Class 9 Maths

Baudhayana–Pythagoras Theorem

Ganita Manjari

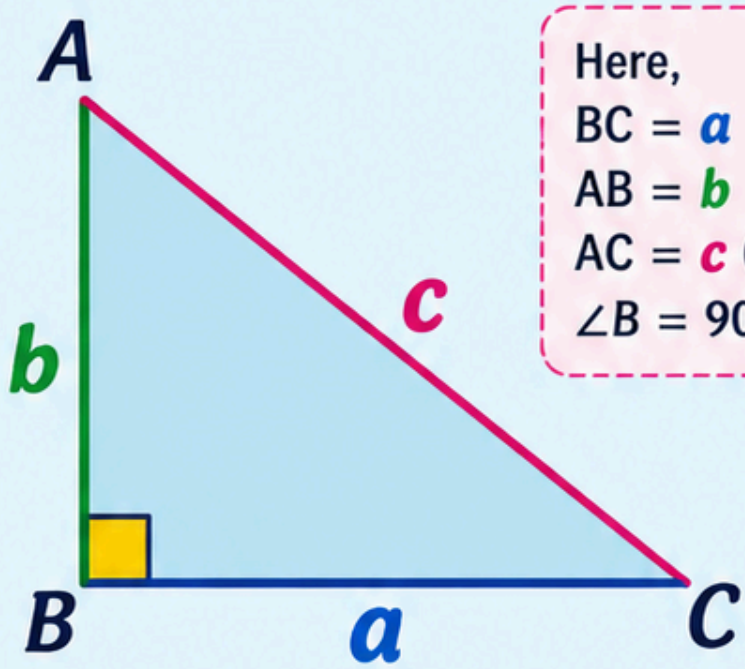
Statement

In a **right-angled triangle**, the square of the **hypotenuse** is equal to the sum of the squares of the other two sides.

$$c^2 = a^2 + b^2$$

where c is the **hypotenuse**, and a and b are the other two sides.

Diagram



Here,
BC = a
AB = b
AC = c (hypotenuse)
$\angle B = 90°$

Example

In the given right-angled triangle, the sides are $a = 6$ cm, $b = 8$ cm and $c = 10$ cm.

Check:

$$c^2 = a^2 + b^2$$
$$10^2 = 6^2 + 8^2$$
$$100 = 36 + 64$$
$$100 = 100$$

The theorem is verified!

Key Points

1. The triangle must be a right-angled triangle.
2. The side opposite the right angle is called the **hypotenuse** (longest side).
3. The square of the hypotenuse is equal to the sum of the squares of the other two sides.
4. It is also known as **Pythagoras Theorem**.

A fundamental result in geometry!

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Class 9 Maths

Converse of Baudhayana–Pythagoras Theorem

Ganita Manjari

Statement

If the square of one side of a triangle is equal to the sum of the squares of the other two sides, then the angle opposite to that side is a **right angle**.

In Symbols

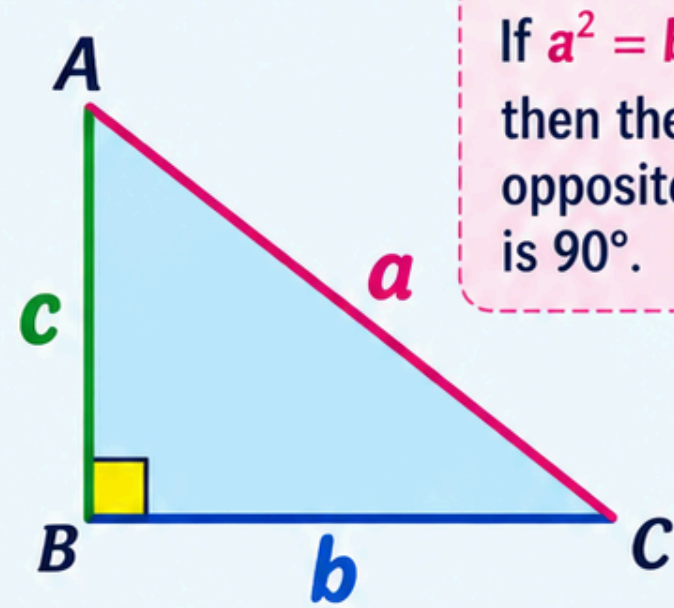
In a triangle ABC, if

$$BC^2 = AB^2 + AC^2$$

then $\angle A = 90°$

So, the triangle ABC is right-angled at A.

Diagram



If $a^2 = b^2 + c^2$ then the angle opposite to a is 90°.

Example

A triangle has sides 7 cm, 24 cm and 25 cm. Check whether it is a right-angled triangle.

Solution:

$$25^2 = 7^2 + 24^2$$

$$625 = 49 + 576$$

$$625 = 625$$

Since the square of the longest side (25 cm) is equal to the sum of the squares of the other two sides, the triangle is a **right-angled triangle** with the 90° angle opposite the 25 cm side.

Key Points

1. The side whose square is equal to the sum of the squares of the other two sides is the longest side.
2. The angle opposite to this side is a right angle (90°).
3. This theorem helps us to identify whether a triangle is right-angled or not.
4. It is the converse of the Baudhayana–Pythagoras Theorem.

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