

Finding Out if a Triangle is a Right Triangle Using the Pythagorean Theorem

To figure out if a triangle is a right triangle, we can use something called the **Pythagorean Theorem**. This theorem is a special rule that only works for right triangles.

What is a Right Triangle?

A right triangle has one angle that is exactly 90 degrees (like the corner of a rectangle). This right angle is what makes the triangle special.

The Pythagorean Theorem Formula

The Pythagorean Theorem states that in a right triangle, the square of the length of the hypotenuse (the longest side, opposite the right angle) is equal to the sum of the squares of the lengths of the other two sides. We can use the formula:

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

- **c** is the length of the hypotenuse.
- **a** and **b** are the lengths of the other two sides.

Steps to Check if a Triangle is a Right Triangle:

1. **Measure the Sides:** Find out the lengths of all three sides of your triangle. Let's call them a , b , and c , where c is the longest side.
2. **Apply the Pythagorean Theorem:** Plug the side lengths into the theorem:
3. **Calculate:** Square the lengths of a and b , and then add those together. Then, square the length of c . You can do it like this:
 - Calculate a^2 and b^2
 - Add them: $a^2 + b^2$
 - Calculate c^2
4. **Compare:** If $a^2 + b^2$ equals c^2 , then your triangle is a right triangle!

Example:

Suppose you have a triangle with sides of lengths 3, 4, and 5:

$$a = 3, b = 4, c = 5$$

Now let's do the math:

- $a^2 = 3^2 = 9$
- $b^2 = 4^2 = 16$
- $c^2 = 5^2 = 25$

Now add a^2 and b^2 :

$$9 + 16 = 25$$

Since $25 = 25$, this triangle is a right triangle!

Conclusion

By using the Pythagorean Theorem, you can easily determine if a triangle is a right triangle. Just remember to measure your sides, square them, and compare the results!