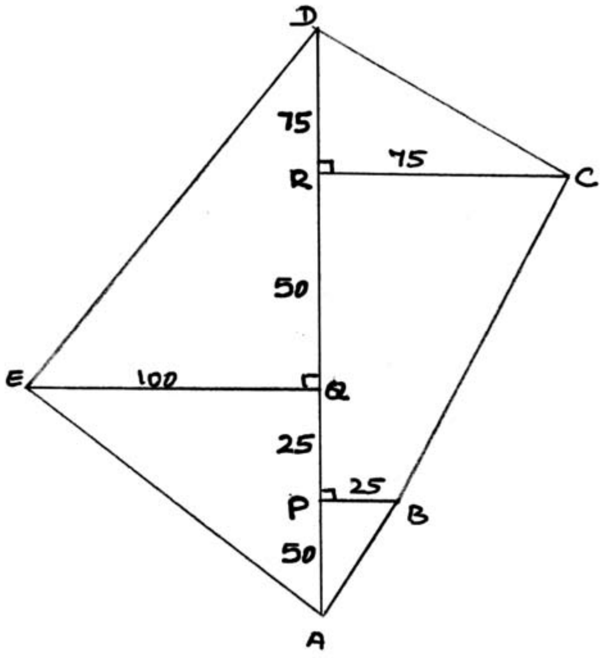
Qn. Nos.	Value Points	Marks allotted
24.	radius = r = 3·5 cm angle between the radii = 80°	

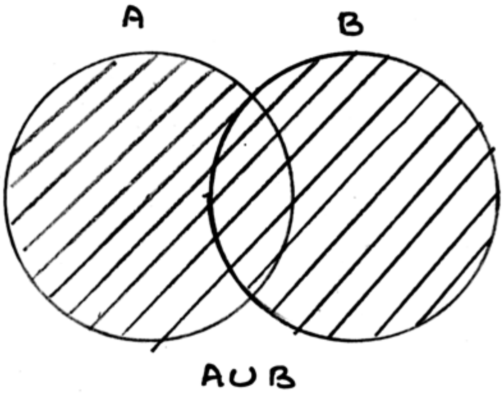


circle	½	
angle between the radii	½	2
tangents at A and B	1	

Qn. Nos.	Value Points			Marks allotted
25.	In Δ *ABC* and Δ *ADC*			
	$B\hat{A}C = A\hat{D}C$	given		
	$A\hat{C}B = A\hat{C}D$	common angle		
	∴ $\Delta ACB \sim \Delta DCA$	equiangular triangles	1	
	∴ $\frac{AC}{DC} = \frac{CB}{CA}$	*AA* – criteria	½	2
	∴ $AC^2 = BC \times DC$		½	
	OR			
	In ⊿*ABC*, $A\hat{B}C = 90°$ and $BD \perp AC$			
	∴ $AB^2 = AD \times AC \rightarrow (1)$ corollary		½	
	similarly $BC^2 = CD \times AC \rightarrow (2)$ corollary		½	
	dividing (1) by (2)			2
	$\frac{AB^2}{BC^2} = \frac{AD \times \cancel{AC}}{CD \times \cancel{AC}}$		½	
	∴ $\frac{AB^2}{BC^2} = \frac{AD}{CD}$		½	
26.	$\sin 30° = \frac{1}{2}$			
	$\cos 60° = \frac{1}{2}, \tan 45° = 1$		1	
	∴ $\sin 30°. \cos 60° - \tan^2 45°$			2
	$= \frac{1}{2} \times \frac{1}{2} - (1)^2$			
	$= \frac{1}{4} - 1 = \frac{1-4}{4}$		½	
	$= -\frac{3}{4}$		½	

Qn. Nos.	**Value Points**		**Marks allotted**
27.	Solution :		
	$(x_1, y_1) = (-5, 4)$		
	$(x_2, y_2) = (-7, 1)$	½	
	$\therefore\ d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	½	
	radius of the circle $= \sqrt{[-7-(-5)]^2 + (1-4)^2}$		
	$= \sqrt{(-7+5)^2 + (-3)^2}$	½	2
	$= \sqrt{(-2)^2 + (-3)^2}$		
	$= \sqrt{4 + 9}$		
	$r = \sqrt{13}$	½	
28.	ratio between the radii of two cylinders $r_1 : r_2 = 2 : 3$ ratio between their curved surface areas $S_1 : S_2 = 5 : 6$	½	
	$\therefore\ \frac{S_1}{S_2} = \frac{\cancel{2}\pi r_1 h_1}{\cancel{2}\pi r_2 h_2}$	½	
	$\frac{5}{6} = \frac{2h_1}{3h_2}$	½	2
	$\therefore\ \frac{h_1}{h_2} = \frac{5 \times \cancel{3}}{\cancel{6}\,2 \times 2} = \frac{5}{4}$		
	ratio between their heights = 5 : 4	½	

Qn. Nos.	**Value Points**	**Marks allotted**
29.	Sphere - radius = r_1 = 10 cm Cone - height = h_2 = 10 cm - radius = r_2 = 5 cm Number of small cones formed = $\frac{\text{volume of the sphere}}{\text{volume of each small cone}}$ ½ = $\frac{\frac{4}{\cancel{3}}\cancel{\pi} r_1^3}{\frac{1}{\cancel{3}}\cancel{\pi} r_2^2 h_2}$ ½ = $\frac{4\times\overset{2}{\cancel{10}}\times\overset{2}{\cancel{10}}\times\cancel{10}}{\cancel{5}\times\cancel{5}\times\cancel{10}}$ ½ = 16 Number of small cones formed = 16 ½	2
30.	Scale : 25 m = 1 cm 50 m = 2 cm 75 m = 3 cm 100 m = 4 cm 125 m = 5 cm 200 m = 8 cm.  Calculation ½ Plan drawing 1½	2

Qn. Nos.	**Value Points**	**Marks allotted**
31.	 Drawing Venn diagram 1 for shading 1	2
32.	$a = 1,\ r = 2,\ T_5 = ?$ ½ $T_n = ar^{n-1}$ ½ $T_5 = 1\,(2)^{5-1}$ ½ $= 1\,(2)^4 = 16$ ½	2
33.	$(3\sqrt{2} + 2\sqrt{3})(2\sqrt{3} - 4\sqrt{2})$ $= 3\sqrt{2}\,(2\sqrt{3} - 4\sqrt{2}) + 2\sqrt{3}\,(2\sqrt{3} - 4\sqrt{2})$ ½ $= 6\sqrt{6} - 12 \times 2 + 4 \times 3 - 8\sqrt{6}$ ½ $= 6\sqrt{6} - 24 + 12 - 8\sqrt{6}$ ½ $\left.\begin{array}{l} = -2\sqrt{6} - 12 \\ = -2(\sqrt{6} + 6) \end{array}\right\}$ ½	2

Qn. Nos. | **Value Points** | **Marks allotted**

34. Total number of students = 14 + 6 + 2 + 18 = 40

Place	No of students	Central angle
Mysuru	14	$\frac{14}{\cancel{40}} \times \overset{9}{\cancel{360}}^\circ = 126^\circ$
Vijayapura	6	$\frac{6}{\cancel{40}} \times \overset{9}{\cancel{360}}^\circ = 54^\circ$
Gokarna	2	$\frac{2}{\cancel{40}} \times \overset{9}{\cancel{360}}^\circ = 18^\circ$
Chitradurga	18	$\frac{18}{\cancel{40}} \times \overset{9}{\cancel{360}}^\circ = 162^\circ$

½

2

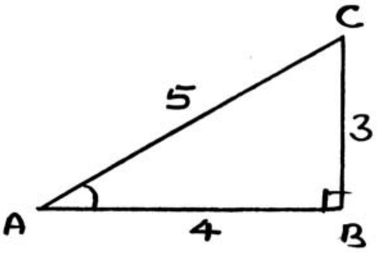
1½

35. Sun of the roots = $m + n = -\frac{b}{a}$ 1

Product of the roots = $mn = \frac{c}{a}$ 1

2

Qn. Nos.	**Value Points**		**Marks allotted**
36.	Perimeter of $\Delta PBC = PB + BC + PC$	½	
	$= PB + BX + XC + PC$		
	but $BX = BQ, XC = CR$		
	$= PB + BQ + CR + PC$	½	
	$= PQ + PR$		
	but $PQ = PR$		2
	$= PQ + PQ$		
	$= 2PQ$	½	
	$= 2 \times 7 = 14$ cm		
	Perimeter of $\Delta PBC = 14$ cm	½	
37.	In ΔABC, $DE \mid\mid AB$		
	$\therefore \quad \frac{CD}{CA} = \frac{CE}{BC}$ cor. BPT	½	
	$\frac{5}{12} = \frac{CE}{18}$	½	
	$\therefore \quad CE = \frac{5 \times \overset{3}{\cancel{18}}}{\underset{2}{\cancel{12}}}$	½	
	$= \frac{15}{2}$		
	$\therefore \quad CE = 7.5$ cm	½	2
38.	Sides are 1, 2, $\sqrt{3}$	½	
	Squares on the sides = 1, 4, 3		
	Sum of the squares on the two smaller sides = 1 + 3 = 4	½	2
	We observe that sum of the squares on the other two sides is equal to square on the longest side.	½	
	$\therefore \quad 1, 2, \sqrt{3}$ form a right angled triangle	½	

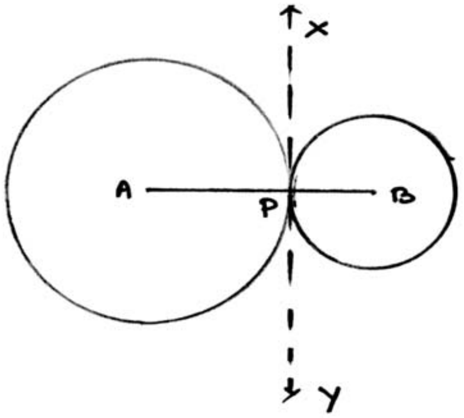
Qn. Nos.	Value Points		Marks allotted
39.	In $\triangle ABC$, $A\hat{B}C = 90°$ $\therefore AC^2 = AB^2 + BC^2$ $= 4^2 + 3^2$ $= 16 + 9 = 25$ $\therefore AC = 5$	1	2
			
	$\therefore \sin A = \frac{BC}{AC} = \frac{3}{5}$	½	
	$\cos A = \frac{AB}{AC} = \frac{4}{5}$	½	
40.	Height = h = 30 cm, radius = r = 3·5 cm CSA = ?		2
	CSA of a cylinder = $2\pi rh$ sq.units	½	
	$= 2 \times \frac{22}{\cancel{7}} \times \overset{0.5}{\cancel{3.5}} \times 30$ sq.cm	½	
	$= 2 \times 22 \times 15$ sq.cm	½	
	= 660 sq.cm.	½	
IV. 41.	Rationalising factor of $\sqrt{6} - \sqrt{3}$ is $\sqrt{6} + \sqrt{3}$ $\therefore \frac{\sqrt{6}+\sqrt{3}}{\sqrt{6}-\sqrt{3}} \times \frac{\sqrt{6}+\sqrt{3}}{\sqrt{6}+\sqrt{3}}$	1	3
	$= \frac{\left(\sqrt{6}+\sqrt{3}\right)^2}{\left(\sqrt{6}+\sqrt{3}\right)\left(\sqrt{6}-\sqrt{3}\right)}$	½	
	$= \frac{6+3+2\sqrt{6}.\sqrt{3}}{6-3}$	½	
	$= \frac{9+2\sqrt{18}}{3}$	½	
	$= \boxed{\frac{9+6\sqrt{2}}{3}}$ $= \frac{\cancel{3}(3+2\sqrt{2})}{\cancel{3}}$ $= \boxed{3+2\sqrt{2}}$	½	

Qn. Nos.	**Value Points**		**Marks allotted**
42.	$$\begin{array}{r\|l} \multicolumn{1}{r}{} & x^2 + 3x - 8 \\ \cline{2-2} x+1 & \cancel{x^3} + 4x^2 - 5x + 6 \\ & \cancel{x^3} + x^2 \\ & (-)\quad(-) \\ \cline{2-2} & 3\cancel{x^2} - 5x + 6 \\ & 3\cancel{x^2} + 3x \\ & (-)\quad(-) \\ \cline{2-2} & -8\cancel{x} + 6 \\ & -8x - 8 \\ & (+)\quad(+) \\ \cline{2-2} & 14 \end{array}$$	1	
	Quotient $\boxed{q(x) = x^2 + 3x - 8}$	½	
	remainder $\boxed{r(x) = 14}$	½	3
	Verification :		
	$g(x) \times q(x) + r(x)$		
	$= (x + 1)(x^2 + 3x - 8) + 14$		
	$= x^3 + 3x^2 - 8x + x^2 + 3x - 8 + 14$	½	
	$= x^3 + 4x^2 - 5x + 6$		
	$= p(x)$		
	$\therefore \boxed{p(x) = [g(x) \times q(x)] + r(x)}$	½	
	OR		
	Synthetic division :		
	$$\begin{array}{r\|rrrr} -2 & 4 & -16 & -9 & -36 \\ & & -8 & 48 & -78 \\ \hline & 4 & -24 & 39 & -114 \end{array}$$	2	
	$\therefore$ The quotient is $4x^2 - 24x + 39$	½	3
	remainder $r(x) = -114$	½	

Qn. Nos.	Value Points		Marks allotted
43.	Let the three conscutive + *ve* integers		
	be x, $(x+1)$ and $(x+2)$	½	
	from the statement,		
	$x^2 + (x+1)(x+2) = 92$	1	
	$x^2 + x^2 + 2x + x + 2 = 92$		
	$2x^2 + 3x + 2 = 92$		
	$2x^2 + 3x + 2 - 92 = 0$		
	$2x^2 + 3x - 90 = 0$ $\quad 2 \times -90 = -180$	½	
	$2x^2 - 12x + 15x - 90 = 0$		3
	$2x(x-6) + 15(x-6) = 0$ $\quad 15 - 12$		
	$(x-6)(2x+15) = 0$	½	
	$\therefore \quad x = 6, \text{ or } x = -\frac{15}{2}$		
	The three consecutive + *ve*		
	integers are 6, 7, 8	½	
	OR		
	Let the numbers be x, y and $x > y$	½	
	sum of their squares is 180		
	i.e. $x^2 + y^2 = 180 \rightarrow (1)$	½	
	Square of the smaller number is equal to 8 times the bigger number		
	$\therefore \quad y^2 = 8x \rightarrow (2)$	½	
	Substituting (2) in (1) we get		
	$x^2 + 8x = 180$		
	$x^2 + 8x - 180 = 0$ $\quad -180$		3
	$x^2 + 18x - 10x - 180 = 0$	½	
	$x(x+18) - 10(x+18) = 0$ $\quad 18 \; -10$		
	$(x-10)(x+18) = 0$		
	$\therefore \quad x = 10 \text{ or } x = -18$	½	
	If $x = 10$ then $y^2 = 8x$		
	$y^2 = 8 \times 10$		
	$y = \sqrt{80} = \sqrt{16 \times 5}$		
	$= 4\sqrt{5}$	½	
	The numbers are 10 and $4\sqrt{5}$		

Qn. Nos. | **Value Points** | **Marks allotted**

44.



½

Data : A and B are the centres of touching circles. P is the point of contact ½

To prove : A, P and B are collinear ½

Construction : Tangent XY is drawn at P ½

Proof : In the figure

$$\left.\begin{aligned} A\hat{P}X &= 90° \rightarrow (1) \\ B\hat{P}X &= 90° \rightarrow (2) \end{aligned}\right\}$$ radius drawn at the point of contact is perpendicular to the tangent ½

3

$A\hat{P}X + B\hat{P}X = 90° + 90°$ by adding (1) and (2)

$A\hat{P}B = 180°$ $A\hat{P}B$ is a straight angle

$\therefore$ APB is a straight line

$\therefore$ A, P and B are collinear ½

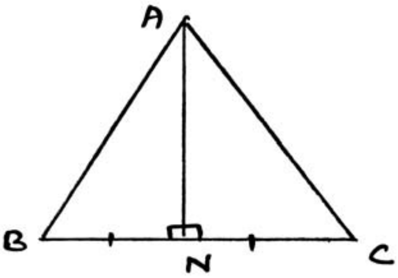
45. In $\triangle ABC$, $AB = BC = CA$

$AN \perp BC$

$\therefore BN = NC = \frac{1}{2} BC = \frac{1}{2} AB$

In ⊿ ABN, $A\hat{N}B = 90°$

$\therefore$ $AB^2 = AN^2 + BN^2$



½ + ½

$AN^2 = AB^2 - BN^2$ ½

$= AB^2 - \left(\frac{1}{2}AB\right)^2$ ½

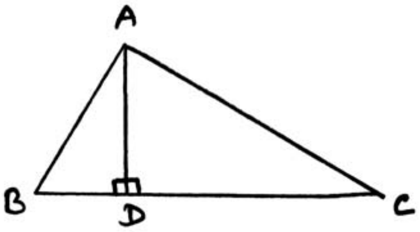
3

$= AB^2 - \frac{AB^2}{4}$

$AN^2 = \frac{4AB^2 - AB^2}{4}$ ½

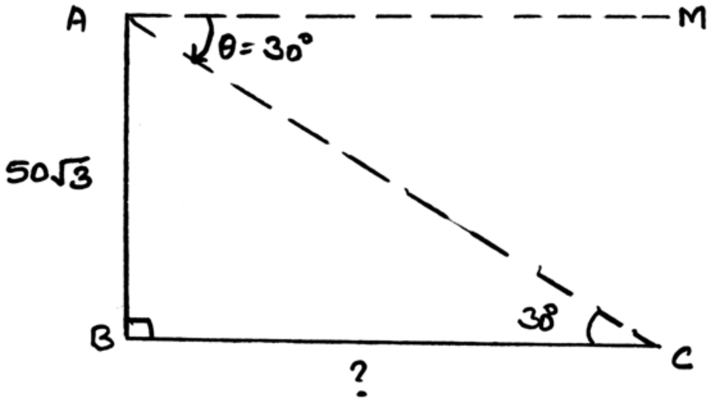
$\boxed{4AN^2 = 3AB^2}$ ½

OR

Qn. Nos.	**Value Points**		**Marks allotted**
		½	
	In ◺ABD, $A\hat{D}B = 90°$		
	∴ $AB^2 = AD^2 + BD^2$	½	
	$AD^2 = AB^2 - BD^2 \rightarrow (1)$	½	3
	In ◺ADC, $A\hat{D}C = 90°$		
	∴ $AC^2 = AD^2 + DC^2$	½	
	$AD^2 = AC^2 - DC^2 \rightarrow (2)$	½	
	from (1) and (2)		
	$AB^2 - BD^2 = AC^2 - DC^2$		
	∴ $AB^2 + DC^2 = AC^2 + BD^2$	½	
46.	LHS = $\tan^2 A - \sin^2 A$		
	$= \frac{\sin^2 A}{\cos^2 A} - \sin^2 A$ ∵ $\tan A = \frac{\sin A}{\cos A}$	½	
	$= \frac{\sin^2 A - \sin^2 A \cos^2 A}{\cos^2 A}$	½	
	$= \frac{\sin^2 A\ (1 - \cos^2 A)}{\cos^2 A}$	½	3
	but $1 - \cos^2 A = \sin^2 A$		
	$= \frac{\sin^2 A\ .\ \sin^2 A}{\cos^2 A}$	½	
	$= \frac{\sin^2 A}{\cos^2 A}\ .\ \sin^2 A$	½	
	$= \tan^2 A\ .\ \sin^2 A.$	½	
	∴ LHS = RHS		

Qn. Nos.	Value Points		Marks allotted
	Alternate method :		
	LHS = $\tan^2 A - \sin^2 A$		
	$= (\sec^2 A - 1) - \sin^2 A$	$\because \tan^2 A = \sec^2 A - 1$ ½	
	$= \frac{1}{\cos^2 A} - 1 - (1 - \cos^2 A)$	$\because \sec^2 A = \frac{1}{\cos^2 A}$ ½ $\sin^2 A = 1 - \cos^2 A$	
	$= \frac{1 - \cos^2 A - \cos^2 A + \cos^4 A}{\cos^2 A}$	½	
	$= \frac{1 - 2\cos^2 A + \cos^4 A}{\cos^2 A}$		
	$= \frac{(1 - \cos^2 A)^2}{\cos^2 A}$	$\because 1 - 2\cos^2 A + \cos^4 A$ $= (1 - \cos^2 A)^2.$ ½	3
	$= \frac{(\sin^2 A)^2}{\cos^2 A}$	$\because 1 - \cos^2 A = \sin^2 A$ ½	
	$= \frac{\sin^2 A}{\cos^2 A} . \sin^2 A$		
	$= \tan^2 A . \sin^2 A.$		
	∴ LHS = RHS.	½	
	OR		

Qn. Nos.	**Value Points**	**Marks allotted**



1

Let AB represents height of the building

$AB = 50\sqrt{3}$ m

BC be the distance between the building and the object

Angle of depression is 30°

Since $AM \,||\, BC$, So $M\hat{A}C = A\hat{C}B = 30°$ ½

In ⊿ ABC, $A\hat{B}C = 90°$, $A\hat{C}B = 30°$ 3

$\therefore \tan 30° = \dfrac{AB}{BC}$ ½

$\dfrac{1}{\sqrt{3}} = \dfrac{50\sqrt{3}}{BC}$ ½

$\therefore BC = 50\sqrt{3} \times \sqrt{3}$

$= 50 \times 3$

distance between the building and the object $\Big\}$ = 150 m ½

V. 47. In an AP

$T_3 + T_5 = 30$ ½

$a + 2d + a + 4d = 30$

$2a + 6d = 30$

$a + 3d = 15 \rightarrow (1)$ ½

and $T_4 + T_8 = 46$

$a + 3d + a + 7d = 46$

$2a + 10d = 46$

$a + 5d = 23 \rightarrow (2)$ ½

Qn. Nos.	Value Points	Marks allotted

Subtracting (1) from (2) **4**

$$\begin{array}{rl} \cancel{a} + 5d & = 23 \\ - \cancel{a} + 3d & = 15 \\ (-) \quad & (-) \\ \hline 2d & = 8 \end{array}$$ ½

$\therefore \quad d = 4$ 1

If $d = 4$ then $a + 3d = 15$

$a + 3 \times 4 = 15$

$a + 12 = 15$

$a = 15 - 12 = 3$ ½

If $a = 3$ and $d = 4$ then the AP is

3, 7, 11, 15, ... ½

OR

In a GP $T_4 = 8$

$ar^3 = 8 \rightarrow (1)$ ½

and $T_8 = 128$

$ar^7 = 128 \rightarrow (2)$ ½

dividing (2) by (1) we get

$$\frac{\cancel{a}r^7}{\cancel{a}r^3} = \frac{\cancel{128}^{16}}{\cancel{8}}$$ ½

$r^4 = 16$

$\therefore \quad \boxed{r = 2}$ ½

If $r = 2$ then $ar^3 = 8$

$a(2)^3 = 8$

$8a = 8$

$\therefore \boxed{a = 1}$ ½

If $a = 1$ and $r = 2$ then **4**

$$S_n = \frac{a\left(r^n - 1\right)}{r - 1}$$ ½

$$\therefore \quad S_{10} = \frac{1\left(2^{10} - 1\right)}{2 - 1}$$ ½

$= 1024 - 1$

$\boxed{S_{10} = 1023}$ ½

Qn. Nos.	**Value Points**	**Marks allotted**

48. $x^2 - 2x - 3 = 0$

$\therefore \quad y = x^2 - 2x - 3$

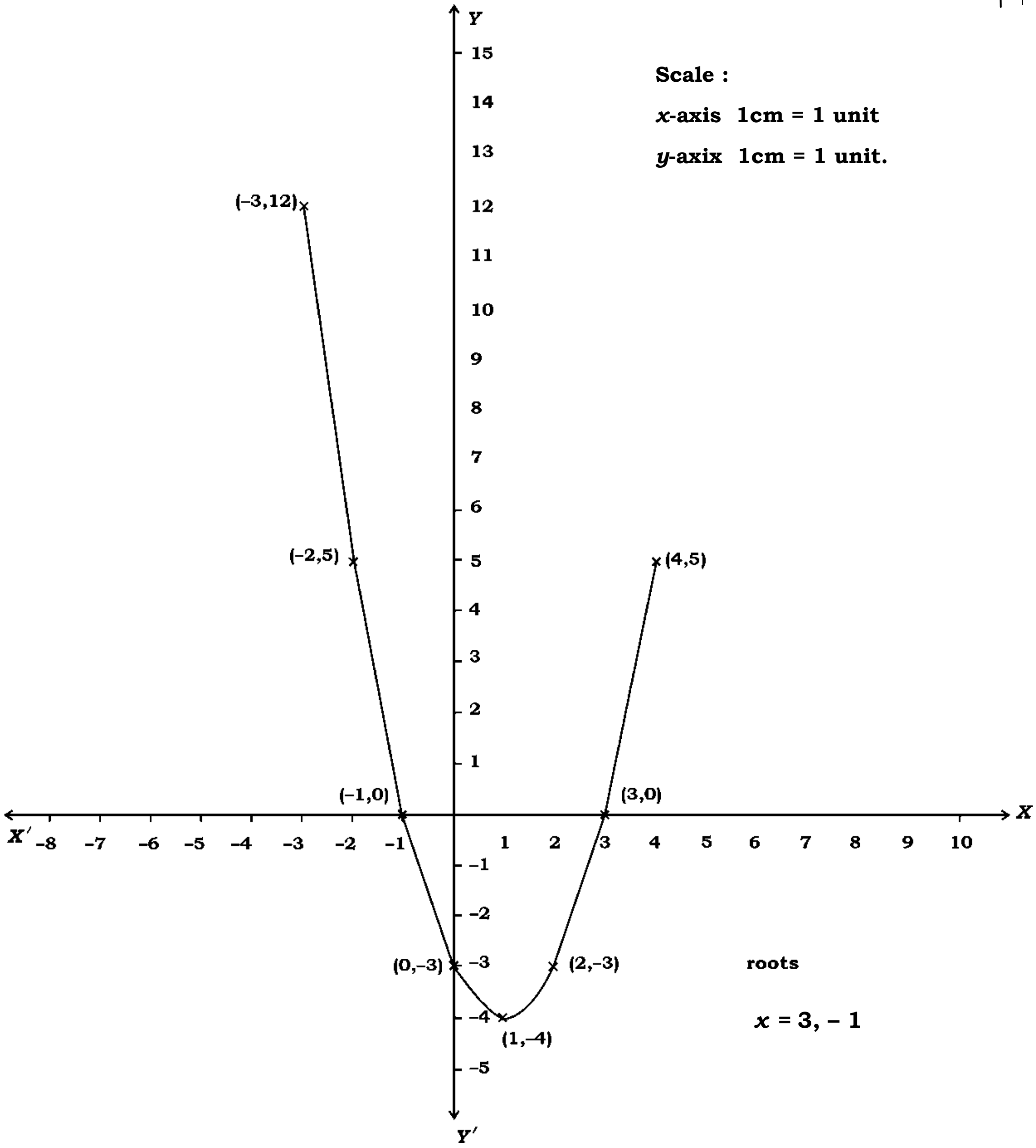
x	0	1	2	3	4	– 1	– 2	– 3
y	– 3	– 4	– 3	0	5	0	5	12

table 2

Drawing parabola 1

identifying roots 1

4



Scale :

***x*-axis 1cm = 1 unit**

***y*-axix 1cm = 1 unit.**

roots

$x = 3, - 1$

Qn. Nos.	**Value Points**	**Marks allotted**

Alternate method :

$$x^2 - 2x - 3 = 0$$

$\boxed{y = x^2}$ $\boxed{y = +2x + 3}$

$y = x^2$

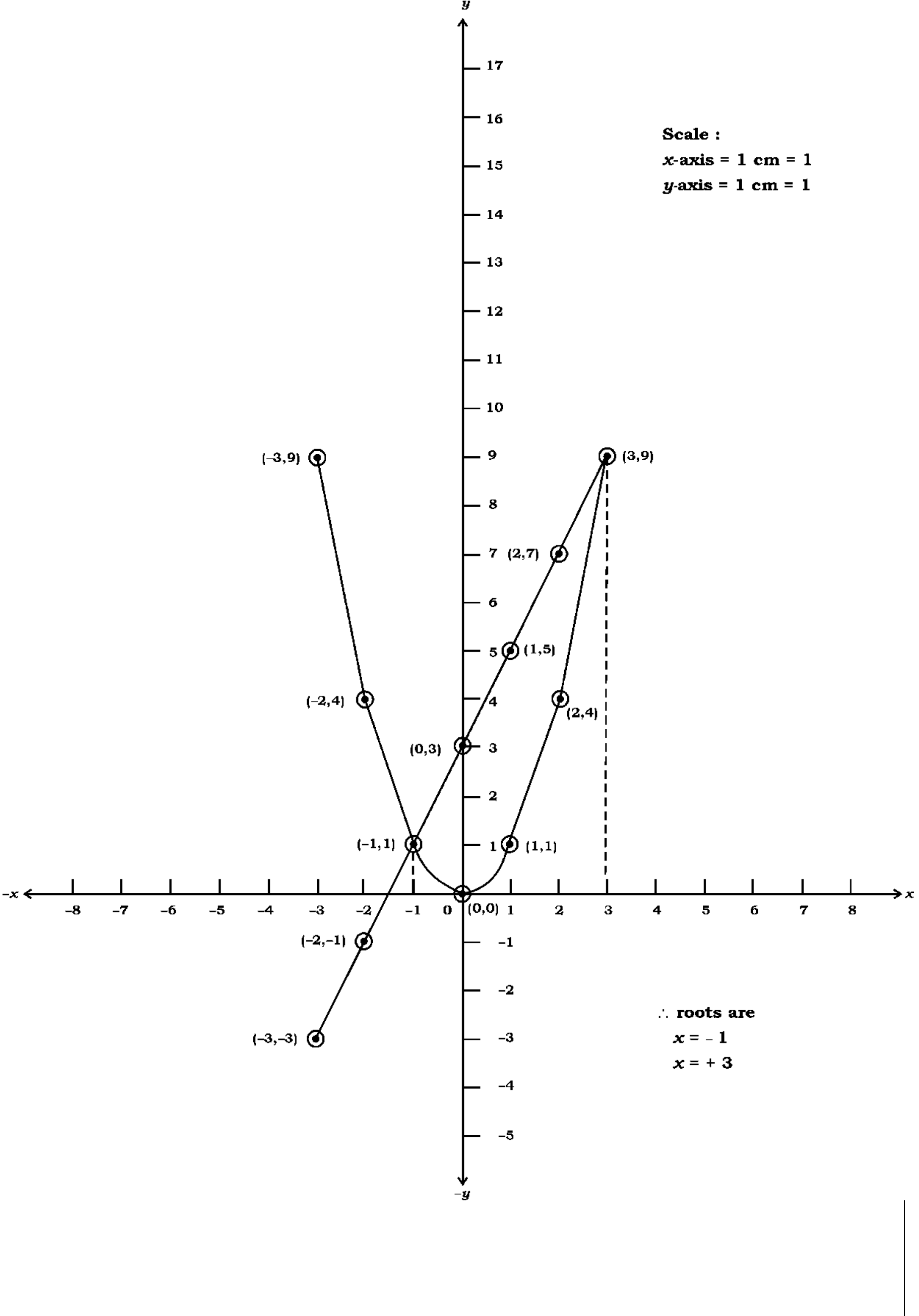
x	– 3	– 2	– 1	0	1	2	3
y	9	4	1	0	1	4	9

$y = 2x + 3$

x	– 3	– 2	– 1	0	1	2	3
y	– 3	– 1	1	3	5	7	9

Table —	2	
Drawing parabola —	1	
Identifying roots —	1	4

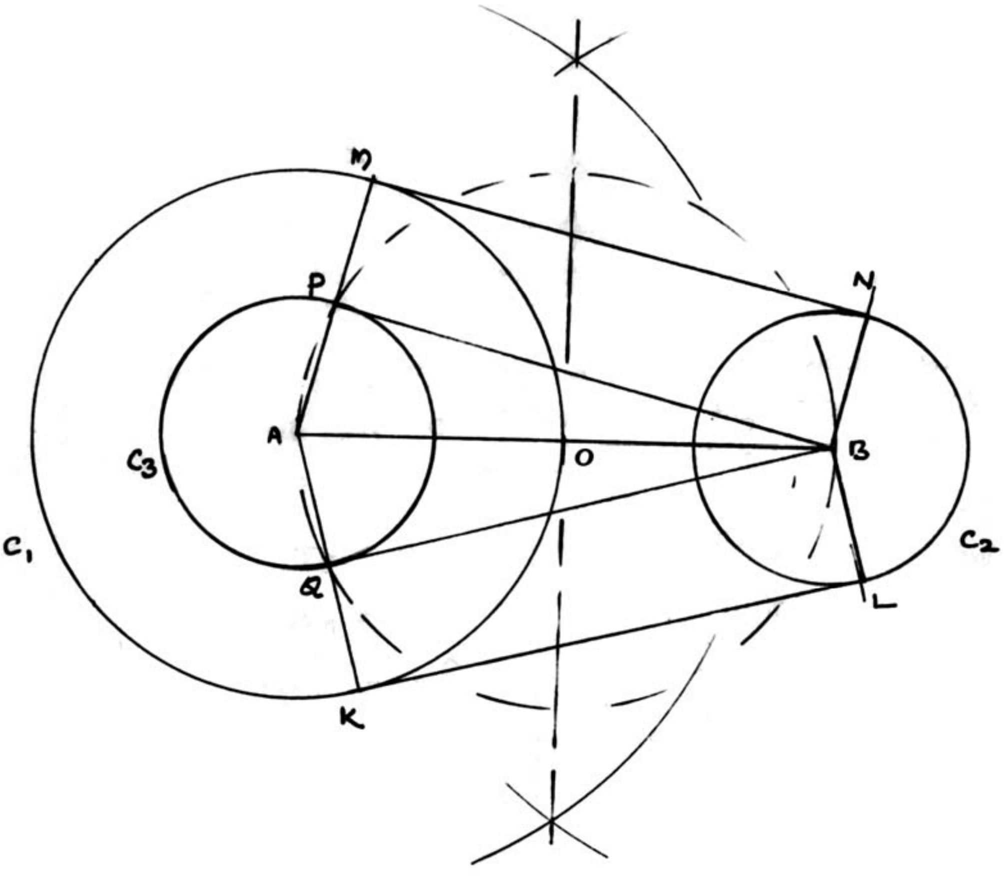
Qn. Nos.	Value Points	Marks allotted



Scale :
x-axis = 1 cm = 1
y-axis = 1 cm = 1

∴ roots are
$x = -1$
$x = +3$

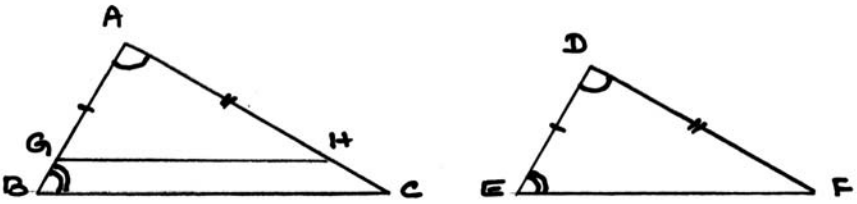
Qn. Nos.	Value Points		Marks allotted
49.	$d = 8$ cm $R = 4$ cm $r = 2$ cm $R - r = 4 - 2 = 2$ cm		



	Length of the tangent $KL = MN = 7{\cdot}8$ cm		
	Drawing AB and marking mid-point	1	
	Drawing circles C_1, C_2, C_3	$1\frac{1}{2}$	4
	Joining BP, BQ, MN, KL	1	
	Measuring and writing the length of tangents	½	

Qn. Nos.	Value Points	Marks allotted

50.



½

Data : In $\Delta\ ABC$ and $\Delta\ DEF$

$B\hat{A}C = E\hat{D}F$, $A\hat{B}C = D\hat{E}F$ ½

To prove : $\dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{AC}{DF}$ ½

Construction : Points G and H are marked on AB and AC such that $AG = DE$ and $AH = DF$. G and H joined. ½

Proof : In $\Delta\ AGH$ and $\Delta\ DEF$

$AG = DE$ construction

$G\hat{A}H = E\hat{D}F$ data

$AH = DF$ construction ½

$\therefore \Delta\ AGH \cong \Delta\ DEF$ *SAS* postulate

$\left.\begin{aligned} \therefore GH &= EF \\ A\hat{G}H &= D\hat{E}F \end{aligned}\right\}$ *CPCT* ½

but $D\hat{E}F = A\hat{B}C$ data

$\therefore A\hat{G}H = A\hat{B}C$ alternate angles

$\therefore GH \,||\, BC$ ½

$\therefore \dfrac{AB}{AG} = \dfrac{BC}{GH} = \dfrac{AC}{AH}$ cor. *BPT*

but $AG = DE$, $GH = EF$, $AH = DF$

$\therefore \dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{AC}{DF}$ ½

4