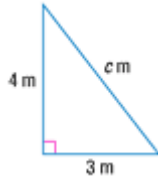


Lesson 9-5

Example 1 Find the Length of the Hypotenuse
Find the length of the hypotenuse of the right triangle.



$$\begin{aligned}c^2 &= a^2 + b^2 && \text{Pythagorean Theorem} \\c^2 &= 4^2 + 3^2 && \text{Replace } a \text{ with 4 and } b \text{ with 3.} \\c^2 &= 16 + 9 && \text{Evaluate } 4^2 \text{ and } 3^2. \\c^2 &= 25 && \text{Add 16 and 9.} \\\sqrt{c^2} &= \sqrt{25} && \text{Take the square root of each side.} \\c &= 5 && \text{Simplify.}\end{aligned}$$

The length of the hypotenuse is 5 meters.

Example 2 Solve a Right Triangle
Find the length of the leg of the right triangle.



$$\begin{aligned}c^2 &= a^2 + b^2 && \text{Pythagorean Theorem} \\20^2 &= a^2 + 12^2 && \text{Replace } c \text{ with 20 and } b \text{ with 12.} \\400 &= a^2 + 144 && \text{Evaluate } 20^2 \text{ and } 12^2. \\400 - 144 &= a^2 + 144 - 144 && \text{Subtract 144 from each side.} \\256 &= a^2 && \text{Simplify.} \\\sqrt{256} &= \sqrt{a^2} && \text{Take the square root of each side.} \\16 &= a && \text{Simplify.}\end{aligned}$$

The length of the leg is 16 inches.

Example 3 Use the Pythagorean Theorem

Multiple-Choice Test Item

Dave purchases a plot of land shaped like a right triangle. The hypotenuse is 110 feet and one of the legs is 60 feet. About how long is the other leg?

- A. 50 feet B. 7.2 feet C. 92.2 feet D. 41.3 feet

Read the Test Item

The three sides of the plot of land form a right triangle.

Solve the Test Item

Use the Pythagorean Theorem to find the length of the remaining leg of the plot of land.

$$\begin{aligned}c^2 &= a^2 + b^2 \\110^2 &= 60^2 + b^2 \\12100 &= 3600 + b^2 \\12100 - 3600 &= 3600 + b^2 - 3600 \\8500 &= b^2 \\\sqrt{8500} &= \sqrt{b^2} \\92.2 &\approx b\end{aligned}$$

Pythagorean Theorem

Replace c with 110 and a with 60.

Evaluate 110^2 and 60^2 .

Subtract 3600 from each side.

Simplify.

Take the square root of each side.

Round to the nearest tenth.

The missing measurement is about 92.2 feet. The answer is C.

Example 4 Identify a Right Triangle

The measures of three sides of a triangle are given. Determine whether each triangle is a right triangle.

- a. 10 cm, 14 cm, 18 cm

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

$$18^2 \stackrel{?}{=} 10^2 + 14^2$$

$$324 \stackrel{?}{=} 100 + 196$$

$$324 \neq 296$$

- b. 15 in., 20 in., 25 in.

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

$$25^2 \stackrel{?}{=} 15^2 + 20^2$$

$$625 \stackrel{?}{=} 225 + 400$$

$$625 = 625$$

The triangle is *not* a right triangle. The triangle is a right triangle.