Pythagorean Theorem

Lesson objectives

Students will be introduced to brief history of Pythagoras. Students will be able to state the Pythagorean Theorem. Students will be introduced to proofs of Pythagorean Theorem. Given the length of two sides, students will determine the length of the third side of a right triangle.
Standard: MCC8.G.6
WHO IS THIS PYTHAGORAS GUY ANYWAY?
DEFINITIONS

Area of a square = side^2
Side of a square = \sqrt{\text{area}}

Area of a triangle = \frac{1}{2} \text{base} \times \text{height}

A Right Triangle is a triangle in which one of its interior angles is a right angle.

The Hypotenuse is the longest side of a right triangle, it is opposite the right angle.
**PYTHAGOREAN THEOREM:**

The sum of the squares of the lengths of the legs of a right triangle is equal to the square of the length of the hypotenuse.

\[ a^2 + b^2 = c^2 \]

-OR-

The sum of the areas (side\(^2\)+side\(^2\)) of the two small squares equals the area (hypotenuse\(^2\)) of the large square.
My theorem has been proven MANY ways!
Find the length of hypotenuse $C$

$c^2 = a^2 + b^2$
Solve for x.

\[ \begin{align*}
\text{left diagram:} & \quad 5 \quad x \\
12 & \\
\end{align*} \]

\[ \begin{align*}
\text{right diagram:} & \quad 17 \quad x \\
8 & \\
\end{align*} \]
How far is the throw from home to second?
How long must a ladder be to reach the roof? Use a calculator.
A 30 ft. ladder, placed 10 feet away from house, just reaches the peak of the roof. How high is the peak of the roof?
The height of a delivery truck bed is three feet. The edge of a ramp on the ground is six feet away from the truck. How long is the ramp?
Joe is on a sidewalk 100 ft. away from the tree, Jim is on a perpendicular sidewalk 70 ft. away from the tree, how far away are they from each other?
It is about 60 mi. from Dover, DE to Annapolis, MD.
It is about 110 mi. from Annapolis, MD to Harrisburg, PA.
About how far is it from Harrisburg, PA to Dover, DE?

It is about 130 mi. from Trenton, NJ to Harrisburg, PA.
It is about 120 mi. from Harrisburg, PA to Washington D.C.
About how far is it from Washington D.C. to Trenton NJ?
Move and rotate the yellow triangles to create a square: $c^2$. 

\[ a^2 + b^2 = c^2 \]
\[ c^2 = (a-b)^2 + 4\left(\frac{ab}{2}\right) \]
\[ = (a-b)^2 + 2ab \]
\[ = a^2 - 2ab + b^2 + 2ab \]
\[ = a^2 + b^2 \]
Instructions: Have your homework out on your desk. While I am passing out your quizzes, attempt the problem below:

*Find the area of the triangle:*

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15

12
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