

Algebra 1-8: The Pythagorean Theorem

Warm-Up

Evaluate.

~~1. $4^2 + 2^2$~~

4. $\sqrt{4^2 + 2^2} = \sqrt{16 + 4} = \sqrt{20} = 4.47$

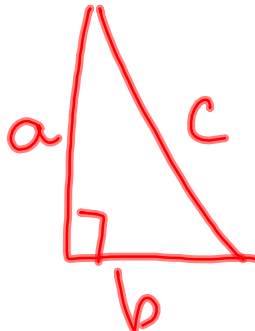
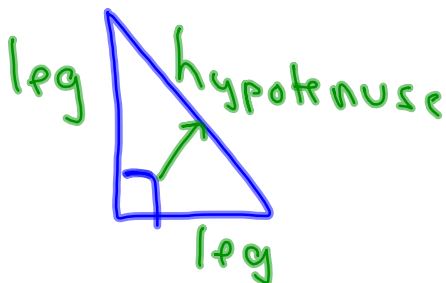
~~2. $6^2 + 3^2$~~

5. $\sqrt{6^2 + 3^2} = \sqrt{36 + 9} = \sqrt{45} = 6.71$

~~3. $1^2 + 8^2$~~

6. $\sqrt{1^2 + 8^2} = \sqrt{1 + 64} = \sqrt{65} = 8.06$

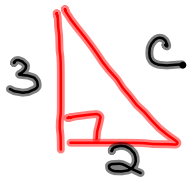
Vocabulary	Definition	Example
Legs	• form the 90° angle / The shorter sides	
Hypotenuse	• longest side / opposite the right angle	
Pythagorean Theorem	$a^2 + b^2 = c^2$ / leg ² + leg ² = hypotenuse ²	



Use: helps find side lengths on a right Δ .

Example Problems

1. Find the length of the hypotenuse if the legs of a right triangle are 3 inches and 2 inches long. _____

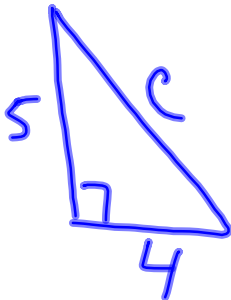


$$\begin{aligned}
 c^2 &= 3^2 + 2^2 \\
 c^2 &= 9 + 4 \\
 c^2 &= 13 \\
 c &= \sqrt{13}
 \end{aligned}$$

$$c = \sqrt{13} \text{ or } 3.61 \text{ inches}$$

* Not (-) since it's a length

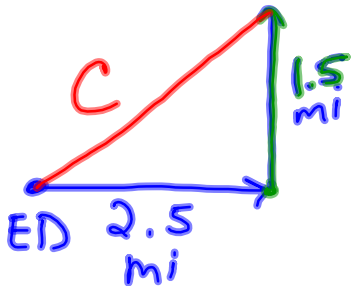
2. Find the length of the hypotenuse if the legs of a right triangle are 4 feet and 5 feet long. _____



$$\begin{aligned}
 c^2 &= 5^2 + 4^2 \\
 c^2 &= 25 + 16 \\
 c^2 &= 41 \\
 c &= \sqrt{41}
 \end{aligned}$$

$$c = \sqrt{41} \text{ or } 6.40 \text{ feet}$$

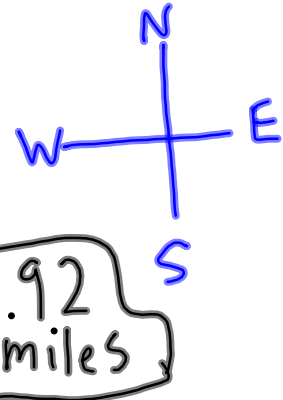
3. To get to school, Ed travels 2.5 miles east and 1.5 miles north. If he could travel to school in a straight line, how far would he have to go? _____



$$2.5^2 + 1.5^2 = C^2$$

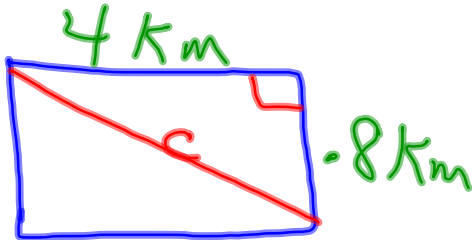
$$6.25 + 2.25 = C^2$$

$$\sqrt{8.5} = C^2$$



$$C = 2.92 \text{ miles}$$

4. Central Park in NYC is shaped like a rectangle.



It is .8 kilometers wide and 4 kilometers long.

They want to make a path from one corner to the opposite corner. How long will it be?

4.08 Km

$$.8^2 + 4^2 = C^2$$

$$.64 + 16 = C^2$$

$$\sqrt{16.64} = C^2$$

$$C = 4.079$$