

CLASS 9 MATHS – CHAPTER 8

QUADRILATERALS – ALL PROPERTIES

Basic Definitions

- **Quadrilateral:** A polygon with four sides, four angles, and four vertices.
- **Diagonal:** A line segment joining two non-adjacent vertices of a quadrilateral.
- **Adjacent sides:** Sides that share a common vertex.
- **Opposite sides:** Sides that do not share a common vertex.

Parallelogram Properties

- Opposite sides are equal and parallel
- Opposite angles are equal
- Adjacent angles are supplementary
- Diagonals bisect each other
- Each diagonal of a parallelogram divides it into two congruent triangles

Rectangle Properties

- All sides are **equal**
- All angles are **90°**
- Diagonals are **equal**
- Diagonals are **perpendicular bisectors of each other**

Square Properties

- All angles are **90°**
- Opposite sides are **equal and parallel**
- Diagonals are **equal**
- Diagonals **bisect each other**

Trapezium Properties

- Only **one pair of opposite sides** is parallel
- Parallel sides are called **bases**
- In an **isosceles trapezium**, non-parallel sides are **equal**
- Diagonals of an isosceles trapezium are **equal**

Kite Properties

- Two pairs of **adjacent sides** are equal
- One pair of **opposite angles** is equal
- Diagonals are **perpendicular**
- One diagonal **bisects the other**

Midpoint Theorem

- The line joining the midpoints of two sides of a triangle is:
 - **Parallel** to the third side
 - **Half** the length of the third side

Angle Sum Property of a Quadrilateral

- Sum of interior angles of a quadrilateral = **360°**
$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$