CCE RR/PR/PF/NSR/NSPR
FULL SYLLABUS

A

ಕರ್ನಾಟಕ ಶಾಲಾ ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯನಿರ್ಣಯ ಮಂಡಲಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು - 560 003

KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD, MALLESHWARAM, BENGALURU – 560 003

ಆಗಸ್ಟ್ 2024 ರ ಪರೀಕ್ಷೆ - 3

AUGUST 2024 EXAMINATION - 3

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E** **CODE NO. : 81-E**

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಆಂಗ್ಲ ಮಾಧ್ಯಮ / English Medium)

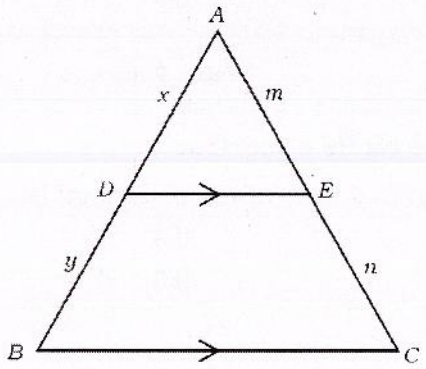
(ಶಾಲಾ ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ / ಖಾಸಗಿ ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ / ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / ಎನ್.ಎಸ್.ಆರ್. / ಎನ್.ಎಸ್.ಪಿ.ಆರ್.)

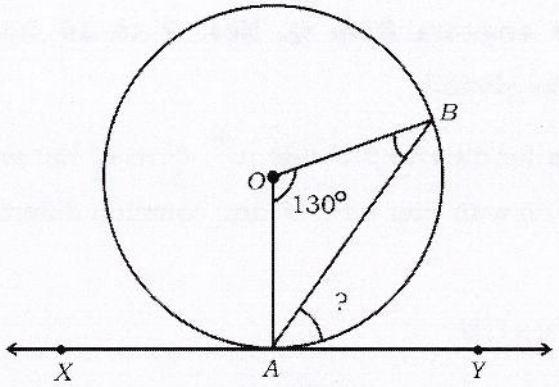
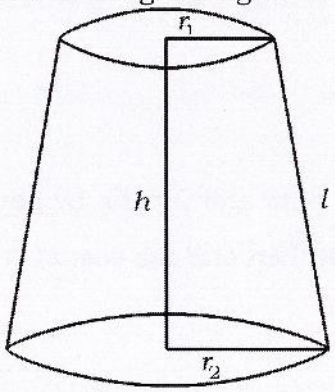
(Regular Repeater / Private Repeater / Private Fresh / NSR / NSPR)

ದಿನಾಂಕ : **08. 08. 2024**] [ಗರಿಷ್ಠ ಅಂಕಗಳು : **80**

Date : 08. 08. 2024] **[Max. Marks : 80**

Qn. Nos.	Ans. Key	Value Points	Marks allotted
I.		**Multiple choice questions :** **8 × 1 = 8**	
1.		The degree of the cubic polynomial is (A) 1 (B) 2 (C) 3 (D) 4 *Ans.* :	
	(C)	3	1
2.		The discriminant of the quadratic equation $ax^2 + bx + c = 0$ is (A) $b^2 - 4ac$ (B) $c^2 - 4ab$ (C) $b^2 + 4ac$ (D) $a^2 + 4ab$ *Ans.* :	
	(A)	$b^2 - 4ac$	1

Qn. Nos.	Ans. Key	Value Points	Marks allotted
3.		$(\sec^2 A - 1)$ is equal to (A) $\tan^2 A$ (B) $\cot^2 A$ (C) $\sin^2 A$ (D) $\operatorname{cosec}^2 A$ *Ans.* :	
	(A)	$\tan^2 A$	1
4.		$7 \times 11 \times 13 + 13$ is a (A) Prime number (B) Composite number (C) Irrational number (D) Odd number *Ans.* :	
	(B)	Composite number	1
5.		If the pair of lines represented by linear equations $x + ky = 4$ and $2x + 4y = 12$ are parallel lines then the value of 'k' is (A) -2 (B) 2 (C) 4 (D) -4 *Ans.* :	
	(B)	2	1
6.		In the figure $DE \parallel BC$. If $AD = x$, $BD = y$, $AE = m$ and $CE = n$, the correct relation among the following is  (A) $\frac{x}{y} = \frac{m}{m+n}$ (B) $\frac{x}{y} = \frac{n}{m}$ (C) $\frac{x+y}{x} = \frac{m}{m+n}$ (D) $\frac{x}{x+y} = \frac{m}{m+n}$ *Ans.* :	
	(D)	$\frac{x}{x+y} = \frac{m}{m+n}$	1

Qn. Nos.	Ans. Key	Value Points	Marks allotted
7.		In the figure XY is a tangent to the circle with centre 'O'. If $\angle AOB = 130°$, then the measure of $\angle BAY$ is  (A) 90° (B) 25° (C) 50° (D) 65° *Ans.* :	
	(D)	65°	1
8.		The formula to find the curved surface area of a frustum of a cone in the given figure is  (A) $A = \pi (r_1 - r_2) l$ (B) $A = \pi (r_1 + r_2) l + \pi r_1^2$ (C) $A = \pi (r_1 + r_2) l$ (D) $A = \frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2)$ *Ans.* :	
	(C)	$A = \pi (r_1 + r_2) l$	1

Qn. Nos.	Value Points	Marks allotted
II.	**Answer the following questions :** $8 \times 1 = 8$ **(Direct answers from Q. Nos. 9 to 16 full marks should be given)**	
9.	Write the formula to find the n^{th} term of the arithmetic progression with first term 'a' and common difference 'd'. *Ans.* : $a_n = a + (n-1)\,d$	1
10.	If the product of zeroes of the polynomial $f(x) = 2x^2 - 3x + k$ is 3, then find the value of 'k'. *Ans.* : $a = 2, \quad b = -3, \quad c = k$ $\alpha\beta = \frac{c}{a}$ ½ $3 = \frac{k}{2}$ ½ $\boxed{k = 6}$	1
11.	A person buys 3 bats and 2 balls by paying Rs. 960. If a bat costs Rs. 300, then find the cost of one ball. *Ans.* : $3x + 2y = 960$ ½ $3 \times 300 + 2y = 960$ $900 + 2y = 960$ $2y = 960 - 900$ $2y = 60$ $y = \frac{60}{2}$ ½ $\boxed{y = 30}$	1

Qn. Nos.	Value Points	Marks allotted
12.	If $P(A) = 80\%$ then show that the probability of not A is $\frac{1}{5}$.	
	Ans. :	
	$P(A)+P(\overline{A})=1$ ½	
	$80\% + P(\overline{A}) = 100\%$	
	$P(\overline{A})=100-80$	
	$P(\overline{A})= 20\%$	
	$P(A)=\frac{1}{5}$ ½	1
13.	Write the formula to find the volume of a sphere having radius 'r' units.	
	Ans. :	
	$V=\frac{4}{3}\pi r^3$	1
14.	Express the denominator of $\frac{17}{40}$ in the form $2^m \times 5^n$ and find the value of 'n'.	
	Ans. :	
	2 | 40 2 | 20 2 | 10 5	
	$40=2^3\times5^1$ ½	
	$\therefore\ n = 1$ ½	1
15.	Find the value of cosec (90° – θ) × cos θ.	
	Ans. :	
	cosec (90 – θ) × cos θ ½	
	sec θ × cos θ	
	$\frac{1}{\cos\theta}\times\cos\theta$	
	= 1 ½	1

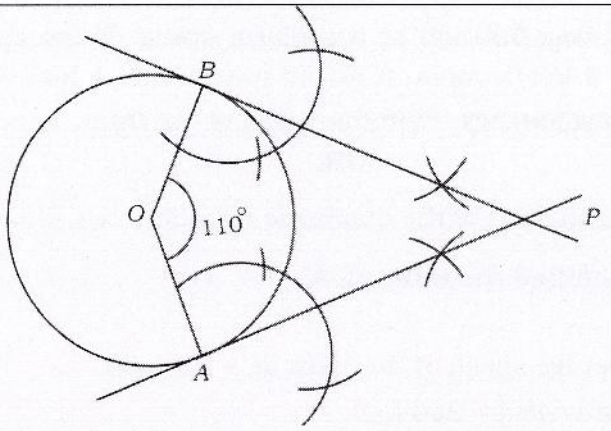
Qn. Nos.	Value Points	Marks allotted
16.	If $\sin\theta = 1$, then find the value of $\cos\theta$.	
	Ans. :	
	$\cos\theta = \sqrt{1-\sin^2\theta}$ ½	
	$= \sqrt{1-(1)^2}$	
	$= \sqrt{1-1}$	
	$= \sqrt{0}$	
	$\cos\theta = 0$ ½	1
III.	**Answer the following questions :** **$8 \times 2 = 16$**	
17.	Prove that $2 + \sqrt{3}$ is an irrational number.	
	OR	
	Find the H.C.F. and L.C.M. of 3, 8 and 15.	
	Ans. :	
	Let us assume $2+\sqrt{3}$ is rational that is, we can find coprime a and b $(b \neq 0)$. ½	2
	Such that $2+\sqrt{3} = \frac{a}{b}$	
	$\sqrt{3} = \frac{a}{b} - 2$	
	Rearranging this equation $\sqrt{3} = \frac{a-2b}{b}$ ½	
	Since a and b are integers.	
	We get $\frac{a-2b}{b}$ is rational and so $\sqrt{3}$ is rational. ½	
	But this contradicts the fact that $\sqrt{3}$ is irrational.	
	This contradiction has arisen bcause of our incorrect assumption that $2+\sqrt{3}$ is rational.	
	So, we conclude $2+\sqrt{3}$ is irrational. ½	
	OR	

Qn. Nos.	Value Points	Marks allotted
	$2\overline{)8}$ $2\overline{)4}$ $2\overline{)2}$ 1 $\quad$ $3\overline{)15}$ 5	
	$3 = 3$	
	$8 = 2^3$ 1	
	$15 = 3 \times 5$	
	$\therefore$ H.C.F of 3, 8 and 15 is 1 ½	
	$\therefore$ L.C.M of 3, 8 and 15 is $3 \times 8 \times 5 = 120$ ½	2
18.	Solve the given pair of linear equations by Elimination method :	
	$x + 2y = 5$	
	$x - y = 2$	
	Ans. :	
	$x + 2y = 5$ ..... (1)	
	$x - y = 2$ ..... (2)	
	(–) (+) (–)	
	$3y = 3$ subtracting	
	$y = \frac{3}{3}$	
	$y = 1$	
	subsituting $y = 1$ in (1)	
	$x + 2y = 5$	
	$x + 2(1) = 5$	
	$x + 2 = 5$	
	$x = 5 - 2$	
	$x = 3$	
	$\therefore$ $\boxed{x = 3}$ $\boxed{y = 1}$	2

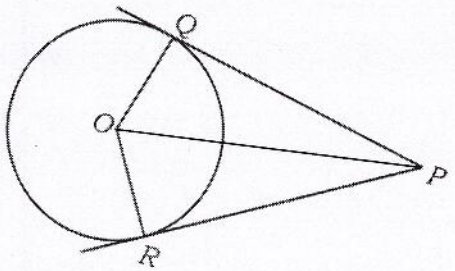
Qn. Nos.	Value Points	Marks allotted
19.	Find the sum of first 20 terms of the arithmetic progression 2, 5, 8, ... using formula.	
	Ans. :	
	$a = 2, \quad d = 5 - 2 = 3, \quad n = 20$ ½	2
	$S_n = \frac{n}{2}[\,2a + (n-1)\,d\,]$ ½	
	$S_{20} = \frac{20}{2}[2 \times 2 + (20-1) \times 3\,]$	
	$S_{20} = 10[4 + 19 \times 3\,]$ ½	
	$= 10\,[\,4 + 57\,]$	
	$S_{20} = 10 \times 61$	
	$\boxed{S_{20} = 610}$ ½	
20.	Find the roots of the equation $x^2 - 3x + 1 = 0$ using 'quadratic formula'.	
	Ans. :	
	$x^2 - 3x + 1 = 0$	2
	$a = 1, \quad b = -3, \quad c = 1$	
	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ ½	
	$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4 \times 1 \times 1}}{2 \times 1}$ ½	
	$x = \frac{3 \pm \sqrt{9-4}}{2}$	
	$x = \frac{3 \pm \sqrt{5}}{2}$ ½	
	$\boxed{x = \frac{3+\sqrt{5}}{2}}$ $\boxed{x = \frac{3-\sqrt{5}}{2}}$ ½	
21.	If $\frac{\sqrt{3}\sec A}{\text{cosec } A} = 1$, then find the value of A.	
	OR	
	Prove that :	
	$\sin 30° \,.\, \cos 60° + \cos 30° \,.\, \sin 60° = \sin 90°$	
	Ans. :	

Qn. Nos.	Value Points		Marks allotted
	$\frac{\sqrt{3}\sec A}{\text{cosec } A}=1$		
	$\frac{\frac{\sqrt{3}}{\cos A}}{\frac{1}{\sin A}}=1$	½	
	$\frac{\sqrt{3}\times \sin A}{\cos A}=1$		
	$\sqrt{3}\tan A=1$	½	
	$\tan A=\frac{1}{\sqrt{3}}$		
	$\tan A = \tan 30°$	½	
	$\boxed{A = 30°}$	½	2
	OR		
	$\sin 30°=\frac{1}{2}, \cos 60°=\frac{1}{2}, \cos 30°=\frac{\sqrt{3}}{2}$		
	$\sin 60°=\frac{\sqrt{3}}{2}$	½	
	L.H.S = $\sin 30° \cos 60° + \cos 30° \sin 60°$		
	$=\frac{1}{2}\times\frac{1}{2}+\frac{\sqrt{3}}{2}\times\frac{\sqrt{3}}{2}$	½	
	$=\frac{1}{4}+\frac{3}{4}$		
	= 1 R.H.S ..... (1)	½	
	1 = sin 90° .....(2)		
	from (1) and (2)		
	sin 30° cos 60° + cos 30° sin 60° = sin 90°	½	2
22.	Find the coordinates of the point which divides the line segment joining the points (– 1, 7) and (4, – 3) in the ratio 2 : 3.		
	Ans. :		
	(– 1, 7) (4, – 3) 2 : 3		
	(x_1, y_1) (x_2, y_2) $m_1 : m_2$	½	

Qn. Nos.	Value Points	Marks allotted
	Let the coordinator be (x, y)	
	$(x, y) = \left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}\right)$ ½	
	$= \left(\frac{2\times(4) + 3(-1)}{2+3}, \frac{2\times(-3) + 3\times(7)}{2+3}\right)$ ½	
	$= \left(\frac{8-3}{5}, \frac{-6+21}{5}\right)$	
	$= \left(\frac{5}{5}, \frac{15}{5}\right)$ ½	
	$(x, y) = (1, 3)$	2
23.	A bag contains cards bearing the numbers 2, 4, 8, 16, 32, 64, 128 and 256. One card is drawn at random from the bag. Find the probability that the card bears a perfect cube number.	
	Ans. :	
	$n(s) = \{2,4,8,16,32,64,128,256\} = 8$ ½	
	$n(A) = \{8, 64\} = 2$ ½	
	$P(A) = \frac{n(A)}{n(S)}$ ½	
	$= \frac{2}{8}$	
	$P(A) = \frac{1}{4}$ ½	2
24.	Draw a circle of radius 3 cm and construct a pair of tangents to the circle such that the angle between them is 70°.	
	Ans. :	
	Angle between Radii- 180° – 70° = 110° ½	

Qn. Nos.	Value Points		Marks allotted
			
	Drawing a circle of radius 4 cm	½	
	Drawing 2 arcs	½	
	Drawing a pair of tangents to circle	½	2
IV.	**Answer the following questions :** **9 × 3 = 27**		
25.	Divide $p(x) = x^3 - 3x^2 + 3x - 5$ by $g(x) = x^2 - x + 1$ and find the quotient [$q(x)$] and remainder [$r(x)$].		
	Ans. :		
	$P(x) = x^3 - 3x^2 + 3x - 5$		
	$g(x) = x^2 - x + 1$		
	$q(x) = ?$		
	$r(x) = ?$		
	$x^2 - x + 1 \overline{)\ x^3 - 3x^2 + 3x - 5\ (\ x - 2}$		
	$x^3 - x^2 + x$	1	
	$(-)\quad(+)\quad(-)$		
	$-2x^2 + 2x - 5$		
	$-2x^2 + 2x - 2$	1	
	$(+)\quad(-)\quad(+)$		
	-3		
	∴ Quotient $\boxed{q(x) = x - 2}$	½	
	Remainder $\boxed{r(x) = -3}$	½	
			3

Qn. Nos.	Value Points	Marks allotted
26.	A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train. **OR** If the discriminant of the quadratic equation $x+\frac{1}{x}=\frac{10}{k}$ is zero, then find the value of 'k'. *Ans.* : Let the average speed of the train be = x km/hr ½ Distance travelled = 360 km Time taken = $\frac{360}{x}$ If the speed increases by 5 km/hr Then the speed of the train = $(x+5)$ km/hr Time taken = $\frac{360}{x+5}$ ½ According to the data $\frac{360}{x}-\frac{360}{x+5}=1$ ½ $\frac{360(x+5)-360x}{x(x+5)}=1$ ½ $\frac{\cancel{360x}+1800-\cancel{360x}}{x^2+5x}=1$ $1800=1(x^2+5x)$ $x^2+5x-1800=0$ $x^2+45x-40x-1800=0$ $x(x+45)-40(x+45)=0$ $(x+45)(x-40)=0$ $x+45=0 \quad x=-45$ Speed of the train cannot be negative ½ $x-40=0$ $\therefore x=40$ The average speed of the train (x) = 40 km/hr ½ **OR** $x+\frac{1}{x}=\frac{10}{k}$	3

Qn. Nos.	Value Points		Marks allotted
	$\frac{x^2+1}{x}=\frac{10}{k}$	½	
	$k\,(x^2+1)=10x$		
	$kx^2+k=10x$		
	$kx^2-10x+k=0$	½	
	$a = k,\ b = -10,\ c = k$		
	$b^2-4ac=0$	½	
	$(-10)^2-4\times k\times k=0$		
	$(-10)^2-4k^2=0$	½	
	$100-4k^2=0$		
	$100=4k^2$		
	$k^2=\frac{100}{4}$		
	$k^2=25$		
	$k=\pm\sqrt{25}$	½	
	$k=\pm 5$		
	$\boxed{k=5}$ $\boxed{k=-5}$	½	3
27.	Prove that "The lengths of tangents drawn from an external point to a circle are equal".		
	Ans. :		
		½	
	Data : O is the centre of the circle, PQ and PR are tangents drawn from external point P.	½	
	To prove : $PQ = PR$	½	
	Construction : Join OP, OQ and OR		

Qn. Nos.	Value Points	Marks allotted
	Proof : In the figure ½ $\angle OQP = \angle ORP = 90°$ [$OQ \perp PQ$, $OR \perp PR$] ½ $OQ = OR$ (Radii of same circle) $OP = OP$ (Common side) $\Delta OQP \cong \Delta ORP$ (R. H.S.) ½ $\therefore\ PQ = PR$ (C.P.C.T) Note : If the theorem is proved as given in the textbook give full marks.	3
28.	The mid-point of the line segment joining the points $A(x, 0)$ and $B(0, y)$ is $(4, 3)$. Find the length of AB. **OR** Find the area of a triangle whose vertices are $A(5, 2)$, $B(4, 7)$ and $C(7, -4)$. *Ans.* : $A(x, 0)$ $B(0, y)$ $(4, 3)$ (x_1, y_1) (x_2, y_2) (x, y) $x = \frac{x_1 + x_2}{2}$ $y = \frac{y_1 + y_2}{2}$ ½ $4 = \frac{x + 0}{2}$ $3 = \frac{0 + y}{2}$ ½ $8 = x$ $6 = y$ $A(8, 0)$ $B(0, 6)$ ½ $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ ½ $= \sqrt{(0-8)^2 + (6-0)^2}$ ½ $= \sqrt{(-8)^2 + (6)^2}$ $= \sqrt{64 + 36}$ $AB = \sqrt{100}$ $AB = 10$ units ½ **OR** $A(5, 2)$ $B(4, 7)$ $C(7, -4)$ (x_1, y_1) (x_2, y_2) (x_3, y_3) ½ $A = \frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$ 1	3

Qn. Nos.	Value Points	Marks allotted
	$= \frac{1}{2}[5(7+4)+4(-4-2)+7(2-7)]$	
	$= \frac{1}{2}[5(11)+4(-6)+7(-5)]$ ½	
	$= \frac{1}{2}[55-24-35]$	
	$= \frac{1}{2}[55-59]$	
	$= \frac{1}{\cancel{2}}[-\overset{2}{\cancel{4}}]$	
	$A = -2$ ½	
	Since area is a measure which cannot be negative .	
	$\therefore$ Area of the triangle = 2 sq.units. ½	3
29.	Find the mean for the following data :	

Class-interval	*Frequency*
10 – 20	2
20 – 30	5
30 – 40	6
40 – 50	5
50 – 60	2

OR

Find the mode for the following data :

Class-interval	*Frequency*
0 – 5	4
5 – 10	10
10 – 15	6
15 – 20	4
20 – 25	5

Ans. :

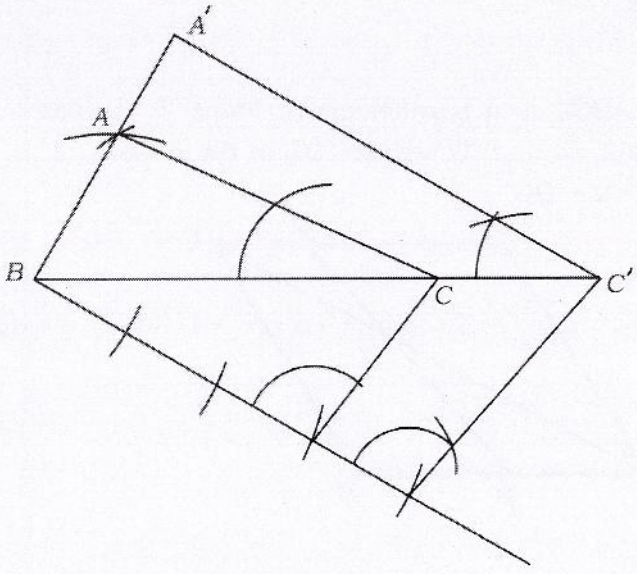
Class-interval	frequency (f_i)	Mid-point x_i	$x_i f_i$
10-20	2	15	30
20-30	5	25	125
30-40	6	35	210
40-50	5	45	225
50-60	2	55	110
	$\Sigma f_i = 20$		$\Sigma f_i x_i = 700$

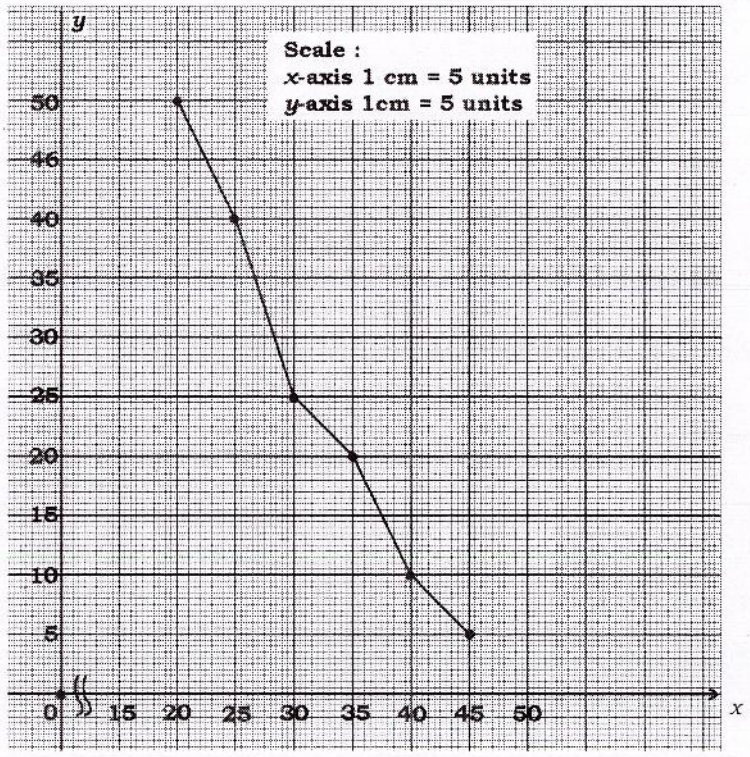
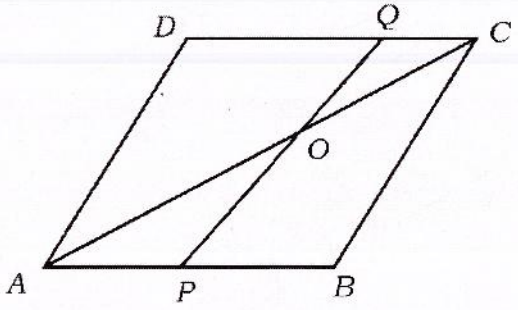
2

Qn. Nos.	Value Points		Marks allotted
	Mean = $\overline{X} = \frac{\sum f_i x_i}{\sum f_i}$	½	
	$= \frac{700}{20}$		
	Mean $(\overline{X})$ = 35	½	3
	OR		
	From the frequency distribution table, we find that		
	$f_1 = 10 \quad f_0 = 4 \quad f_2 = 6 \quad h = 5 \quad l = 5$	½	
	Mode = $l + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$	½	
	$= 5 + \left[\frac{10-4}{2\times10-4-6}\right] \times 5$	½	
	$= 5 + \left[\frac{6}{20-10}\right] \times 5$	½	
	$= 5 + \left[\frac{\cancel{6}^{3}}{\cancel{10}_{2}}\right] \times \cancel{5}^{1}$	½	
	= 5 + 3		
	Mode = 8	½	3
30.	During the medical check-up of 50 students of a class, their weights were recorded as follows. Draw a "more than type ogive" for the given data :		

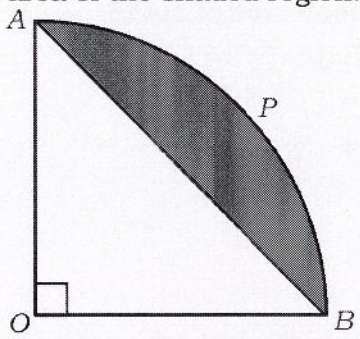
Weight (in kg)	*Number of students (cumulative frequency)*
20 or more than 20	50
25 or more than 25	40
30 or more than 30	25
35 or more than 35	20
40 or more than 40	10
45 or more than 45	5

Ans. :

Qn. Nos.	Value Points		Marks allotted
	$\therefore\ \Delta AOP \sim \Delta COQ$ (*A. A* criteria)		
	$\therefore\ \frac{OA}{OC}=\frac{AP}{CQ}$ $\quad CQ=\frac{1}{5}CD$ $\quad AP=\frac{2}{5}AB$	½	
	$\therefore\ \frac{OA}{OC}=\frac{\frac{2}{5}AB}{\frac{1}{5}CD}$	½	
	$AB = CD$ (opposite sides of a parallelogram)		
	$\therefore\ \frac{OA}{OC}=\frac{\frac{2}{\cancel{5}}\cancel{AB}}{\frac{1}{\cancel{5}}\cancel{AB}}$	½	
	$\therefore\ \frac{OA}{OC}=2$		
	$\therefore\ OA = 2 \times OC$	½	3
32.	Construct a triangle with sides 5 cm, 6 cm and 7 cm and then construct another triangle whose sides are $\frac{4}{3}$ of the corresponding sides of first triangle.		
	Ans. : 		
	Construction of given triangle	1	
	Construction of acute angle with division	½	
	Drawing parallel lines	1	
	Obtaining required triangle	½	3

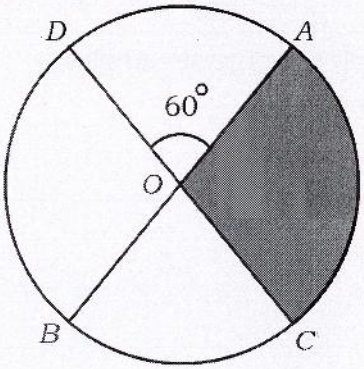
Qn. Nos.	Value Points	Marks allotted
		
	Drawing axes and writing scale 1	
	Marking points 1	
	Drawing ogive 1	3
31.	In the figure, *ABCD* is a parallelogram. Point *'P'* divides *AB* in the ratio 2 : 3 and *'Q'* divides *DC* in the ratio 4 : 1. Prove that $OA = 2 \times OC$. 	
	Ans. : In ΔOAP and ΔOQC $\angle A = \angle C$ (Alternate angles) $\angle O = \angle O$ (Vertically opposite angles) $\angle P = \angle Q$ (alternate angles) 1	

Qn. Nos.	Value Points	Marks allotted
33.	The perimeter of a quadrant of a circle with centre *'O'* is 25 cm. Find the area of the shaded region.	



OR

In the figure, diameters *AB* and *CD* intersect at *'O'*. If length of the arc *BC* = 22 cm and $\angle AOD = 60°$, then find the area of the sector *AOC*.



Ans.

Perimeter of the sector = 25 cm ½

$$\frac{1}{2}\pi r + r + r = 25$$

$$\frac{1}{\cancel{2}} \times \frac{\overset{11}{\cancel{22}}}{7} \times r + 2r = 25$$ ½

$$\frac{11r}{7} + 2r = 25$$

$$\frac{11r + 14r}{7} = 25$$

$$\frac{25r}{7} = 25$$

$$25r = 25 \times 7$$

$$r = \frac{\cancel{25} \times 7}{\cancel{25}}$$

$r = 7$ cm ½

Qn. Nos.	Value Points		Marks allotted
	Area of shaded region =		
	Area of sector – area of ΔOAB	½	
	$\frac{1}{4}\pi r^2 - \frac{1}{2} b \times h$	½	
	$\frac{1}{\cancel{4}_{2}} \times \frac{\overset{11}{\cancel{22}}}{\cancel{7}} \times 7^{\cancel{2}_{1}} - \frac{1}{2} \times 7 \times 7$		
	$\frac{77}{2} - \frac{49}{2}$		
	$\frac{77 - 49}{2}$		
	$= \frac{28}{2}$		
	$= 14 \text{ cm}^2$	½	3
	OR		
	$\angle BOC = 60°$ (Vertically opposite angles)		
	Arc length of BC = 22 cm	½	
	$\frac{\theta}{360°} \times 2\pi r = 22$		
	$\frac{\overset{1}{\cancel{60}}}{\cancel{360}_{6_3}} \times \cancel{2}^{1} \times \frac{22}{7} \times r = 22$	½	
	$\frac{22r}{21} = 22$		
	$22r = 22 \times 21$		
	$r = \frac{\cancel{22} \times 21}{\cancel{22}}$		
	$r = 21$ cm	½	
	AOB is diameter		
	$\therefore \angle BOD = 180° - 60° = 120°$		
	Area of shaded region =		
	$= \frac{\theta}{360°} \times \pi r^2$	½	
	$= \frac{120}{360} \times \frac{22}{7} \times (21)^2$		
	$= \frac{\overset{1}{\cancel{120}}}{\cancel{360}_{3}} \times \frac{22}{\cancel{7}_{1}} \times \overset{7}{\cancel{21}} \times 21$	½	
	Area of shaded region = 462 cm^2	½	3

Qn. Nos.	Value Points	Marks allotted
V.	**Answer the following questions :** **4 × 4 = 16**	
34.	A person works in a shop from Monday to Saturday. His every- day earnings are in an arithmetic progression. His total earnings from Monday to Wednesday is Rs. 525 and Friday he gets Rs. 100 more than his Monday's earning. Find his everyday's earning.	
	OR	
	The angles of a quadrilateral are in arithmetic progression. If the sum of a pair of opposite angles is 130°, then find the angles of the quadrilateral.	
	Ans. :	
	Let the person's income from Monday to Saturday be a,	
	$a + d$, $a + 2d$, $a + 3d$, $a + 4d$, $a + 5d$. ½	
	According to data $a + a + d + a + 2d = 525$	
	$3a + 3d = 525 \div 3$ 1	
	$a + d = 175$ ..... (1)	
	$\cancel{a} + 4d = \cancel{a} + 100$	
	$4d = 100$	
	$d = \frac{100}{4}$	
	$\boxed{d = 25}$ ½	
	Substituting $d = 25$ in equation (1)	
	$a + d = 175$ ½	
	$a + 25 = 175$	
	$a = 175 - 25$	
	$\boxed{a = 150}$ ½	
	∴ His everyday's income =	
	a, $a + d$, $a + 2d$, $a + 3d$, $a + 4d$, $a + 5d$	
	150, 150 + 25, 150 + 2 × 25, 150 + 3 × 25, 150 + 4 × 25,	
	150 + 5 × 25. 1	
	150, 175, 200, 225, 250, 275	4
	OR	

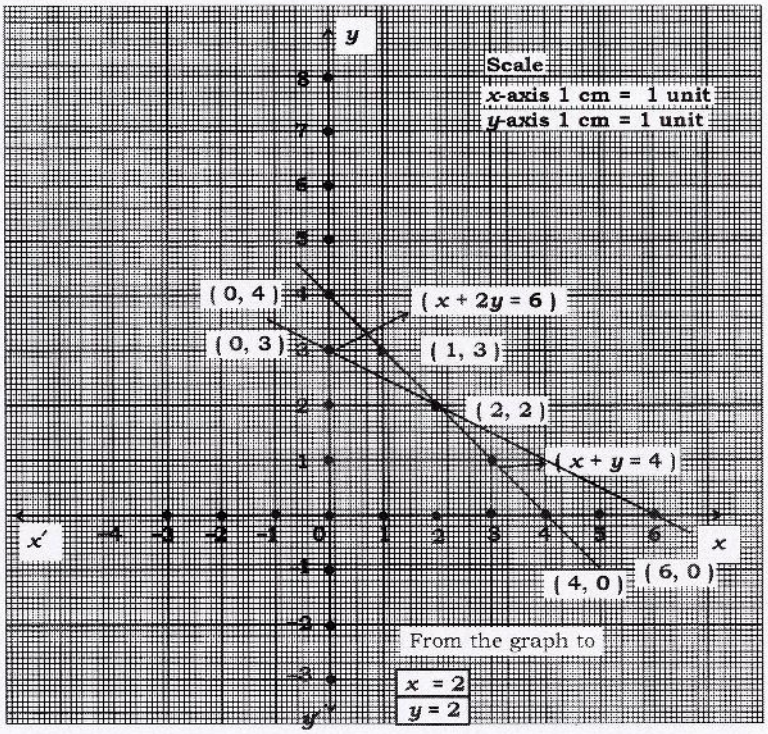
Qn. Nos.	Value Points	Marks allotted
	Let the angles of the quadrilateral be a, $a + d$, $a + 2d$, $a + 3d$ ½	
	$\therefore\ a + a + d + a + 2d + a + 3d = 360°$	
	$4a + 6d = 360° \div 2$ ½	
	$2a + 3d = 180°$ ..... (1)	
	Sum of a pair of opposite angles = 130° ½	
	$a + a + 2d = 130°$ OR $a + d + a + 3d = 130°$	
	$2a + 2d = 130° \div 2$ $2a + 4d = 130°$	
	$a + d = 65°$..... (2) $a + 2d = 130°$ ½	
	$2a + 3d = 180°$ .....(1) × 1	
	$a + d = 65°$ ..... (2) × 2	
	$2a + 3d = 180°$	
	$2a + 2d = 130°$ subtracting	
	(–) (–) (–)	
	$\boxed{d = 50°}$ ½	
	Subsituting $d = 50°$ in equation 2	
	$a + d = 65°$	
	$a + 50° = 65°$	
	$a = 65° - 50°$	
	$\boxed{a = 15°}$ ½	
	$\therefore$ Angles of the quadrilateral are	
	$a, a + d, a + 2d, a + 3d$	
	$15°, 15° + 50°, 15° + 2 \times 50°, 15 + 3 \times 50°$	
	$15°, 65°, 115°, 165°$ 1	4
35.	Find the solution of the given pair of linear equations by graphical method :	
	$x + y = 4$	
	$x + 2y = 6$	
	Ans. :	
	$x + y = 4$	

x	0	4	1	2
y	4	0	3	2

Qn. Nos.	Value Points	Marks allotted

$x + 2y = 6$

x	0	6	2
y	3	0	2



For table construction 1 + 1

Drawing two lines by marking points 1

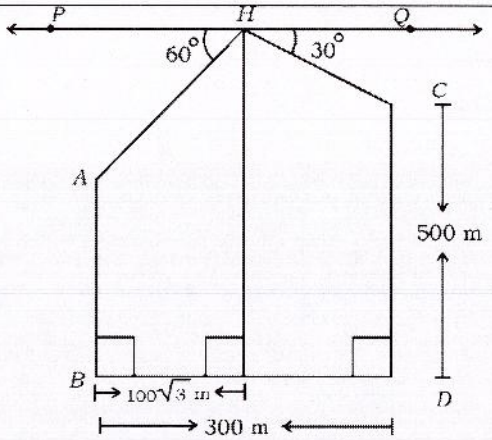
Marking point of intresection and writing values of x and y 1

Note : Any other points can be considered to get straight lines. 4

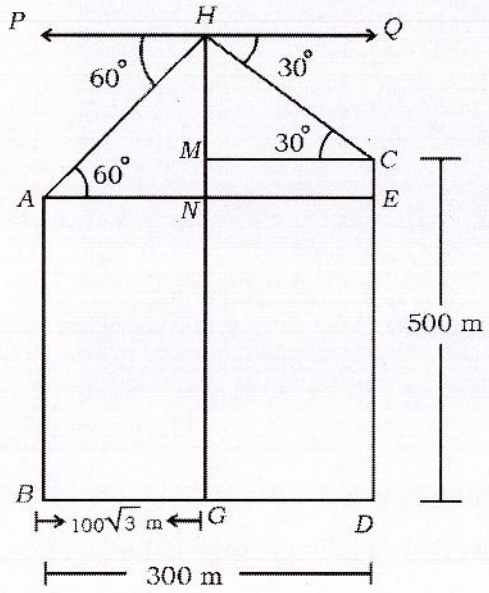
36. There are two vertical towers on a level ground which are 300 m apart. A soldier in an helicopter above the ground observes the top of the towers and he found the angles of depression to be 60° and 30° as shown in the figure. If the height of the taller tower is 500 m and the distance between the foot of the shorter tower and the foot of the altitude from the helicopter to the ground is $100\sqrt{3}$ m, then find the height of the shorter tower.

[Take $\sqrt{3}$ = 1·73]

Qn. Nos.	Value Points	Marks allotted



Ans. :



Join *AN*, *MC*, and *NE*.

$\angle AHP = \angle HAN = 60°$ (Alternate angles)

$\angle CHQ = \angle HCM = 30°$ (Alternate angles) ½

In ΔAHN

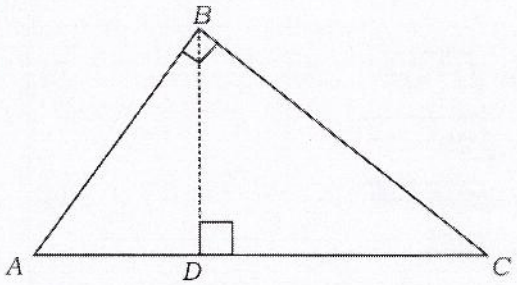
$\tan 60° = \frac{HN}{AN}$ $\qquad AN = BG = 100\sqrt{3}$ m

$\sqrt{3} = \frac{HN}{100\sqrt{3}}$

$HN = 100\sqrt{3} \times \sqrt{3}$ 1

$= 100 \times 3$

$HN = 300$ m

Qn. Nos.	Value Points		Marks allotted
	$GD = 300 - 100\sqrt{3}$	½	
	$= 100\sqrt{3}\ (\sqrt{3} - 1)$		
	In $\Delta\ HMC$		
	$\tan 30° = \frac{HM}{MC}$		
	$\frac{1}{\sqrt{3}} = \frac{HM}{100\sqrt{3}(\sqrt{3} - 1)}$	1	
	$HM = 100(\sqrt{3} - 1)$		
	$= 100(1 \cdot 73 - 1)$		
	$= 100 \times 0 \cdot 73$		
	$\boxed{HM = 73\ \text{m}}$		
	$MN = HN - HM$		
	$= 300 - 73$		
	$\boxed{MN = 227\ \text{m}}$	½	
	∴ Height of shorter tower =		
	$AB = DE = DC - CE$		
	$= 500 - 227$	½	4
	$\boxed{AB = 273\ \text{m}}$		
37.	Prove that "In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides".		
	Ans. :		
		½	
	Data : In ΔABC, $\angle B = 90°$	½	
	To prove : $AC^2 = AB^2 + BC^2$	½	

Qn. Nos.	Value Points	Marks allotted
	Consruction : Draw $AD \perp BC$ ½	
	Proof : $\Delta ADB \sim \Delta ABC$	
	$\frac{AD}{AB} = \frac{AB}{AC}$ (sides are proportional)	
	$AB^2 = AC \,.\, AD$ ..... (1) ½	
	$\Delta BDC \sim \Delta ABC$	
	$\frac{CD}{BC} = \frac{BC}{AC}$	
	$BC^2 = AC.CD$ ..... (2) ½	
	Adding (1) and (2)	
	$AB^2 + BC^2 = AC.AD + AC.CD$ ½	
	$= AC(AD + CD)$	
	$= AC \,.\, AC$	
	$AB^2 + BC^2 = AC^2$ ½	
	Note : Proving this theorem as mentioned in the text-book, marks should be given.	4
VI.	**Answer the following question :** **1 × 5 = 5**	
38.	The volume of a cylinder is equal to 5 times the volume of a cone. The base radius and slant height of the cone are 7 cm and 25 cm respectively. If the radius of the circular base of the cylinder is 14 cm, then find the volume and curved surface area of the cylinder.	
	Ans. :	
	Height of the cone (h) = $\sqrt{l^2 - r^2}$ ½	
	$= \sqrt{25^2 - 7^2}$	
	$= \sqrt{625 - 49}$ ½	
	$= \sqrt{576}$	
	= 24 cm ½	
	Volume of cone = $\frac{1}{3}\pi r^2 h$ ½	

Qn. Nos.	Value Points		Marks allotted
	$= \frac{1}{\cancel{3}} \times \frac{22}{7} \times \cancel{7} \times 7 \times \overset{8}{\cancel{24}}$		
	= 1232 cc	½	
	Volume of the cylinder = 5 × volume of cone		
	= 5 × 1232	½	
	= 6160 cc		
	Radius of cylinder = 14 cm volume of cylinder = 6160 cc		
	∴ Volume of cylinder = $\pi r^2 h$	½	
	$6160 = \frac{22}{7} \times 14 \times 14 \times h$		
	$h = \frac{6160}{616} = 10$ cm	½	
	Curved surface area of a cone (A) = $2\pi rh$	½	
	$= 2 \times \frac{22}{\cancel{7}} \times \overset{2}{\cancel{14}} \times 10$		
	= 880 cm^2	½	5