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# SOLUTIONS: CHAPTER TEST - QUADRILATERALS

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

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## Section A: Multiple Choice Questions

- Answer: (d) 42 (Correction to choice d: 42 or Closest 40)**  
 $(2x + 10) + (3x - 40) = 180 \implies 5x - 30 = 180 \implies 5x = 210 \implies x = 42.$
- Answer: (c) Rhombus**  
A rhombus has all sides equal, but diagonals are equal only if it's a square.
- Answer: (c) Square**  
If diagonals are equal, bisect each other, and are perpendicular, the shape is a square.
- Answer: (c)  $55^\circ$**   
In rectangle  $PQRS$ ,  $\triangle OPQ$  is isosceles ( $OP = OQ$ ).  $\angle OQP = \angle OPQ = 35^\circ$  is incorrect as  $\angle P = 90^\circ$ . Actually,  $\angle OQP = 90 - 35 = 55^\circ$ .
- Answer: (b) 24 cm**  
Side =  $52/4 = 13$  cm. Half-diagonal = 5 cm. By Pythagoras:  $5^2 + x^2 = 13^2 \implies x = 12$ . Full diagonal = 24 cm.
- Answer: (d)  $72^\circ$**   
Let angles be  $x$  and  $\frac{2}{3}x$ .  $x + \frac{2}{3}x = 180 \implies \frac{5}{3}x = 180 \implies x = 108^\circ$ . Smallest =  $\frac{2}{3}(108) = 72^\circ$ .
- Answer: (b)  $100 \text{ cm}^2$**   
Diagonal  $d = a\sqrt{2} = 10\sqrt{2} \implies a = 10$ . Area =  $a^2 = 100$ .
- Answer: (d) 13 cm**  
 $2x + 3 = 3x - 2 \implies x = 5$ .  $AB = 2(5) + 3 = 13$ .

## Section B: Very Short Answer Questions

- Proof:** In  $\triangle ABC$  and  $\triangle CDA$ ,  $AB = CD, BC = DA$  (opp. sides) and  $AC = AC$  (common). By SSS,  $\triangle ABC \cong \triangle CDA$ .
- Diagonals bisect each other:  
 $x + y = 12$  and  $x - y = 13$  is inconsistent with standard labeling. If  $OB = OD \implies 13 = x - y$ .  
Solving  $x + y = 12$  and  $x - y = 13 \implies 2x = 25, x = 12.5, y = -0.5$ .
- If diagonals are equal in a parallelogram ( $AC = BD$ ), then in  $\triangle ABC$  and  $\triangle BAD$ ,  $AB = AB, BC = AD, AC = BD$ . By SSS,  $\triangle ABC \cong \triangle BAD \implies \angle A = \angle B$ . Since  $\angle A + \angle B = 180^\circ$ , each is  $90^\circ \implies$  Rectangle.
- Let angles be  $3k, 4k, 5k$ . Greatest - Least =  $5k - 3k = 2k = 60^\circ \implies k = 30^\circ$ .  
Angles are  $90^\circ, 120^\circ, 150^\circ$ . Fourth angle =  $360 - 360 = 0^\circ$  (Impossible).  
*Correction:* Sum of 4 angles is  $360^\circ$ . Ratio must involve 4 terms.

## Section C: Short Answer Questions

1. **Proof:**  $AB = CD \implies \frac{1}{2}AB = \frac{1}{2}CD \implies AP = CQ$ . Since  $AP \parallel CQ$ ,  $APCQ$  is a parallelogram.
2. The adjacent angles  $\angle A + \angle B = 180^\circ$ . Their bisectors  $\angle PAB + \angle PBA = 90^\circ \implies \angle APB = 90^\circ$ . Similarly all angles are  $90^\circ \implies$  Rectangle.
3. In  $\triangle ABC$ ,  $D$  is mid-point of  $BC$  and  $DE \parallel AB$ . By Converse of Mid-point Theorem,  $E$  is mid-point of  $AC$ . Thus  $DE = \frac{1}{2}AB$ .

## Section D: Long Answer Questions

1. Diagonals of rhombus are  $AC \perp BD$ . By Mid-point theorem,  $PQ \parallel AC$  and  $QR \parallel BD$ . Since  $AC \perp BD$ ,  $PQ \perp QR$ . A parallelogram with a right angle is a rectangle.
2. In  $\triangle ALO$  and  $\triangle CMO$ :  $AL = CM$  (given),  $\angle LAO = \angle MCO$  (alt. angles),  $\angle ALO = \angle CMO$  (alt. angles). By ASA,  $\triangle ALO \cong \triangle CMO \implies LO = MO$  and  $AO = CO$ . Thus they bisect each other.

## Section E: Case Study Answers

1. (a) They are equal and bisect each other.
2. (a) Rectangle (Midpoints of a rectangle form a rhombus; midpoints of a square form a square).
3. (b) Rectangle.
4. (c)  $180^\circ$ .
5. (b) Rhombus.