

INDIAN SCHOOL MUSCAT
FINAL EXAMINATION 2022-23
MATHEMATICS (041)

CLASS:IX

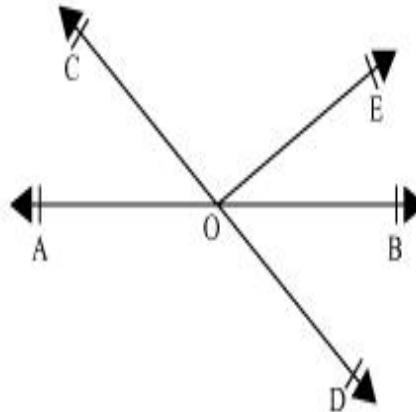
Max.Marks: 80

				SET	A/B/C
MARKING SCHEME					
SET	QN. NO	VALUE POINTS			MARKS SPLIT UP
		SET - A	SET - B	SET - C	
	1	(d) an irrational number	c) 50°	(d) 35	1
	2	a) Isosceles but not congruent	(d) not defined	(d) 45°	1
	3	(a) $3x + y - 5 = 0$	(a) 22	(c) a real number	1
	4	(b) 52°	(c) $50 - 60$	(c) 10 cm	1
	5	(c) a real number	(d) an irrational number	(d) $\frac{32}{3}\pi r^3$	1
	6	(c) (2, 0)	(b) 52°	c) 50°	1
	7	(c) $l^2 = h^2 + r^2$	(d) 45°	(a) 22	1
	8	(d) 35	(c) 1	(d) not defined	1
	9	(c) 10 cm	a) Isosceles but not congruent	(b). $48^\circ, 60^\circ, 120^\circ, 132^\circ$	1
	10	(a) quadratic polynomial in x	(c) a real number	(d) an irrational number	1
	11	(c) $50 - 60$	(c) (2, 0)	(b) 52°	1
	12	(d) $\frac{32}{3}\pi r^3$	(c) $l^2 = h^2 + r^2$	a) Isosceles but not congruent	1
	13	(d) 45°	(a) $3x + y - 5 = 0$	(a) quadratic polynomial in x	1
	14	(d) not defined	(d) 35	(c) $50 - 60$	1

	15	(b). $48^\circ, 60^\circ, 120^\circ, 132^\circ$	(c) 10 cm	(c) 1	1
	16	(a) 22	(a) quadratic polynomial in x	(c) (2, 0)	1
	17	c) 50°	(b). $48^\circ, 60^\circ, 120^\circ, 132^\circ$	(c) $l^2 = h^2 + r^2$	1
	18	(c) 1	(d) $\frac{32}{3}\pi r^3$	(a) $3x + y - 5 = 0$	1
	19	a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion	c.) Assertion is true but the Reason is false.	a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion	1
	20	c.) Assertion is true but the Reason is false.	a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion	c.) Assertion is true but the Reason is false.	1

SET- A

	21	Use Identity $(x + a)(x + b) = [x^2 + (a + b)x + ab]$ $(103 \times 99) = 10197$	$\frac{1}{2}$ $1\frac{1}{2}$
	22	(a) $120^\circ + y = 180^\circ \rightarrow y = 60^\circ$ (b) $2x + 40^\circ = 180^\circ \rightarrow x = 70^\circ$	1 1
	23	(4,0) (6,1) Or any 2 relevant answer	1 1
	24	Identity $\rightarrow (x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$ $(2x - 5)^3 = 8x^3 - 60x^2 + 150x - 125$ OR $LHS = (x - y)(x^2 + xy + y^2)$ $= x^3 + x^2y + xy^2 - x^2y - xy^2 - y^3$ $= x^3 - y^3 = RHS$	$\frac{1}{2}$ $1\frac{1}{2}$
	25	$2\pi r = 220$ $r = \frac{220 \times 7}{2 \times 22}$ $r = 35$ Base area = $\pi r^2 = 110 \times 35 = 3850 \text{ cm}^2$ OR $4\pi r^2 = 484\pi$ $r^2 = 121 \rightarrow r = 11$ <i>Diameter</i> = 22 cm	1 1
	26	X=0.252525.....(1) 100X=25.252525.....(2) (2)-(1) 99X=25	$\frac{1}{2}$ 1 1

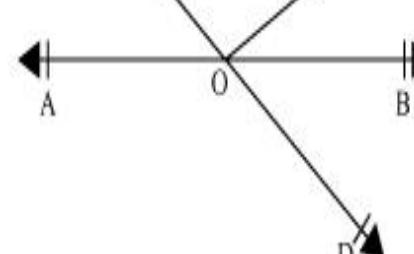
		$X = \frac{25}{99}$ OR $(3\sqrt{3} + 2\sqrt{2})(2\sqrt{3} + 3\sqrt{2})$ $3\sqrt{3}(2\sqrt{3} + 3\sqrt{2}) + 2\sqrt{2}(2\sqrt{3} + 3\sqrt{2})$ $= 6 \times 3 + 9\sqrt{3}\sqrt{2} + 4\sqrt{2}\sqrt{3} + 6 \times 2$ $= 18 + 9\sqrt{6} + 4\sqrt{6} + 12$ $= 30 + (9+4)\sqrt{6} = 30 + 13\sqrt{6}$	$\frac{1}{2}$ 1 1 $\frac{1}{2}$ $\frac{1}{2}$															
	27	Given, To prove Figure Proof OR Given, To prove Figure Proof	$\frac{1}{2}$ $\frac{1}{2}$ 2 $\frac{1}{2}$ $\frac{1}{2}$ 2															
	28	<table border="1"> <thead> <tr> <th>MARKS</th> <th>TALLY MARK</th> <th>FREQUENCY</th> </tr> </thead> <tbody> <tr> <td>40-60</td> <td></td> <td>3</td> </tr> <tr> <td>60-80</td> <td></td> <td>6</td> </tr> <tr> <td>80-100</td> <td></td> <td>11</td> </tr> <tr> <td>TOTAL</td> <td></td> <td>20 (Cut $\frac{1}{2}$ Mark if not)</td> </tr> </tbody> </table>	MARKS	TALLY MARK	FREQUENCY	40-60		3	60-80		6	80-100		11	TOTAL		20 (Cut $\frac{1}{2}$ Mark if not)	1 1 1
MARKS	TALLY MARK	FREQUENCY																
40-60		3																
60-80		6																
80-100		11																
TOTAL		20 (Cut $\frac{1}{2}$ Mark if not)																
	29	$\angle AOC + \angle BOE = 70^\circ$ and $\angle BOD = 40^\circ$ Now, AB is a line $\therefore \angle AOC + \angle BOE + \angle COE = 180^\circ$ (Angles on a line are supplementary) $\Rightarrow 70^\circ + \angle COE = 180^\circ$ $\Rightarrow \angle COE = 180^\circ - 70^\circ = 110^\circ$ Also, $\angle AOC = \angle BOD$ (Vertically opposite angles) $\Rightarrow \angle AOC = 40^\circ$ $\therefore \angle BOE = 70^\circ - 40^\circ = 30^\circ$ Hence, reflex $\angle COE = 360^\circ - \angle COE = 360^\circ - 110^\circ = 250^\circ$		1 1 1														
	30	$3(k) - k(-1) = 8$ $3k + k = 8$ $4k = 8$ $k = 2$	1 $\frac{1}{2}$ 1 $\frac{1}{2}$															
	31	Each Bar	$1+1+1$															
	32	Factor Theorem – statement $P(-1) = 0 \rightarrow (x + 1)$ is a factor $p(x) \div (x + 1) = x^2 - 7x + 10$ Splitting middle term $\rightarrow (x - 5)(x - 2)$ $p(x) = (x + 1)(x - 5)(x - 2)$	1 1 $1\frac{1}{2}$ 1 $\frac{1}{2}$															

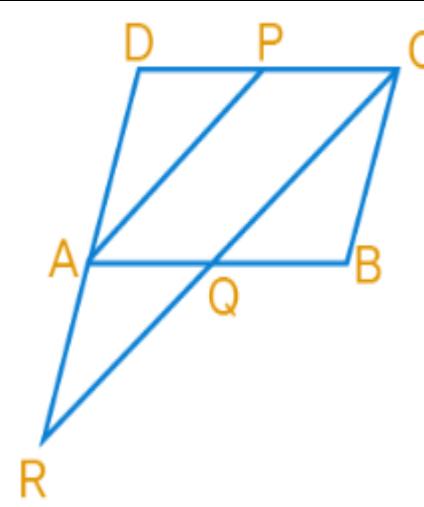
33	(a) Number line + Perpendicular + Triangle + Correct location of $\sqrt{5}$. (b) $\frac{2}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1} = \frac{2\sqrt{3}+2}{2} = \frac{\sqrt{3}+1}{1}$		$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ $1 + 1 + 1$
34	Given, to prove, figure, constrn Draw DP parallel to EF Considering triangle ADP, E is the midpoint of AD $EF \parallel DP$ By converse of midpoint theorem, F is the midpoint of AP. Considering triangle FBC, D is the midpoint of BC $DP \parallel BF$ By converse of midpoint theorem, P is the midpoint of FC So, $AF = FP = PC$ Therefore, $AF = \frac{1}{3} AC$ OR		$\frac{1}{2}$ $\frac{1}{2}$ 1 1 $\frac{1}{2}$ $\frac{1}{2}$
	Given, to prove, figure, constrn $BC \parallel AD$ and $BC = AD$ $AB \parallel CD$ and $AB = CD$ Since P is the midpoint of DC. $DP = PC = \frac{1}{2} CD$ ----- (1) Given, $QC \parallel AP$, $PC \parallel AQ$ APCQ is a parallelogram So, $AQ = PC$ From (1), $AQ = PC = \frac{1}{2} CD$ Since $AB = CD$ $PC = \frac{1}{2} AB = BQ$ Considering AQR and BQC, $AQ = BQ$ $\angle AQR = \angle BQC$ (VOA) $\angle ARQ = \angle BCQ$ (Alt int \angle s) $AQR \cong BQC$ (ASA) $AR = BC$ (CPCT) Given, $BC = AD$ So, $AR = AD$ $CO = OR$ (CPCT)		$\frac{1}{2}$ $\frac{1}{2}$ 1 1 $\frac{1}{2}$ $\frac{1}{2}$

35	<p>Total volume of 27 iron spheres = Volume of new sphere $\text{Volume of each original sphere} = \frac{4}{3}\pi r^3$ $\text{Volume of 27 spheres} = 27 \times \frac{4}{3}\pi r^3 = 1083\pi r^3$ $\text{Volume of new sphere} = 1083\pi r^3$ $\frac{4}{3}\pi(r')^3 = 1083\pi r^3$ $(r')^3 = 27r^3$ Therefore, $r' = 3r$.(ii) ratio of S and S' Surface area of original sphere (S)=$4\pi r^2$ Surface area of new sphere (S')=$4\pi(r')^2=4\pi(3r)^2=36\pi r^2$ Therefore, Ratio of S and S'=$4\pi r^2 : 36\pi r^2 = 1 : 9$. OR</p>	1 $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$
	<p>Volume (Hemisphere)=$\frac{2}{3}\pi r^3$ Surface area=$3\pi r^2$ $\therefore 3\pi r^2 = \frac{2}{3}\pi r^3$ $\Rightarrow 2r = 9$ $\Rightarrow r = 4.5$ Base circumference= $2\pi r = \frac{198}{7}$ CSA= $2\pi r^2 = \frac{891}{7}$</p>	$\frac{1}{2}$ $\frac{1}{2}$ 1 1 1 1 $\frac{1}{2}$ 1 1
36	<p>(a)13 cm, 14 cm, 15 cm (b)42 cm (c)336 cm^2 OR 42 cm</p>	1 1 2
37	<p>(a)SAS (b) (iii) Side QR = Side AB (c)$3x + 1 = x + 5 \rightarrow x = 2$ OR $3x + 1 = x + 5 \rightarrow x = 2 \rightarrow AC = 7 \text{ cm}$</p>	1 1 2
38	<p>(a)A(4,6) (b)C (c) $\sqrt{2^2 + 3^2} = \sqrt{13} \text{ cm}$ OR 3 cm^2</p>	1+1+2

SET- B

	21	$2\pi r = 220$ $r = \frac{220 \times 7}{2 \times 22}$ $r = 35$ <p>Base area = $\pi r^2 = 110 \times 35 = 3850 \text{ cm}^2$</p> <p style="text-align: center;">OR</p> $4\pi r^2 = 484\pi$ $r^2 = 121 \rightarrow r = 11$ <p><i>Diameter</i> = 22 cm</p>	1 1
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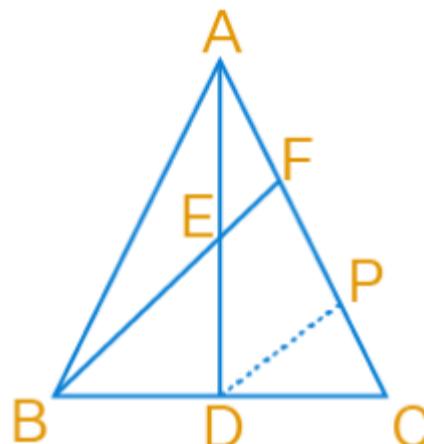
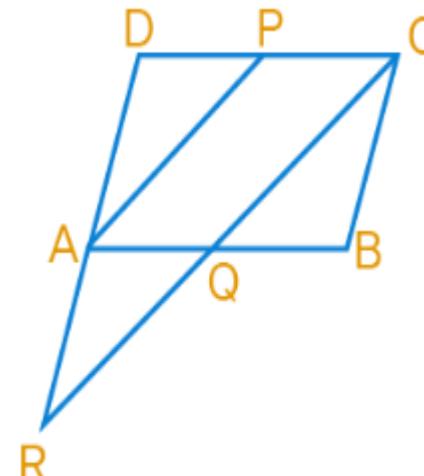
30	<p>$\angle AOC + \angle BOE = 70^\circ$ and $\angle BOD = 40^\circ$</p> <p>Now, AB is a line $\therefore \angle AOC + \angle BOE + \angle COE = 180^\circ$ (Angles on a line are supplementary) $\Rightarrow 70^\circ + \angle COE = 180^\circ$ $\Rightarrow \angle COE = 180^\circ - 70^\circ = 110^\circ$ Also, $\angle AOC = \angle BOD$ (Vertically opposite angles) $\Rightarrow \angle AOC = 40^\circ$ $\therefore \angle BOE = 70^\circ - 40^\circ = 30^\circ$ Hence, reflex $\angle COE = 360^\circ - \angle COE = 360^\circ - 110^\circ = 250^\circ$</p>		1 1 1
31	<p>Given, To prove Figure Proof</p> <p style="text-align: center;">OR</p> <p>Given, To prove Figure Proof</p>	$\frac{1}{2}$ $\frac{1}{2}$ 2 $\frac{1}{2}$ $\frac{1}{2}$ 2	
32	<p>Total volume of 27 iron spheres = Volume of new sphere</p> <p>Volume of each original sphere $= \frac{4}{3}\pi r^3$</p> <p>Volume of 27 spheres $= 27 \times \frac{4}{3}\pi r^3 = 1083\pi r^3$</p> <p>Volume of new sphere $= 1083\pi r^3$</p> <p>$\frac{4}{3}\pi (r')^3 = 1083\pi r^3$</p> <p>$(r')^3 = 27r^3$</p> <p>Therefore, $r' = 3r$</p> <p>.(ii) ratio of S and S'</p> <p>Surface area of original sphere (S) $= 4\pi r^2$</p> <p>Surface area of new sphere (S') $= 4\pi (r')^2 = 4\pi (3r)^2 = 36\pi r^2$</p> <p>Therefore, Ratio of S and S' $= 4\pi r^2 : 36\pi r^2 = 1 : 9$.</p> <p style="text-align: center;">OR</p> <p>Volume (Hemisphere) $= \frac{2}{3}\pi r^3$</p> <p>Surface area $= 3\pi r^2$</p> <p>$\therefore 3\pi r^2 = \frac{2}{3}\pi r^3$</p> <p>$\Rightarrow 2r = 9$</p> <p>$\Rightarrow r = 4.5$</p> <p>Base circumference $= 2\pi r = \frac{198}{7}$</p> <p>CSA $= 2\pi r^2 = \frac{891}{7}$</p>	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ 1 1 1 1 1 1	

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	35	<p>Factor Theorem – statement $P(-1) = 0 \rightarrow (x + 1)$ is a factor $p(x) \div (x + 1) = x^2 - 7x + 10$ Splitting middle term $\rightarrow (x - 5)(x - 2)$ $p(x) = (x + 1)(x - 5)(x - 2)$</p>	1 1 $\frac{1}{2}$ 1 $\frac{1}{2}$	

	36	(a)A(4,6) (b)C (c) $\sqrt{2^2 + 3^2} = \sqrt{13}$ cm OR 3 cm ²	1+1+2
	37	(a)13 cm, 14 cm, 15 cm (b)42 cm (c)336 cm ² OR 42 cm	1 1 2
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SET- C

	21	(4,0) (6,1) Or any 2 relevant answer	1 1
	22	Use Identity $(x + a)(x + b) = [x^2 + (a + b)x + ab]$ $(103 \times 99) = 10197$	$\frac{1}{2}$ $1\frac{1}{2}$
	23	Identity $\rightarrow (x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$ $(2x - 5)^3 = 8x^3 - 60x^2 + 150x - 125$ OR	$\frac{1}{2}$ $1\frac{1}{2}$
		$LHS = (x - y)(x^2 + xy + y^2)$ $= x^3 + x^2y + xy^2 - x^2y - xy^2 - y^3$ $= x^3 - y^3 = RHS$	$1\frac{1}{2}$ $\frac{1}{2}$
	24	$2\pi r = 220$ $r = \frac{220 \times 7}{2 \times 22}$ $r = 35$ Base area = $\pi r^2 = 110 \times 35 = 3850 \text{ cm}^2$ OR	1 1
		$4\pi r^2 = 484\pi$ $r^2 = 121 \rightarrow r = 11$ $Diameter = 22 \text{ cm}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
		(a) $120^\circ + y = 180^\circ \rightarrow y = 60^\circ$ (b) $2x + 40^\circ = 180^\circ \rightarrow x = 70^\circ$	1 1
	26	Given, To prove Figure Proof OR	$\frac{1}{2}$ $\frac{1}{2}$ 2
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	27	Each Bar	1+1+1

	32	<p>Given, to prove, figure, constrn Draw DP parallel to EF Considering triangle ADP, E is the midpoint of AD $EF \parallel DP$ By converse of midpoint theorem, F is the midpoint of AP. Considering triangle FBC, D is the midpoint of BC $DP \parallel BF$ By converse of midpoint theorem, P is the midpoint of FC So, $AF = FP = PC$ Therefore, $AF = \frac{1}{3} AC$</p> <p style="text-align: center;">OR</p>		$\frac{1}{2}$ $\frac{1}{2}$ 1 1 $\frac{1}{2}$ $\frac{1}{2}$
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	33	<p>Total volume of 27 iron spheres = Volume of new sphere Volume of each original sphere = $\frac{4}{3}\pi r^3$ Volume of 27 spheres = $27 \times \frac{4}{3}\pi r^3 = 1083\pi r^3$ Volume of new sphere = $1083\pi r^3$ $\frac{4}{3}\pi(r')^3 = 1083\pi r^3$</p>		1 $\frac{1}{2}$

