

## Verification of Properties of a Square

### Square:

A square is a special quadrilateral where:

- All sides are equal, and
- All angles are right angles ( $90^\circ$ )

It is a special type of rectangle and rhombus.

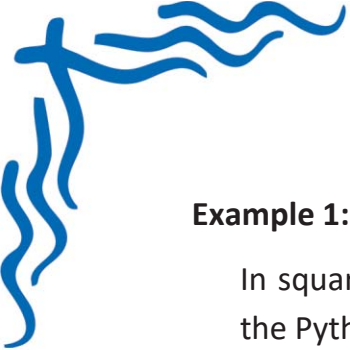
### Properties of a Square:

- All sides are equal.
- All angles are  $90^\circ$ .
- Opposite sides are parallel.
- Diagonals are equal in length.
- Diagonals bisect each other at right angles ( $90^\circ$ ).
- 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 = $90^\circ$	Use a protractor to measure $\angle A$ , $\angle B$ , $\angle C$ , $\angle D$
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 $90^\circ$	Measure $AO = OC$ and $BO = OD$ , and angle at intersection = $90^\circ$

**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:  $\text{Diagonal}^2 = \text{side}^2 + \text{side}^2$

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

$$\Rightarrow \text{Diagonal} = \sqrt{72} = 6\sqrt{2} \text{ cm}$$

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 =  $90^\circ$  using a protractor.

Answer: Verified. Diagonals bisect each other at  $90^\circ$ .

**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.