Verification of Properties of a Rectangle

Rectangle:

A rectangle is a special type of parallelogram where each angle is 90°. It has:

- Opposite sides equal and parallel
- Equal diagonals
- Diagonals that bisect each other

Properties of a Rectangle:

- All interior angles are 90°.
- Opposite sides are equal and parallel.
- Diagonals are equal in length.
- Diagonals bisect each other.
- Adjacent angles are supplementary (90° + 90° = 180°).

How to Verify These Properties?

Let us consider a rectangle ABCD.

Property	How to Verify
All angles = 90°	Measure ∠A, ∠B, ∠C, ∠D using a protractor
Opposite sides equal	Measure AB and CD; AD and BC using a scale
Diagonals are equal	Measure AC and BD; they should be the same
Diagonals bisect each other	Draw both diagonals and check if they intersect at midpoints
Adjacent angles are supplementary	∠A + ∠B = 90° + 90° = 180°

Example 1:

In rectangle PQRS, if diagonal PR = 13 cm and side PQ = 5 cm, and side QR = 12 cm, verify the diagonal using the Pythagoras theorem.

Solution:

In a rectangle, diagonals form a right triangle.

We verify:

$PR^2 = PQ^2 + QR^2$

$= 5^2 + 12^2 = 25 + 144 = 169$

$\Rightarrow PR = \sqrt{169} = 13$ cm

Answer: Verified, diagonal PR = 13 cm

Example 2:

In rectangle ABCD, the diagonals AC and BD intersect at point O. If AO = 4.5 cm, find the length of diagonal AC.

Solution:

Diagonals of a rectangle bisect each other, so:

AO = OC = 4.5 cm

$\Rightarrow AC = AO + OC = 4.5 + 4.5 = 9$ cm

Answer: Diagonal AC = 9 cm

Summary Points:

- A rectangle has equal diagonals and all angles equal to 90°.
- Its opposite sides are equal and parallel.
- Diagonals bisect each other at the midpoint.
- You can verify rectangle properties using measurements, protractor, and Pythagoras theorem.