



Name: _____

Date: _____

How can I find the length of the hypotenuse in a right triangle?

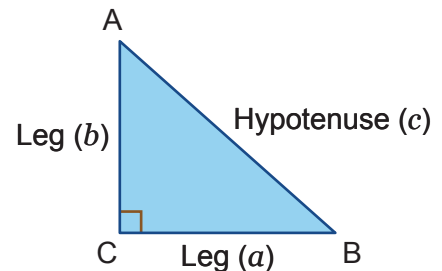
Review

A right triangle is a triangle that contains one right angle, which measures 90° . The sides that make up the right angle are the legs, and the side opposite the right angle is the hypotenuse.

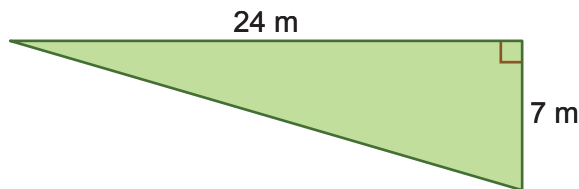
The Pythagorean theorem states that for any right triangle with legs a and b and hypotenuse c , $a^2 + b^2 = c^2$.



The hypotenuse is across from the right angle and the longest side of the triangle.



What is the length of the hypotenuse of the right triangle?



Use the Pythagorean theorem. The legs are 24 meters and 7 meters, and the hypotenuse is unknown. So, $a = 24$ and $b = 7$.

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

$$24^2 + 7^2 = c^2$$

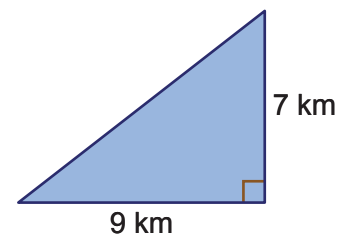
$$576 + 49 = c^2$$

$$625 = c^2$$

$$25 = c$$

The hypotenuse of the right triangle is 25 meters long.

To get to the aquarium, Sherry left her house, drove 9 kilometers east, and then drove 7 kilometers north. How far is Sherry's house from the aquarium if you measure along a direct path?



Use the Pythagorean theorem. The legs are 9 kilometers and 7 kilometers, and the hypotenuse is unknown. So, $a = 7$ and $b = 9$.

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

$$9^2 + 7^2 = c^2$$

$$81 + 49 = c^2$$

$$130 = c^2$$

$$\sqrt{130} = c$$

130 is not a perfect square. Use a calculator to find $\sqrt{130} \approx 11.4$.

A direct path from Sherry's house to the aquarium is about 11.4 kilometers long.



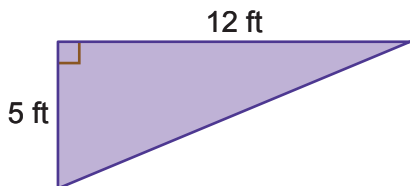
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Practice

Fill in the blanks to find the length of the hypotenuse.

1.

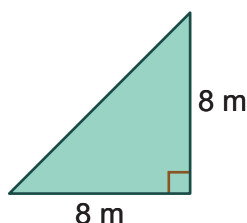


$$a^2 + b^2 = c^2$$

$$\begin{array}{rcl} \underline{5^2} & + & \underline{12^2} = \underline{c^2} \\ \underline{25} & + & \underline{144} = c^2 \\ \underline{169} & & = c^2 \\ \underline{13} & & = c \end{array}$$

Fill in the blanks to find the length of the hypotenuse. Write your answer in square root form.

2.



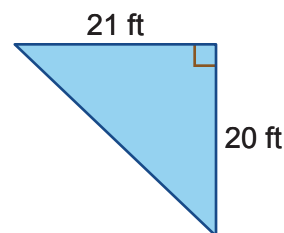
$$a^2 + b^2 = c^2$$

$$\begin{array}{rcl} \underline{8^2} & + & \underline{8^2} = c^2 \\ \underline{64} & + & \underline{64} = c^2 \\ \underline{128} & & = c^2 \\ \underline{\sqrt{128}} & & = c \end{array}$$

Find the length of the hypotenuse.

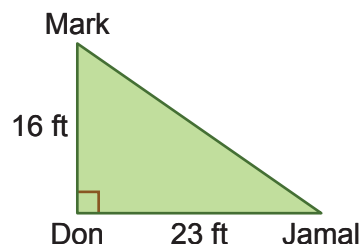
3. A park fences in a right triangular-shaped area for a playground. Two sides of the triangular fence are 20 feet and 21 feet. What is the length of the third and longest side of the fence?

Solution: The third side of the fence is 29 feet long.



4. Don, Mark, and Jamal are kicking a soccer ball to each other. The diagram shows the formation they are standing in. How far away from Mark is Jamal? Round to the nearest hundredth.

Solution: Mark is about 28.02 feet from Jamal.



How can you find the length of the hypotenuse in a right triangle if you know the lengths of the legs?

To find the length of the hypotenuse in a right triangle, find the square root of the sum of the squares of the legs.