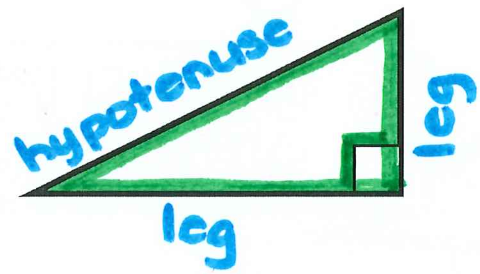
The Pythagorean Theorem is for- finding the length of a missing side in a right Δ.

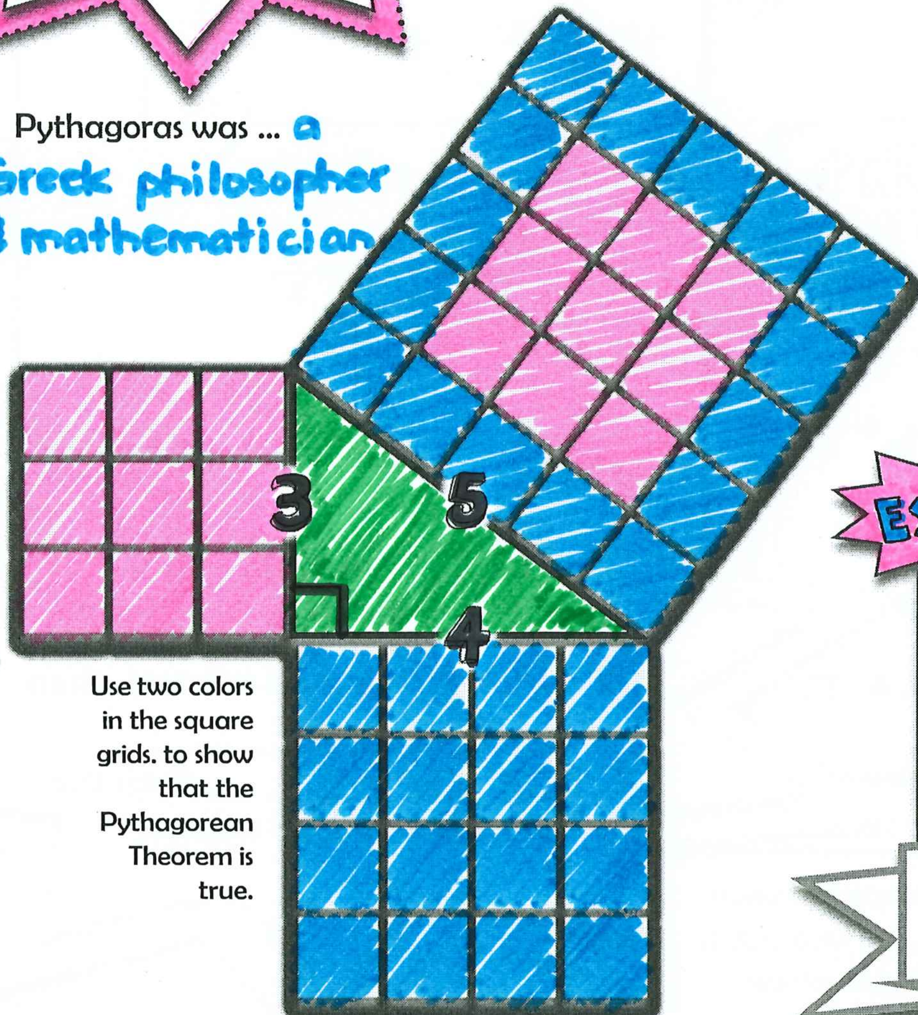
Pythagorean Theorem

Label the legs and hypotenuse.



The theorem only works on right triangles.

Pythagoras was ... a Greek philosopher & mathematician



Use two colors in the square grids. to show that the Pythagorean Theorem is true.

the theorem:

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

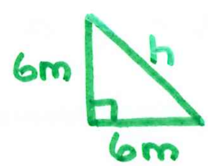
Here's what each letter represents:

a & b → legs (interchangeable)

c → hypotenuse (longest)

Ex 1

A right isosceles triangle has legs 6 meters long each. Find the length of the hypotenuse to the nearest tenth of a meter.



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

$6^2+6^2=h^2$

$36+36=h^2$

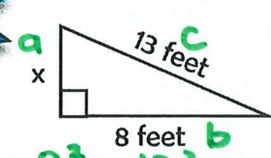
$\sqrt{72}=\sqrt{h^2}$

Answer:

hypotenuse ≐ 8.5m

Ex 2

Find x.



$x^2+8^2=13^2$

$x^2+64=169$

$\sqrt{x^2}=\sqrt{105}$

Answer:

x ≐ 10.2 feet

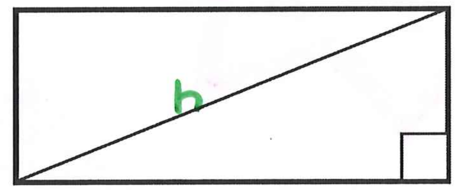
Name:

Try It

Find the length of the diagonal

11 in

4 in



$4^2 + 11^2 = h^2$

$16 + 121 = h^2$

$\sqrt{137} = \sqrt{h^2}$

$h \doteq 11.7$ inches

Is this a right triangle? (R.A.T)

Side lengths: 8 cm, 10 cm, 16 cm

Does $8^2 + 10^2 = 16^2$?

$64 + 100 = 256$

$164 \neq 256$

$\boxed{\text{No}}$, this is not a R.A.T.

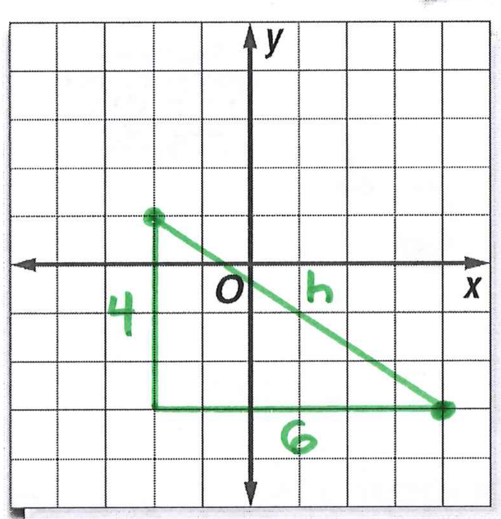
The theorem works both ways!

1. If a triangle is a right triangle, then $a^2+b^2=c^2$.
2. If $a^2+b^2=c^2$, then the triangle is a right triangle.

History

Although Pythagoras is credited with the first proof of the Pythagorean Theorem (used in Euclidean Geometry), it is believed that Babylonian, Mesopotamian, Chinese, and Indian mathematicians understood the concept before his time. There are many proofs of the Pythagorean theorem, including both algebraic and geometric proofs.

Find the distance between the points (4, -3) and (-2, 1) on the coordinate plane.



$4^2 + 6^2 = h^2$

$16 + 36 = h^2$

$\sqrt{52} = \sqrt{h^2}$

$h \doteq 7.2$ units

Name: