# 1. What is a Quadrilateral?

A quadrilateral is a polygon with 4 sides, 4 angles, and 4 vertices.

 Notation: A quadrilateral is written as ABCD
 Sum of interior angles of a quadrilateral = 360°

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#  2. Types of Quadrilaterals

| Type | Properties |
|---|---|
| Parallelogram | Opposite sides equal and parallel, opposite angles equal |
| Rectangle | All angles are 90°, opposite sides equal and parallel |
| Square | All sides equal, all angles are 90°, diagonals equal and bisect each other |
| Rhombus | All sides equal, opposite angles equal, diagonals bisect each other at 90° |
| Trapezium | Only one pair of opposite sides is parallel |
| Kite | Two pairs of adjacent sides equal, one pair of opposite angles equal |

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## □ 3. Angle Sum Property

The sum of all interior angles in a quadrilateral is always:

□ 360°

□ □A + □B + □C + □D = 360°

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## □ 4. Properties of a Parallelogram

- Opposite sides are equal and parallel.

- Opposite angles are equal.
- Diagonals bisect each other.
- Each diagonal divides the parallelogram into two congruent triangles.

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## 5. Conditions for a Quadrilateral to be a Parallelogram

A quadrilateral is a parallelogram if:

- Both pairs of opposite sides are equal.
- Both pairs of opposite angles are equal.

- Diagonals bisect each other.
- One pair of opposite sides is both equal and parallel.

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## 6. Mid-point Theorem (Revised)

If a line joins the midpoints of two sides of a triangle, it is:

- Parallel to the third side
- Half of its length

This is useful when analyzing shapes made up of triangles and quadrilaterals.

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## □ 7. Important Theorems (for Proofs)

1. Diagonals of a rectangle are equal.

2. Diagonals of a rhombus bisect at right angles.

3. Opposite angles of a parallelogram are equal.

4. The diagonals of a square are equal and bisect at 90°.

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## □ 8. Common Exam Questions

- Prove a given quadrilateral is a parallelogram using properties.
- Use the angle sum property to calculate missing angles.
- Find side lengths or angles using properties of special quadrilaterals.
- Apply congruence and midpoint concepts in proof questions.