Quadrilateral

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

The word “quad” means four and “lateral” means sides.

So, any shape with four sides is called a quadrilateral.

Examples of Quadrilaterals:

- Square
- Rectangle
- Rhombus
- Parallelogram
- Trapezium
- Kite

Properties of a Quadrilateral:

- A quadrilateral has 4 sides.
- It has 4 vertices.
- It has 4 angles.
- The sum of all interior angles of a quadrilateral is always 360°.
- It can be regular (all sides and angles equal) or irregular.

Formula:

Sum of Interior Angles of a Quadrilateral

$= (n - 2) \times 180°$

Where n = number of sides

$\Rightarrow (4 - 2) \times 180° = 360°$

Types of Quadrilaterals (based on properties):

Type	Special Property
Square	All sides and angles equal (90°)
Rectangle	Opposite sides equal, all angles 90°
Rhombus	All sides equal, opposite angles equal
Parallelogram	Opposite sides and angles equal
Trapezium	One pair of opposite sides are parallel
Kite	Two pairs of adjacent sides are equal

Example 1

One of the angles of a quadrilateral is 100°, and the other three angles are 80°, 90°, and x. Find the value of x.

Solution:

Sum of angles in a quadrilateral = 360°

Given:

Angle 1 = 100°

Angle 2 = 80°

Angle 3 = 90°

Angle 4 = x

So,

100° + 80° + 90° + x = 360°

⇒ 270° + x = 360°

⇒ x = 360° − 270° = 90°

Answer: x = 90°

Example 2

A quadrilateral has angles in the ratio 2:3:4:5. Find all the angles.

Solution:

Let the angles be 2x, 3x, 4x, and 5x.

Sum = 360°

⇒ 2x + 3x + 4x + 5x = 360°

⇒ 14x = 360°

⇒ x = 360° ÷ 14 = 25.71°

So,

2x = 2 × 25.71 = 51.42°

3x = 3 × 25.71 = 77.13°

4x = 4 × 25.71 = 102.84°

5x = 5 × 25.71 = 128.55°

Answer: The angles are approximately 51.42°, 77.13°, 102.84°, and 128.55°.

Key Points to Remember:

- A quadrilateral always has 4 angles and 4 sides.
- Sum of angles in a quadrilateral is 360°.
- Quadrilaterals come in various types depending on side lengths and angle measures.