Verification of Properties of a Square

Square:

A square is a special quadrilateral where:

- All sides are equal, and
- All angles are right angles (90°)

It is a special type of rectangle and rhombus.

Properties of a Square:

- All sides are equal.
- All angles are 90°.
- Opposite sides are parallel.
- Diagonals are equal in length.
- Diagonals bisect each other at right angles (90°).
- Each diagonal divides the square into two equal right-angled triangles.

How to Verify These Properties?

To verify the square, take a square ABCD and check:

Property	How to Verify
All sides equal	Measure AB, BC, CD, DA using a scale
All angles = 90°	Use a protractor to measure ∠A, ∠B, ∠C, ∠D
Opposite sides parallel	Use a set square or parallel lines tool
Diagonals equal	Measure AC and BD using a ruler
Diagonals bisect each other at 90°	Measure AO = OC and BO = OD, and angle at intersection = 90°

Example 1:

In square PQRS, each side measures 6 cm. Find the length of the diagonal using the Pythagoras theorem.

Solution:

Each side = 6 cm

In triangle PQS (right-angled):

Diagonal = hypotenuse

Using: Diagonal² = side² + side²

= $6^2 + 6^2 = 36 + 36 = 72$

⇒ Diagonal = $\sqrt{72} = 6\sqrt{2}$ cm

Answer: Diagonal = $6\sqrt{2}$ cm

Example 2:

In square ABCD, the diagonals AC and BD intersect at point O. If AC = 8 cm, verify that the diagonals bisect each other.

Solution:

If AC = 8 cm, then AO = OC = $\frac{8}{2}$ = 4 cm

Now check BD. If BD = 8 cm, then BO = OD = $\frac{8}{2}$ = 4 cm

Also, check angle between them = 90° using a protractor.

Answer: Verified. Diagonals bisect each other at 90°.

Summary Points:

- A square is a regular quadrilateral with all sides and angles equal.
- Diagonals of a square are equal, bisect each other, and are perpendicular.
- You can verify square properties using a scale, protractor, and Pythagoras theorem.
- A square is a special case of both rectangle and rhombus.