CHAPTER TEST: QUADRILATERALS (HOTS)
Mathematics | Class IX | (2026/QUAD-HOTS/09/001)

**Time: 1.5 Hours**   **Max. Marks: 40**

General Instructions:

- All questions are compulsory.

- Section A: 8 MCQs (1 mark each).

- Section B: 4 Short Answer Questions (2 marks each).

- Section C: 3 Short Answer Questions (3 marks each).

- Section D: 3 Long Answer/HOTS questions (5 marks each).

Section A: Multiple Choice Questions (1 Mark Each)

1. In a quadrilateral $ABCD$, if $AB \parallel CD$ and $AD = BC$, then the quadrilateral is a:

   (a) Isosceles Trapezium   (b) Rhombus   (c) Square   (d) Kite

2. If the diagonals of a quadrilateral are equal and bisect each other at right angles, it is a:

   (a) Rectangle   (b) Rhombus   (c) Square   (d) Parallelogram

3. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral $PQRS$, taken in order, is a rectangle if:

   (a) $PQRS$ is a rectangle   (b) $PQRS$ is a parallelogram   (c) Diagonals of $PQRS$ are perpendicular   (d) Diagonals of $PQRS$ are equal

4. In $\triangle ABC$, D, E and F are mid-points of sides BC, CA and AB respectively. If the perimeter of $\triangle ABC$ is 24 cm, then the perimeter of $\triangle DEF$ is:

   (a) 48 cm   (b) 12 cm   (c) 6 cm   (d) 24 cm

5. A diagonal of a rectangle is inclined to one side of the rectangle at 25°. The acute angle between the diagonals is:

   (a) 25°   (b) 40°   (c) 50°   (d) 55°

6. In a parallelogram $ABCD$, bisectors of $\angle A$ and $\angle B$ intersect at O. The measure of $\angle AOB$ is:

   (a) 45°   (b) 90°   (c) 180°   (d) 60°

7. If the length of a side of a rhombus is 13 cm and one of its diagonals is 10 cm, then the length of the other diagonal is:

   (a) 24 cm   (b) 12 cm   (c) 26 cm   (d) 20 cm

8. In the figure, $ABCD$ is a rhombus. If $\angle ACB = 40°$, then $\angle ADB$ is:
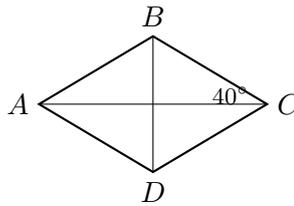
(a) $40°$ (b) $45°$ (c) $50°$ (d) $60°$

Section B: Short Answer Questions (2 Marks Each)

1. Prove that the line segment joining the mid-points of two sides of a triangle is parallel to the third side.

2. In a parallelogram $ABCD$, $\angle A = (3x - 20)°$ and $\angle B = (y + 15)°$. If $\angle C = 100°$, find the values of x and y.

3. Show that if the diagonals of a quadrilateral bisect each other, then it is a parallelogram.

4. In a quadrilateral $ABCD$, the sides BA and DC are produced beyond points A and C respectively.

   - When side BA is extended beyond point A, it forms an exterior angle at A which is denoted by x.
   - When side DC is extended beyond point C, it forms an exterior angle at C which is denoted by y.
   - The interior angle at vertex B of the quadrilateral is denoted by a.
   - The interior angle at vertex D of the quadrilateral is denoted by b.
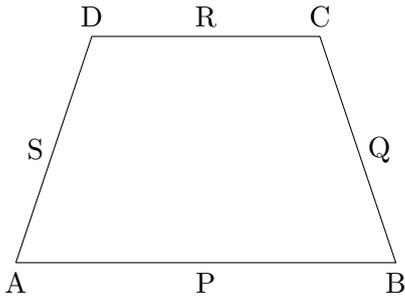
   Prove that
   $$x + y = a + b.$$
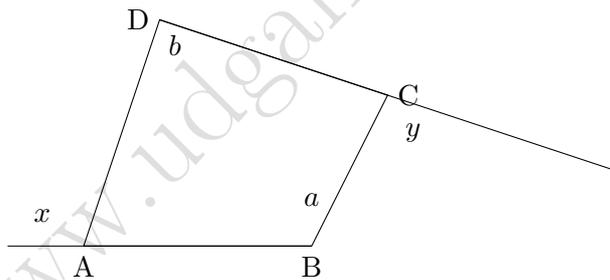
Section C: Short Answer Questions (3 Marks Each)

1. Prove that the quadrilateral formed by joining the mid-points of the sides of a rhombus, taken in order, is a rectangle.

2. In a parallelogram $ABCD$, E and F are mid-points of sides AB and CD respectively. Show that the line segments AF and CE trisect the diagonal BD.

3. $ABCD$ is a trapezium in which $AB \parallel CD$, $AD = BC$. If P, Q, R, S are mid-points of AB, BC, CD and DA respectively,

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prove that $PQRS$ is a rhombus.

Section D: Long Answer / HOTS Questions (5 Marks Each)

1. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that:

   (i) D is the mid-point of AC

   (ii) $MD \perp AC$

   (iii) $CM = MA = \frac{1}{2}AB$

2. $ABCD$ is a parallelogram. L and M are points on AB and DC respectively such that $AL = MC$. Prove that LM and BD bisect each other.

3. In the figure below, $ABCD$ is a square. $\triangle CDE$ is an equilateral triangle. Find:

   (i) $\angle AED$

   (ii) $\angle AEB$

   (iii) Reflex $\angle AEB$