Interior and Exterior Angles of a Quadrilateral

Interior Angle:

An interior angle of a quadrilateral is the angle formed inside the shape, between two adjacent sides.

Exterior Angle:

An exterior angle of a quadrilateral is the angle formed outside the shape when one side is extended.

Key Relation:

- At every vertex of a quadrilateral:
- Interior Angle + Exterior Angle = 180°
- This is because they form a linear pair (a straight angle).

Properties of Interior and Exterior Angles:

- A quadrilateral has 4 interior angles and 4 exterior angles.
- Sum of all interior angles = 360°
- Each pair of interior and exterior angles at the same vertex adds up to 180°.
- Sum of the exterior angles (one at each vertex, taken in the same direction) of any polygon = 360°, including quadrilaterals.

Example 1:

In a quadrilateral ABCD, the interior angles are 90°, 80°, 110°, and x. Find the value of x.

Solution:

Sum of interior angles = 360°

⇒ 90° + 80° + 110° + x = 360°

⇒ 280° + x = 360°

⇒ x = 360° − 280° = 80°

Answer: The fourth interior angle is 80°

Example 2:

The exterior angle at one vertex of a quadrilateral is 60°. What is the corresponding interior angle?

Solution:

Interior angle + Exterior angle = 180°

Let interior angle be x:

x + 60° = 180°

⇒ x = 180° − 60° = 120°

Answer: The interior angle is 120°

Extra Tip:

If you're given all exterior angles, their total will always be:

360°, no matter what the shape (as long as it's a polygon).

Summary Points:

- A quadrilateral has 4 interior and 4 exterior angles.
- Interior + Exterior angle at a vertex = 180°
- Sum of all interior angles = 360°
- Sum of all exterior angles = 360° (one per vertex)
- Exterior angles help in solving problems related to unknown angles.