

**Example: Using the Pythagorean Theorem to Find Distance****Problem:**

To get to your Grandma's house, you have to drive 12 miles West and 5 miles South. How far away does she live if you could drive straight to her house?

**Solution:**

To solve this problem, it will help if you draw a picture showing what the problem is describing.

First of all, from your starting point, draw an arrow representing the 12 miles west that you have to drive.

From that point, draw another arrow representing the 5 miles south you have to drive.

This is Grandma's house.

The distance you are looking for is the distance from your starting point to Grandma's house if you could drive straight to her house.

This makes a right triangle and therefore we can use the Pythagorean Theorem to find the missing side length.

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

The legs of the right triangle are the 12 and 5. The hypotenuse of the right triangle is the distance.  $12^2 + 5^2 = d^2$ , where  $d$  represents the distance.

Square the first two terms.  $144 + 25 = d^2$ .

Add the terms together.  $169 = d^2$ .

Solve for  $d$  by taking the square root. The square root of 169 is 13.  $13 = d$ .

The distance directly to Grandma's house is 13 miles.