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Date: _____

Mr. Johnson
Math 8

Lesson 1.5 – The Pythagorean Theorem

What do you know about the Pythagorean Theorem?

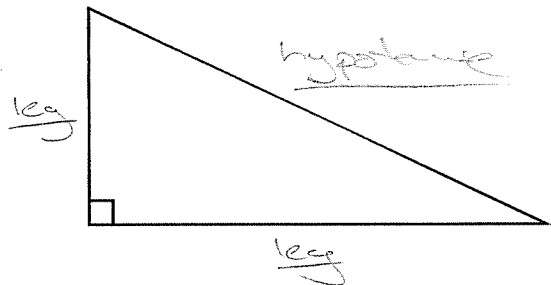
student opinion

Definitions:

Leg: the sides of a right \angle triangle

Hypotenuse - side opposite the right \angle in a right triangle

Hint: (The hypotenuse is always located opposite from the 90° angle)



Label the legs and the hypotenuse on the triangle

Investigate:

In groups of 4 use the manipulative provided to form a 3×3 square and a 4×4 square which form a right angle to one another. From there I want you to find the size of the square that would be formed to complete our right triangle.

Investigate Questions

1. What size was the square that completed the triangle? What was the length of the hypotenuse?

$5 \times 5 = 25$ square units. Hypotenuse was 5 units long.

2. What happens if you do the same with a 2×2 square and 3×3 square?

It does not produce a 'perfect square'

3. Can you find another combination of squares that work like the first example?

6, 8, 10 or 5, 12, 13

4. Explain the best you can what you think this formula may represent, $a^2 + b^2 = c^2$

student opinion

Notes:

The Pythagorean Theorem is one of math's oldest and most famous formulas. This formula allows us to determine any missing side length of a right triangle provided we know 2 side lengths.

The formula is $a^2 + b^2 = c^2$.

a - leg

b - leg

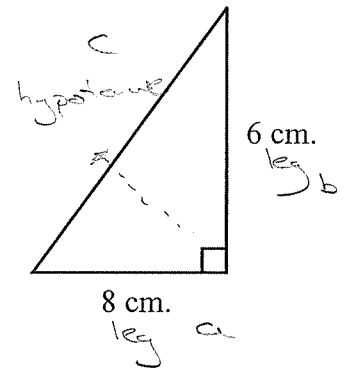
c - hypotenuse

The formula can also be written as $a^2 = c^2 - b^2$, in this case you would be solving for the length of the leg.

Examples:

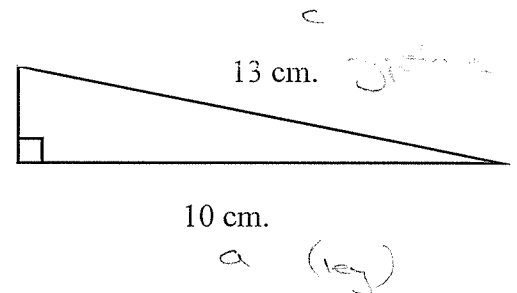
1. Find the unknown length to one decimal place.

$$\begin{aligned} a^2 + b^2 &= c^2 \\ (8)^2 + (6)^2 &= c^2 \\ 64 + 36 &= c^2 \\ \sqrt{100} &= \sqrt{c^2} \\ 10 \text{ cm} &= c \end{aligned}$$



2. Find the unknown length to one decimal place.
(BE CAREFUL!!) *what are we solving for?*

$$\begin{aligned} a^2 + b^2 &= c^2 \\ (10)^2 + b^2 &= (13)^2 \\ 100 + b^2 &= 169 \\ b^2 &= 169 - 100 \\ \sqrt{b^2} &= \sqrt{69} \\ b &= \sqrt{69} \end{aligned}$$



Mistakes Grade 8's make:

- They let C represent the unknown side. Instead we know that C represents the length of the hypotenuse
- They forget what it means to square a number. When squaring a number we multiply the number being squared by itself.
- They guess where the hypotenuse is. Remember the hypotenuse is always located opposite from the 90° ∠.

Assignment:

Pg. 33-36

#'s 1-13

