

To know when to simplify in Pythagorean relationships, it's essential to first understand what we mean by a Pythagorean relationship. In basic terms, it involves finding the sides of a right triangle using the Pythagorean theorem, which states:

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

Here,  $a$  and  $b$  are the lengths of the two shorter sides of the triangle (the legs), and  $c$  is the length of the longest side (the hypotenuse).

Now, let's break down when to simplify your calculations:

1. **Identify the sides of the triangle:** Before you can think about simplifying, you need to know which sides you are working with. If you have the lengths of the sides, you can start calculating.
2. **Calculate  $a^2$  and  $b^2$ :** For example, if  $a = 3$  and  $b = 4$ , you would calculate:

$$a^2 = 3^2 = 9 \text{ and } b^2 = 4^2 = 16.$$

3. **Add them together:** You would add the squares of the legs together:

$$9 + 16 = 25.$$

4. **Find the square root for  $c$ :** Now, you find the hypotenuse  $c$  by taking the square root of your sum:

$$c = \sqrt{25} = 5.$$

5. **Look for simplification:** If you end up with a number that can be simplified further (like  $\sqrt{8} = 2\sqrt{2}$ ), then go ahead and simplify. Otherwise, you leave it as is. This usually happens when you work with square roots.

In summary, you simplify when:

- You can make a number or square root smaller without changing its value.
- You have integers or square root results that can be divided by a common factor.

Remember, simplifying makes your calculations easier and clearer!