



INDIAN SCHOOL AL WADI AL KABIR

MIDTERM EXAMINATION

Subject: MATHEMATICS

Class :IX

Marking scheme (SET1)

Max. Marks: 80

Date: 15-09-2026

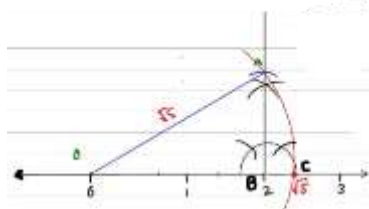
Time: 3 hours

General Instructions:

Read the following instructions very carefully and strictly follow them:

- i. This question paper contains **38** questions. **All** questions are **compulsory**.
- ii. This question paper is divided into **five** Sections **A, B, C, D and E**.
- iii. In **Section A**, Question no. **1 to 18** are multiple choice questions (MCQs) and question number **19 and 20** are Assertion-Reason based questions of **1** mark each.
- iv. In **Section B**, Question no. **21 to 25** are very short answer (VSA) type questions, carrying **2** marks each.
- v. In **Section C**, Question no. **26 to 31** are short answer (SA) type questions, carrying **3** marks each.
- vi. In **Section D**, Question no. **32 to 35** are long answer (LA) type questions carrying **5** marks each.
- vii. In **Section E**, Question no. **36 to 38** are case study-based questions carrying **4** marks each.
Internal choice is provided in **2** marks questions in each case-study.
- viii. There is no overall choice. However, an internal choice has been provided in **2** questions in Section **B**, **2** questions in Section **C**, **2** questions in Section **D** and **3** questions in Section **E**.
- ix. Draw neat diagrams wherever required.

SECTION A		
PART-1(MCQ-1 mark each)		
Q. No.	Question	Marks
1	(B) -1	1
2	(C) 3	1
3	(D) 5	1
4	(A) $72^\circ, 108^\circ$	1
5	(B) 9	1
6	(D) Debt	1
7	(C) 999996	1
8	(D) 2, -9	1
9	(A) $3x + 2y$	1
10	(C) 29 units	1
11	(B) $\frac{\sqrt{15}}{\sqrt{5}}$	1
12	(B) 5cm	1
13	(C) ₹420	1
14	(A) $\frac{1}{2} \left(\frac{1}{3} + \frac{3}{4} \right)$	1
15	(C) 70°	1

16	(A) 104		1
17	(A) 5		1
18	(C) $AB = CD$		1
ASSERTION AND REASONING (1 mark each)			
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 Assertion (A)		1
Section B (2 marks each)			
21	Using $(x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$ ½ $\left(\frac{3}{2}a - 5b\right)^3 = \left(\frac{3}{2}a\right)^3 - 3\left(\frac{3}{2}a\right)^2(5b) + 3\left(\frac{3}{2}a\right)(5b)^2 - (5b)^3$ $= \frac{27}{8}a^3 - \frac{135}{4}a^2b + \frac{225}{2}ab^2 - 125b^3$ 1 ½		2
22	a) Let Meera's present age be x years. Mother's present age = $4x$. ½ After 5 years: $(x + 5) + (4x + 5) = 55$ $5x + 10 = 55$ $x = 9$ 1 Therefore, Meera's present age = 9 years and mother's present age = 36 years. ½ (OR) b) Let the lengths of the two ribbons be $4x$ cm and $5x$ cm. ½ Given: $5x - 4x = 45$ ½ $x = 45$ ½ Therefore, $4x = 180$ cm, $5x = 225$ cm ½		2
23	a) Step 1: On the number line, take 2 units from 0 and represent this point as B. Therefore, segment $OB = 2$ units Step 2: At point B, draw a perpendicular and mark A such that $BA = 1$ unit. Join O to A. $\therefore OA = \sqrt{5}$ units Step 3: Now, with O as the center and OA as radius, draw an arc to cut the number line at C. Point C represents $\sqrt{5}$ on the number line.  (OR) b) Let $x = 1.4191919 \dots$ ½ $10x = 14.191919 \dots$ ---(1) $1000x = 1419.191919 \dots$ -----(2) Subtracting (2) - (1): $990x = 1405$, ½ $x = \frac{1405}{990} = \frac{281}{198}$ ½		2
24	Expansion is wrong. The correct expansion is: $(a - b)^2 = a^2 - 2ab + b^2$ $(11x - 6)^2 = (11x)^2 - 2(11x)(6) + 6^2$ $= 121x^2 - 132x + 36$ ½ 1 ½		2
25	$p(x) = 4 + x^3 - x + 2x^2$ (i) $x = -1$, $p(-1) = 4 + (-1)^3 - (-1) + 2(-1)^2$ $= 4 - 1 + 1 + 2 = \boxed{6}$ 1		2

$$(ii) x = 3,$$

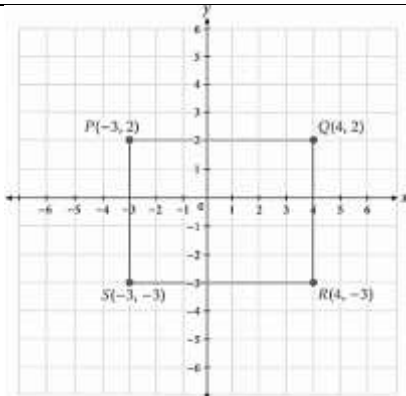
$$p(3) = 4 + 3^3 - 3 + 2(3)^2$$

$$= 4 + 27 - 3 + 18 = \boxed{46}$$

1

Section C (3 marks each)

26



Plotting, labelling and joining the points
Coordinates of S in graph: (-3, -3)

2 ½
½

3

27

a)

Let the breadth be x m.

Then length = $(x + 5)$ m.

$$x(x + 5) = 84$$

$$x^2 + 5x - 84 = 0$$

$$(x + 12)(x - 7) = 0$$

$$x = 7 \text{ or } x = -12$$

Sum = 5, Product = -84

2 ½

Since length cannot be negative, Breadth = 7 m, Length = 12 m

½

(OR)

b) $x + y + z = 10$, $x^2 + y^2 + z^2 = 38$, and $xyz = 25$,

$$(x + y + z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$$

$$10^2 = 38 + 2(xy + yz + zx)$$

$$100 - 38 = 2(xy + yz + zx)$$

$$xy + yz + zx = 31$$

1 ½

$$x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - (xy + yz + zx))$$

$$x^3 + y^3 + z^3 - 3 \times 25 = 10 \times (38 - 31)$$

$$x^3 + y^3 + z^3 - 75 = 10 \times 7$$

$$x^3 + y^3 + z^3 = 70 + 75 = 145$$

1 ½

28

(i)

Day	Amount (₹)
1	$120 - 1 \times 8 = 112$
2	$120 - 2 \times 8 = 104$
3	$120 - 3 \times 8 = 96$
4	$120 - 4 \times 8 = 88$
5	$120 - 5 \times 8 = 80$

1 ½

(ii) After 3 days.

½

(iii) $120 - 8n$. Linear decay.

1

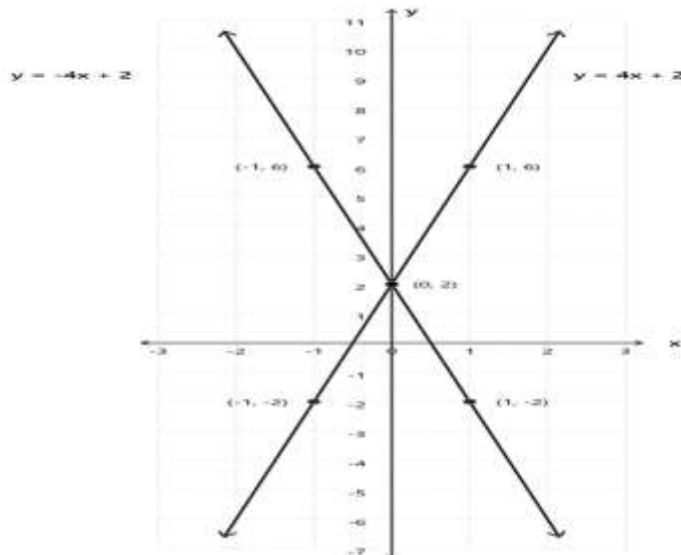
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(ii) $-\frac{22}{5}$ and $\frac{9}{2}$: Terminating decimal expansion.
 $-\frac{1}{3}, \frac{5}{6}$: Non-terminating decimal expansion.
 For a rational number $\frac{p}{q}$ in lowest form, the decimal expansion is terminating only when the prime factors of q are 2 and/or 5. 2

Section D (5 mark each)

32

$y = -4x + 2$		$y = 4x + 2$	
x	y	x	y
-1	6	-1	-2
0	2	0	2
1	-2	1	6



Slope of $y = -4x + 2$ is -4, slope of $y = 4x + 2$ is 4

33

a) (i)

Using the identity $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$:

$$125a^3 + 8b^3 = (5a)^3 + (2b)^3$$

$$(5a + 2b)(25a^2 - 10ab + 4b^2)$$

(ii) $(3x - \frac{y}{2} + 4)^2$

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$

$$\begin{aligned} \left(3x - \frac{y}{2} + 4\right)^2 &= (3x)^2 + \left(-\frac{y}{2}\right)^2 + 4^2 + 2(3x)\left(-\frac{y}{2}\right) + 2\left(-\frac{y}{2}\right)(4) + 2(4)(3x) \\ &= 9x^2 + \frac{y^2}{4} + 16 - 3xy - 4y + 24x \end{aligned}$$

(OR)

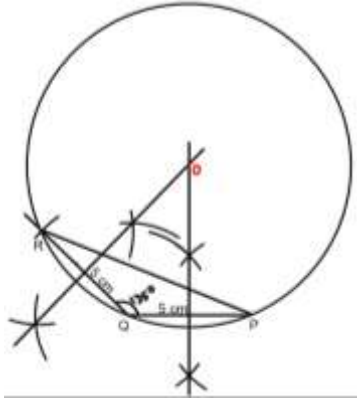
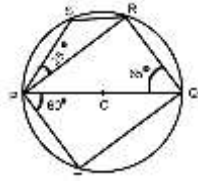
b)

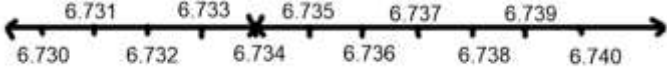
$$x^2 - 9 = x^2 - 3^2 = (x - 3)(x + 3)$$

$$x^2 + 4x + 3$$

$$= x^2 + x + 3x + 3$$

$$= x(x + 1) + 3(x + 1) = (x + 1)(x + 3)$$

	$x^2 - 6x + 9 = x^2 - 2(x)(3) + 3^2 = (x - 3)^2 \quad 1\frac{1}{2}$ $\frac{(x^2-9)}{(x^2+4x+3)(x^2-6x+9)} = \frac{(x-3)(x+3)}{(x+1)(x+3)(x-3)(x-3)} = \frac{1}{(x+1)(x-3)} \quad 1$	
34	A(-6, 2), B(0, 2), C(0, -4) and D(-6, -4) $AB = \sqrt{(0+6)^2 + (2-2)^2} \quad BC = \sqrt{(0-0)^2 + (-4-2)^2}$ $= \sqrt{36} = 6 \quad = \sqrt{36} = 6$ $CD = \sqrt{(-6-0)^2 + (-4+4)^2} \quad DA = \sqrt{(-6+6)^2 + (2+4)^2}$ $= \sqrt{36} = 6 \quad = \sqrt{36} = 6$ $AB = CD = 6, \quad BC = DA = 6$ Hence, ABCD is a parallelogram. $AC = \sqrt{(0+6)^2 + (-4-2)^2} \quad BD = \sqrt{(-6-0)^2 + (-4-2)^2}$ $= \sqrt{36+36} = \sqrt{72} = 6\sqrt{2} \quad = \sqrt{36+36} = 6\sqrt{2} \quad AC = BD$ Since ABCD is a parallelogram and its diagonals are equal, ABCD is a rectangle.	5
35	a) Triangle construction 1 ½ Constructing the perpendicular bisectors and marking the intersection point O Taking radius OP or OQ or OR and drawing circle Centre is outside the triangle. 2  (OR) b) Given: $\angle PQR = 65^\circ, \angle QPT = 60^\circ$ (i) Since PQ is the diameter, angle in a semicircle is 90°. $\angle PRQ = 90^\circ$ In $\triangle PQR$, $\angle QPR + \angle PQR + \angle PRQ = 180^\circ$ $\angle QPR + 65^\circ + 90^\circ = 180^\circ, \quad \angle QPR = 25^\circ \quad 1\frac{1}{2}$ (ii) $\angle PSR + \angle PQR = 180^\circ$ (Opposite angles of a cyclic quadrilateral are supplementary) $\angle PSR + 65^\circ = 180^\circ$ $\angle PSR = 115^\circ \quad 1$ (iii) In $\triangle PRS$, (Angle sum property) $\angle RPS + \angle PSR + \angle PRS = 180^\circ$ $25^\circ + 115^\circ + \angle PRS = 180^\circ \quad \angle PRS = 40^\circ \quad 1$ 	5

	(iv) $\angle PTQ = 90^\circ$, Since PQ is the diameter, the angle subtended by PQ at T is 90°. In $\triangle PQT$, $\angle QPT + \angle PTQ + \angle PQT = 180^\circ$ $60^\circ + 90^\circ + \angle PQT = 180^\circ$ $\angle PQT = 30^\circ$ 1 ½	
	Section E (CASE STUDY BASED QUESTIONS – 4 MARKS EACH)	
36	(i) P(-3, 5): II Quadrant, Q(5, -4): IV Quadrant (ii) $AC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $AC = \sqrt{(7 - 1)^2 + (10 - 2)^2}$ $= \sqrt{6^2 + 8^2}$ $= \sqrt{36 + 64}$ $= \sqrt{100}$ $AC = 10 \text{ units}$ ½ (iii) (a) $AB = \sqrt{(4 - 1)^2 + (6 - 2)^2}$ $= \sqrt{3^2 + 4^2}$ $= \sqrt{25} = 5$ $BC = \sqrt{(7 - 4)^2 + (10 - 6)^2}$ $= \sqrt{3^2 + 4^2}$ $= \sqrt{25} = 5$ $AB + BC = 5 + 5 = 10$, $AB + BC = AC$, Hence, the three points A,B,C are collinear. 1 ½ (OR) (iii) (b) $D(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$ $D = \left(\frac{7 + (-3)}{2}, \frac{10 + 18}{2} \right)$, $D = \left(\frac{4}{2}, \frac{28}{2} \right)$ $D = (2, 14)$, $x = 2, y = 14$ ½	1 1 2 2
37	(i)  (ii) $-\frac{6}{15} = -\frac{6 \div 3}{15 \div 3} = -\frac{2}{5}$ $-\frac{2}{5} = -\frac{6}{15}$. Yes, they are equal. (iii) a) $\frac{-4}{5} \times \left(\frac{15}{8} - \frac{5}{12} \right)$ $= -\frac{4}{5} \times \frac{15}{8} - \left(-\frac{4}{5} \times \frac{5}{12} \right)$ $= -\frac{60}{40} + \frac{20}{60}$ $= -\frac{3}{2} + \frac{1}{3}$ LCM = 6, 1	1 1 2

	$-\frac{3}{2} + \frac{1}{3} = -\frac{9}{6} + \frac{2}{6} = -\frac{7}{6}$ 1 (OR) (iii) b) $\frac{2x}{5} + \frac{x}{10} = \frac{3}{4}$ Taking LCM of 5, 10 = 10 $\frac{4x}{10} + \frac{x}{10} = \frac{3}{4}$ $\frac{5x}{10} = \frac{3}{4}$ $\frac{x}{2} = \frac{3}{4}, \quad x = \frac{3}{2}$ 1	2
38	(i) $\angle ACB = 23^\circ$ (Angles in the same segment are equal) (ii) $\angle ACB + \angle CAB = x$, (Exterior angle property) $40^\circ + 23^\circ = 63^\circ, x = 63^\circ$ (iii) a) $QP = PR$, $\triangle QPR$ is isosceles. If $\angle PQR = 50^\circ$, then $\angle PQR = \angle PRQ = 50^\circ$ $\angle QPR = 180^\circ - 50^\circ - 50^\circ$ $\angle QPR = 80^\circ$ 1 $\angle QOR = 2 \times 80 = 160^\circ$ (The angle at the centre is twice the angle at the circumference) $\angle QPR + \angle QSR = 180^\circ$ (opposite angles in a cyclic quadrilateral) $\angle QSR = 180^\circ - 80^\circ = 100^\circ$ 1 (OR) (iii) b) Given, $OQ = 10$ cm and chord $QR = 16$ cm, Since the perpendicular from the centre of a circle to a chord bisects the chord, $QM = \frac{QR}{2} = \frac{16}{2} = 8 \text{ cm}$ 1 In right-angled $\triangle OMQ$, $OQ^2 = OM^2 + QM^2$ $10^2 = OM^2 + 8^2$ 1/2 $100 = OM^2 + 64$ $OM^2 = 36$ $OM = 6$ 1/2	1 1 2 2

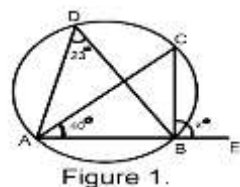


Figure 1.

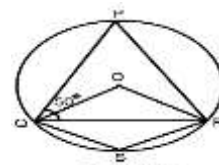


Figure 2.

