Lesson 16: Applications of the Pythagorean Theorem

Classwork

Example 1

Given a right triangle with a hypotenuse with length 13 units and a leg with length 5 units, as shown, determine the length of the other leg.

\[
\begin{align*}
5^2 + b^2 &= 13^2 \\
5^2 - 5^2 + b^2 &= 13^2 - 5^2 \\
b^2 &= 13^2 - 5^2 \\
b^2 &= 169 - 25 \\
b^2 &= 144 \\
b &= 12
\end{align*}
\]

The length of the leg is 12 units.

Exercises 1–2

1. Use the Pythagorean theorem to find the missing length of the leg in the right triangle.
2. You have a 15-foot ladder and need to reach exactly 9 feet up the wall. How far away from the wall should you place the ladder so that you can reach your desired location?

Exercises 3–6

3. Find the length of the segment $AB$, if possible.
4. Given a rectangle with dimensions 5 cm and 10 cm, as shown, find the length of the diagonal, if possible.

![Diagram of a rectangle with diagonal](image)

5. A right triangle has a hypotenuse of length 13 in. and a leg with length 4 in. What is the length of the other leg?

6. Find the length of $b$ in the right triangle below, if possible.

![Diagram of a right triangle](image)