

CHAPTER TEST: QUADRILATERALS

Mathematics | Class IX (2026/QUAD/09/003)

Time: 1.5 Hours

Max. Marks: 33

GENERAL INSTRUCTIONS

- All questions are compulsory.
 - Section A: 5 MCQs (1 mark each).
 - Section B: 4 Short Answer Questions (2 marks each).
 - Section C: 4 Long Answer Questions (4 marks each).
 - Section D: 4 Objective/Concept Questions (1 mark each).
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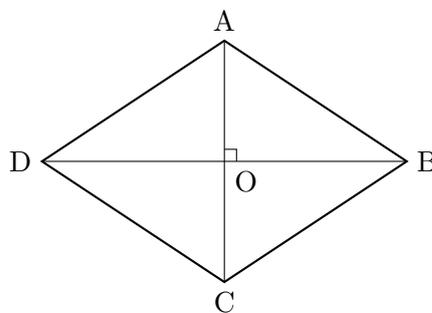
Section A: Multiple Choice Questions ($8 \times 1 = 8$ Marks)

1. In a parallelogram $ABCD$, if $\angle A = (2x + 10)^\circ$ and $\angle B = (3x - 40)^\circ$, then the value of x is:
 - (a) 10
 - (b) 20
 - (c) 30
 - (d) 40
2. A quadrilateral whose all sides are equal and diagonals are not equal is a:
 - (a) Square
 - (b) Rectangle
 - (c) Rhombus
 - (d) Parallelogram
3. If the diagonals of a quadrilateral bisect each other at right angles and are equal, then the quadrilateral is a:
 - (a) Rectangle
 - (b) Rhombus
 - (c) Square
 - (d) Kite
4. In a rectangle $PQRS$, the diagonals PR and QS intersect at O . If $\angle OPQ = 35^\circ$, then $\angle OQP$ is:
 - (a) 35°
 - (b) 45°
 - (c) 55°
 - (d) 65°

5. The perimeter of a rhombus is 52 cm. If one diagonal is 10 cm, the length of the other diagonal is:
- 12 cm
 - 24 cm
 - 26 cm
 - 48 cm
6. If an angle of a parallelogram is two-thirds of its adjacent angle, the smallest angle of the parallelogram is:
- 36°
 - 48°
 - 60°
 - 72°
7. In a square $ABCD$, the diagonal AC measures $10\sqrt{2}$ cm. The area of the square is:
- 50 cm^2
 - 100 cm^2
 - 200 cm^2
 - 400 cm^2
8. Given a parallelogram $ABCD$ where $AB = 2x + 3$ and $CD = 3x - 2$. The length of AB is:
- 7 cm
 - 9 cm
 - 11 cm
 - 13 cm

Section B: Very Short Answer Questions ($4 \times 2 = 8$ Marks)

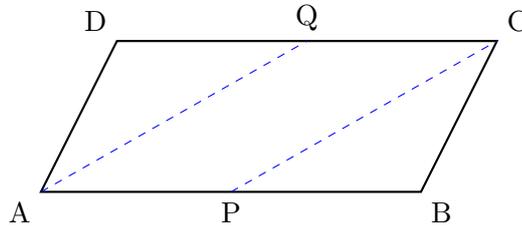
- Prove that a diagonal of a parallelogram divides it into two congruent triangles.
- In the given figure, $ABCD$ is a rhombus. Find the value of x and y if the diagonals intersect at O , $OA = x + y$, $OC = 12$, $OB = 13$, and $OD = x - y$.



- If the diagonals of a parallelogram are equal, then show that it is a rectangle.
- Three angles of a quadrilateral are in the ratio 3:4:5 and the difference between the least and the greatest angle is 60° . Find all the angles.

Section C: Short Answer Questions ($3 \times 3 = 9$ Marks)

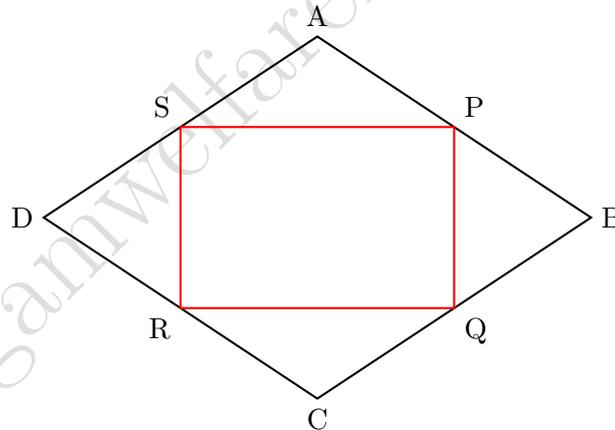
1. $ABCD$ is a parallelogram in which P and Q are mid-points of opposite sides AB and CD . Prove that $APCQ$ is a parallelogram.



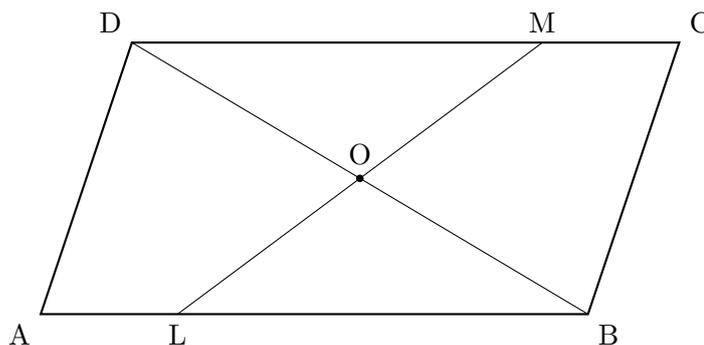
2. Show that the bisectors of angles of a parallelogram form a rectangle.
3. In $\triangle ABC$, AD is the median. A line is drawn through D parallel to AB to intersect AC at E . Show that E is the mid-point of AC and $DE = \frac{1}{2}AB$.

Section D: Long Answer Questions ($2 \times 5 = 10$ Marks)

1. $ABCD$ is a rhombus and P, Q, R, S are the mid-points of the sides AB, BC, CD and DA respectively. Prove that the quadrilateral $PQRS$ is a rectangle.



2. In the following figure, $ABCD$ is a parallelogram. L and M are points on AB and DC such that $AL = CM$. Prove that LM and BD bisect each other.



Section E: Case Study Based Questions (1 × 5 = 5 Marks)

An architect is designing a decorative ceiling truss for a modern art gallery. The main structural component is a large quadrilateral frame. To ensure stability and aesthetic symmetry, the architect decides that the frame must be a parallelogram. Within this parallelogram, smaller supporting beams are placed connecting the midpoints of adjacent sides to create a diamond-shaped inner pattern. The architect knows that the properties of these shapes are crucial for weight distribution. During the inspection, it is found that the diagonals of the main frame are 16 meters and 12 meters long. The workers need to calculate specific angles and lengths to cut the timber precisely. The symmetry of the parallelogram ensures that opposite sides are equal and parallel, which simplifies the manufacturing process. Understanding the relationship between different types of quadrilaterals like rectangles and rhombuses allows the architect to optimize both the cost and the visual appeal of the truss system.

1. If the main frame is a rectangle, what must be true about its diagonals?
 - (a) They are equal and bisect each other
 - (b) They are perpendicular and unequal
 - (c) They are unequal and do not bisect
 - (d) They are perpendicular and equal
2. If the inner diamond shape formed by joining midpoints is a square, the original frame must be a:
 - (a) Rectangle
 - (b) Rhombus
 - (c) Parallelogram
 - (d) Trapezium
3. If one angle of the parallelogram frame is 90° , then the shape is a:
 - (a) Rhombus
 - (b) Rectangle
 - (c) Square
 - (d) Trapezium
4. The sum of any two adjacent angles in the parallelogram frame is:
 - (a) 90°
 - (b) 120°
 - (c) 180°
 - (d) 360°
5. If the diagonals of the main frame bisect each other at 90° , the frame is a:
 - (a) Rectangle
 - (b) Rhombus
 - (c) Parallelogram
 - (d) Trapezium