



# ALGEBRA I ACTIVITY 14: PYTHAGOREAN THEOREM WITH EQUATION SOLVER

Tlgebra.com

## ACTIVITY OVERVIEW:

In this activity we will

- Enter the Pythagorean Theorem into Equation Solver
- Use Equation Solver to find missing lengths in right triangle problems

Equation Solver can solve an equation in several variables for zero given values for all the variables but one.

Press **MATH**  $\blacktriangleright$  to locate **0: Solver...** and press **ENTER**.

```

MATH NUM CPX PRB
4:  $\rightarrow$  J (
5: *J
6: fMin(
7: fMax(
8: nDeriv(
9: fnInt(
0: Solver...
  
```

Given the Pythagorean Theorem  $a^2 + b^2 = c^2$  written in the form  $a^2 + b^2 - c^2 = 0$ , the Equation Solver can find a, b or c given values for the other two.

Use the **ALPHA** key to help you enter the equation as shown. Press **ENTER**.

```

EQUATION SOLVER
eqn: 0=A2+B2-C2
  
```

The screen shows the three variables and a default boundary of a really small number to a really large number ( $-1 \times 10^{99}$  to  $1 \times 10^{99}$ ). In some situations when there would be more than one solution, you can set different boundaries to indicate which solution is desired.

```

A2+B2-C2=0
A=0
B=0
C=0
bound={-1E99,1...
  
```

Test the Equation Solver with something for which you know the result to verify that you have entered everything correctly. Type in values of 3 for **A** and 4 for **B**. Move your cursor next to **C**.

```

A2+B2-C2=0
A=3
B=4
C=
bound={-1E99,1...
  
```

<p>To solve for <b>C</b>, press <b>ALPHA</b><b>ENTER</b> (green “solve” command above the “enter” key). The result of “5” is the expected result. Now you can use the equation solver to solve several problems with Pythagorean Theorem.</p>	<pre>A<sup>2</sup>+B<sup>2</sup>-C<sup>2</sup>=0 A=3 B=4 ▪ C=5 bound={-1E99, 1... left-rt=0</pre>
<p>The straight distance between home plate and second base on a baseball diamond is the hypotenuse of a right triangle. The distance from base to base is 90 feet. To find the hypotenuse, enter 90 for both <b>A</b> and <b>B</b>. Delete the value for <b>C</b>.</p>	<pre>A<sup>2</sup>+B<sup>2</sup>-C<sup>2</sup>=0 A=90 B=90 C= bound={-1E99, 1... left-rt=0</pre>
<p>Move your cursor beside <b>C</b>, press <b>ALPHA</b><b>ENTER</b>. The distance from home plate to second base is about 127.3 feet.</p>	<pre>A<sup>2</sup>+B<sup>2</sup>-C<sup>2</sup>=0 A=90 B=90 ▪ C=127.27922061... bound={-1E99, 1... left-rt=0</pre>
<p>The base of a right triangle is 18 units, and its hypotenuse is 22.5 units. What is its height? Enter 18 for <b>A</b> (or <b>B</b>) and 22.5 for <b>C</b>. Move the cursor beside <b>B</b> (or <b>A</b>).</p>	<pre>A<sup>2</sup>+B<sup>2</sup>-C<sup>2</sup>=0 A=18 B=█ C=22.5 bound={-1E99, 1... left-rt=0</pre>
<p>Press <b>ALPHA</b><b>ENTER</b>. The height of the triangle is 13.5 units.</p>	<pre>A<sup>2</sup>+B<sup>2</sup>-C<sup>2</sup>=0 A=18 ▪ B=13.499999999... C=22.5 bound={-1E99, 1... left-rt=0</pre>