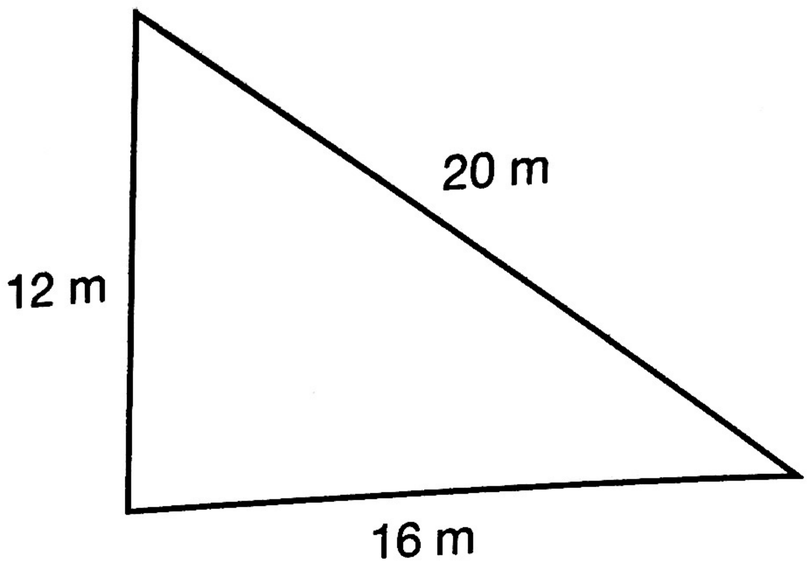
1.6 The Pythagorean Theorem

GOAL

Model, explain, and apply the Pythagorean theorem.

1. Is this triangle a right triangle?



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

$20^2 = 12^2 + 16^2$

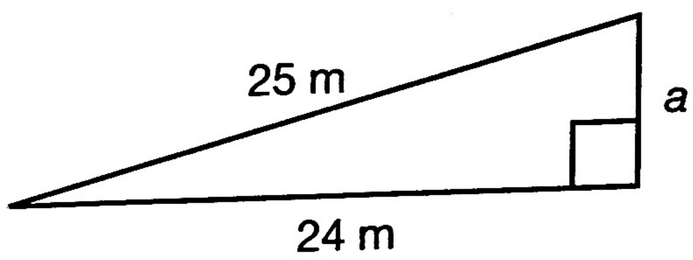
$400 = 144 + 256$

$400 = 400$

RS = LS? yes.

Is this triangle a right triangle? yes.

2. Calculate the unknown length.



$(25)^2 = a^2 + (24)^2$

$625 = a^2 + 576$

$49 = a^2$

$\sqrt{49} = a \Rightarrow a = 7$

3. Which of these are Pythagorean triples?

$900 = 121 + 484$ $169 = 144 + 25$

a) 11, 22, 30 NO **b)** 5, 12, 13 yes. متساوي الساقين

4. The hypotenuse of an isosceles right triangle is 14 cm. How long are the legs? Include a diagram. Recall that an isosceles right triangle has legs that are the same length.

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

$196 = a^2 + a^2$

$196 = 2a^2$

$98 = a^2$

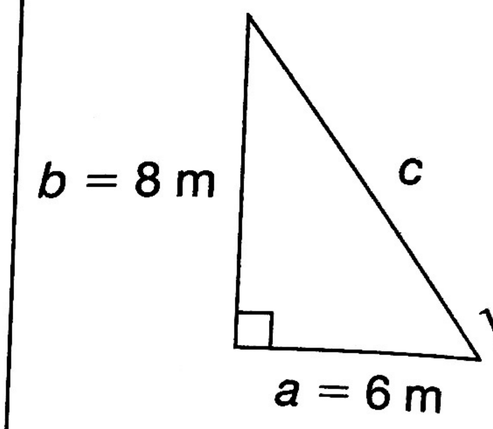
$\sqrt{98} = a$

estimation $10 =$

At-Home Help

You can use the Pythagorean theorem to:

- calculate the hypotenuse



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

$c^2 = 6^2 + 8^2$

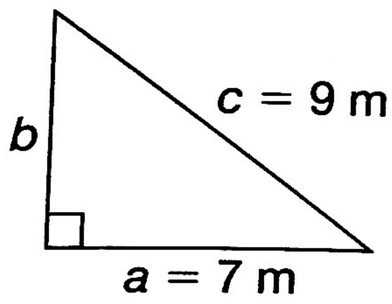
$c^2 = 36 + 64$

$c^2 = 100$

$\sqrt{c^2} = \sqrt{100}$

$c = 10$ m

- calculate one leg



$b^2 = c^2 - a^2$

$b^2 = 9^2 - 7^2$

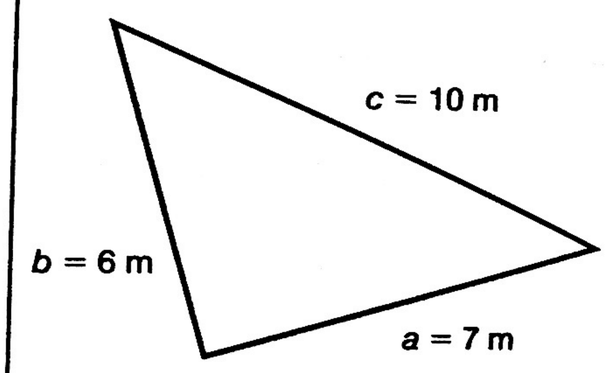
$b^2 = 81 - 49$

$b^2 = 32$

$\sqrt{b^2} = \sqrt{32}$

$b \approx 6$ m

- determine if a triangle is a right triangle



$a^2 + b^2 = 7^2 + 6^2$

$= 49 + 36$

$= 85$

$c^2 = 10^2$

$= 100$

$85 \neq 100$

This triangle is not a right triangle.