



INDIAN SCHOOL AL WADI AL KABIR

MIDTERM EXAMINATION

Subject: MATHEMATICS SET: 1

Class: IX

Max. Marks: 80

Date: 15-09-2026

Time: 3 hours

General Instructions:

Read the following instructions very carefully and strictly follow them:

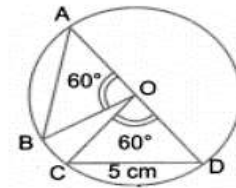
- This question paper contains **38** questions. **All** questions are **compulsory**.
- This question paper is divided into **five** Sections **A, B, C, D and E**.
- In **Section A**, Question no. **1** to **18** are multiple choice questions (MCQs) and question number **19** and **20** are Assertion-Reason based questions of **1** mark each.
- In **Section B**, Question no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.
- In **Section C**, Question no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.
- In **Section D**, Question no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.
- 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.
- 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**.
- Draw neat diagrams wherever required.

SECTION A

PART-1(MCQ-1 mark each)

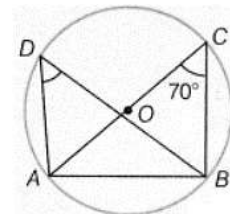
Q. No.	Question	Marks
1	The coefficient of the variable y in the linear equation $5(2x - y) + 3x + 4y - 7 = 0$ is: (A) -9 (B) -1 (C) 13 (D) 5	1
2	The distance between two rational numbers p and q on a number line is given by $ p - q $. Then the distance between $-\frac{7}{4}$ and $\frac{5}{4}$ is: (A) -3 (B) $\frac{1}{2}$ (C) 3 (D) $-\frac{1}{2}$	1
3	A delivery company uses a coordinate grid to mark the locations of two warehouses. Warehouse R is located at $(-3, \frac{7}{2})$, while Warehouse S is located at $(2, -\frac{1}{2})$. Then the value of the expression (ordinate of R) - (ordinate of S) + 1 is: (A) 4 (B) 6 (C) 7 (D) 5	1
4	ABCD is a cyclic quadrilateral. If $\angle A : \angle C = 2 : 3$, then measure of both angles are: (A) $72^\circ, 108^\circ$ (B) $86^\circ, 98^\circ$ (C) $62^\circ, 118^\circ$ (D) $72^\circ, 118^\circ$	1

- 5 The y-intercept of $y = -4x + 9$ is: 1
 (A) -4 (B) 9 (C) 4 (D) -9
- 6 According to Brahmagupta's rules, the product of a debt and a fortune is a: 1
 (A) Fortune (B) Zero (C) Negative fortune (D) Debt
- 7 The value of 1002×998 using suitable identity is: 1
 (A) 998996 (B) 1000004 (C) 999996 (D) 996998
- 8 The value of x and y , if $(4x + 3, -8) = (11, y + 1)$ is: 1
 (A) $8, -9$ (B) $9, -2$ (C) $2, 9$ (D) $2, -9$
- 9 The volume of a cube is given by the expression $(27x^3 + 8y^3 + 54x^2y + 36xy^2)$ cubic units. Then the expression for the side length of the cube is _____ units. 1
 (A) $3x + 2y$ (B) $3x - 2y$ (C) $9x - 8y$ (D) $9x + 8y$
- 10 A surveyor marks the position of a water tank at W $(20, 21)$ on a village map, with the origin representing the survey office. To lay a straight pipeline from the office to the tank, the surveyor needs to know its length. The length of the pipeline is: 1
 (A) 21 units (B) 20 units (C) 29 units (D) 41 units
- 11 Which of the following is an irrational number? 1
 (A) $\sqrt{\frac{16}{9}}$ (B) $\frac{\sqrt{15}}{\sqrt{5}}$ (C) $\sqrt{121}$ (D) $\frac{\sqrt{48}}{\sqrt{3}}$
- 12 In the adjoining figure, O is the centre of the circle, then the length of AB is: 1



- (A) 25 units (B) 5 cm (C) $\sqrt{5}$ units (D) 5 units

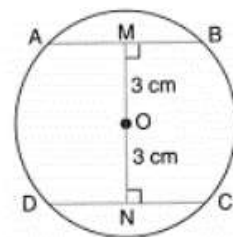
- 13 A delivery service charges a fixed fee of ₹60 and ₹30 for every kilometre travelled. If the total cost of a delivery is given by $C(d) = 60 + 30d$, where d is the distance in kilometres. Then the cost of delivering a parcel 12 km away is: 1
 (A) ₹360 (B) ₹390 (C) ₹420 (D) ₹450
- 14 The rational number that lies between $\frac{1}{3}$ and $\frac{3}{4}$ is: 1
 (A) $\frac{1}{2}\left(\frac{1}{3} + \frac{3}{4}\right)$ (B) $2\left(\frac{1}{3} + \frac{3}{4}\right)$ (C) $2\left(\frac{1}{3} - \frac{3}{4}\right)$ (D) $\frac{1}{2}\left(\frac{1}{3} - \frac{3}{4}\right)$
- 15 In the given figure, $\angle ACB = 70^\circ$, then $\angle ADB$ is _____. 1



- (A) 140° (B) 35° (C) 70° (D) 60°

- 16 If $x + y = 12$ and $xy = 20$, then the value of $(x^2 + y^2)$ is: 1
 (A) 104 (B) 124 (C) 144 (D) 164

- 17 A baker has $12\frac{1}{2}kg$ of flour. Each batch of bread requires $2\frac{1}{2}kg$ of flour. Then the number of complete batches the baker can prepare are: 1
 (A) 5 (B) 7 (C) 8 (D) 3
- 18 In the adjacent figure, the relation between AB and CD is: 1



- (A) $AB > CD$ (B) $AB < CD$ (C) $AB = CD$ (D) $AB = 2CD$

Section A

Question number 19 and 20 is Assertion and Reason based questions carrying 1 mark. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
 (b) Both Assertion (A) and Reason (R) are true and Reason (R) is **not** the correct explanation of Assertion (A)
 (c) Assertion (A) is true, but reason (R) is false.
 (d) Assertion (A) is false, but reason (R) is true.
- 19 Assertion: The value of $(a + b)^2 - 4ab = 2(a + b)$ 1
 Reason: If $x^2 + kx + 6 = (x + 2)(x + 3)$, for all x, then the value of k is 5
- 20 Assertion: The lines $y = 2x + 3$ and $y = 2x - 5$ are parallel. 1
 Reason: Lines with equal slopes and different y-intercepts are parallel.

Section B (2 marks each)

- 21 Expand using suitable identities: $(\frac{3}{2}a - 5b)^3$ 2
- 22 a) The present age of Meera's mother is four times Meera's present age. After 5 years, the sum of their ages will be 55 years. Find their present ages. 2
 (OR)
 b) The difference between the lengths of two ribbons is 45cm. If the ratio of their lengths is 4: 5, then find their lengths.
- 23 a) Represent $\sqrt{5}$ on the number line. 2
 (OR)
 b) Express 1.4191919... in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
- 24 A student expands $(11x - 6)^2$ as $121x^2 - 36$. Identify the mistake and write the correct expansion using a suitable algebraic identity. 2
- 25 Find the value of the cubic polynomial $p(x) = 4 + x^3 - x + 2x^2$ at: 2
 (i) $x = -1$ (ii) $x = 3$

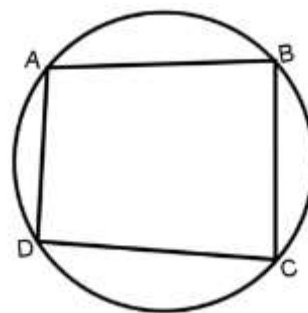
Section C (3 marks each)

- 26 Plot the points P(-3, 2), Q(4, 2), R(4, -3) which are three vertices of a rectangle PQRS. Join the points in order, find the co-ordinates of point S and mention it in the graph paper itself. 3

- 27 a) A rectangular garden has an area of 84 m^2 . If its length is 5 metres more than its breadth, then find the length and breadth of the garden. 3

(OR)

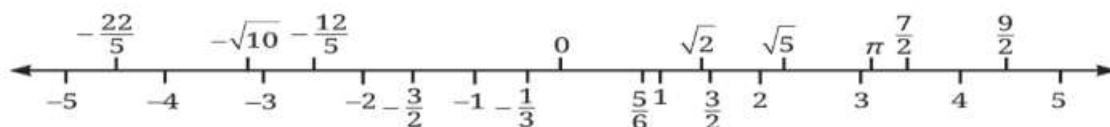
- b) If $x + y + z = 10$, $x^2 + y^2 + z^2 = 38$, and $xyz = 25$,
find the value of $x^3 + y^3 + z^3$.
- 28 Arjun has ₹120 on his travel card. He spends ₹8 every day. 3
- (i) Make a table and show how much money Arjun will have at the end of each day, from day 1 to day 5.
- (ii) Find after how many days he will be left with ₹96.
- (iii) Find a linear expression to represent the amount he will have after n days. Mention whether it represents linear growth or decay.
- 29 Find three distinct rational numbers between $-\frac{5}{7}$ and $\frac{9}{11}$. 3
- 30 ABCD is a cyclic quadrilateral. If $\angle A = (4x + 8)^\circ$ and $\angle C = (6x - 18)^\circ$, find x , $\angle A$ and $\angle C$. If $\angle B = 72^\circ$, also find $\angle D$. Justify each step. 3



- 31 a) Prove that $\sqrt{3}$ is irrational using proof by contradiction. 3

(OR)

- b) Observe the number line and answer the following questions.



- (i) Write down the irrational numbers greater than 2 marked on the number line.
- (ii) Consider the rational numbers $-\frac{22}{5}$, $-\frac{1}{3}$, $\frac{5}{6}$, and $\frac{9}{2}$ marked on the number line.
Without performing long division identify which have terminating and which have non-terminating recurring decimal expansions. Give reason.

Section D (5 mark each)

- 32 Draw the graphs of $y = -4x + 2$ and $y = 4x + 2$ on the same graph paper. Also, mention the slope of each line in the graph paper itself. 5
- 33 a) (i) Factorise completely: $125a^3 + 8b^3$ 5
(ii) Expand and simplify using suitable identities: $(3x - \frac{y}{2} + 4)^2$
- (OR)
- b) Simplify the rational expression assuming the denominators are non-zero:
$$\frac{(x^2 - 9)}{(x^2 + 4x + 3)(x^2 - 6x + 9)}$$
- 34 Using distance formula, show that the points A(-6, 2), B(0, 2), C(0, -4) and D(-6, -4) are vertices of a rectangle. 5

- 35 a) Draw ΔPQR with $PQ = 5$ cm, $\angle Q = 135^\circ$, $QR = 5$ cm. Draw the circumcircle of ΔPQR .
Is the centre inside or outside the triangle?

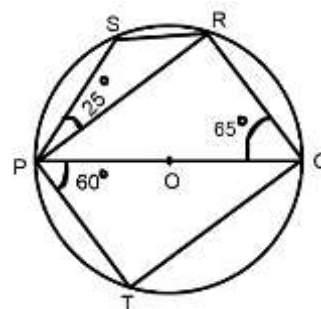
5

(OR)

b) In the given figure, PQ is the diameter of the circle. If $\angle PQR = 65^\circ$, $\angle QPT = 60^\circ$, then find the measure of

- (i) $\angle QPR$
(ii) $\angle PSR$
(iii) $\angle PRS$
(iv) $\angle PQT$

Give reasons to support your answers.



Section E

(CASE STUDY BASED QUESTIONS – 4 MARKS EACH)

36 CASE STUDY BASED-I

Railway engineers are mapping out a local track expansion project on a Cartesian grid. Three primary railway stations are located at $A(1, 2)$, $B(4, 6)$, and $C(7, 10)$.

To improve communication, engineers plan to set up two advanced signal relay towers at points $P(-3, 5)$ and $Q(5, -4)$. Furthermore, to manage high traffic between Station $C(7, 10)$ and a maintenance yard located at $E(-3, 18)$, a central control depot $D(x, y)$ is to be built exactly at the midpoint of line segment CE .



Based on the above information, answer the following:

- (i) Identify the quadrants in which the two signal relay towers are located. 1
(ii) Calculate the distance between Station A and C for track material estimation. 1
(iii) (a) Verify whether the points A, B, C are collinear using distance formula. 2

(OR)

- (iii) (b) If $D(x, y)$ is the mid point of the line segment CE . Find x and y . 2

37 CASE STUDY BASED-II

In a Mathematics Lab activity, students explored rational numbers — plotting them on a number line, comparing fraction measurements while cooking, simplifying expressions using the distributive property, and solving for an unknown length of ribbon using an equation.



Based on the above information, answer the following:

- (i) Locate 6.734 on number line. 1
(ii) Check whether the pair of rational numbers $-\frac{2}{5}$ and $-\frac{6}{15}$ are equal. 1

(iii) a) Simplify using the distributive property: $\frac{-4}{5} \times \left(\frac{15}{8} - \frac{5}{12}\right)$ 2

(OR)

(iii) b) Solve for x: $\frac{2x}{5} + \frac{x}{10} = \frac{3}{4}$ 2

38 **CASE STUDY BASED-III**

In a circular park, pathways connect junction points marked on the boundary, forming triangles and quadrilaterals inside the circle. Figure (1) shows junctions A, B, C, D with diagonals AC, BD, and AB extended to E. Figure (2) shows centre O with boundary points P, Q, R, S, where QP = PR.

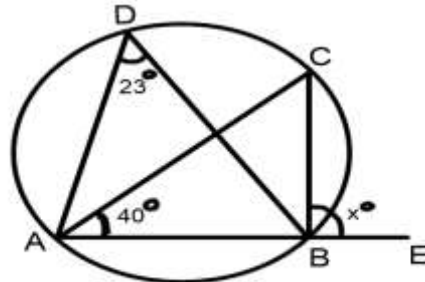


Figure 1.

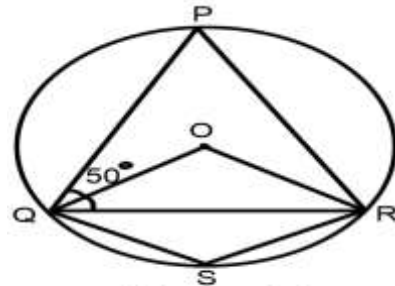


Figure 2.

Based on the above information, answer the following questions:

- (i) In the figure 1, find $\angle ACB$. Give reason. 1
(ii) Also, find the value of x in figure 1. 1

- (iii) a) In figure 2, O is the centre of the circle and QP = PR. If $\angle PQR = 50^\circ$, then find $\angle QOR$ and $\angle QSR$. 2

(OR)

- (iii) b) In figure (2), if the radius OQ = 10 cm and chord QR = 16 cm, find the perpendicular distance of QR from the centre O. 2
