

We will label the distance of the ladder from the tree as one leg, $a = 12$, and the length of the ladder as the hypotenuse, $c = 20$. Then the height of the branch can be found by solving the following equation for b .

$$\begin{aligned}c^2 &= a^2 + b^2 && \text{Pythagorean Theorem} \\400 &= 144 + b^2 \\400 - 144 &= b^2 \\b &= \sqrt{256} \\b &= 16\end{aligned}$$

9.R.2 Exercises

Concept Check

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

- 49 is a perfect square.
- In the expression $\sqrt{81}$, the number 9 is the radicand.
- The Pythagorean Theorem can be used to find the length of the longest side of a right triangle if the lengths of the two legs are known.
- The Pythagorean Theorem works for any type of triangle.

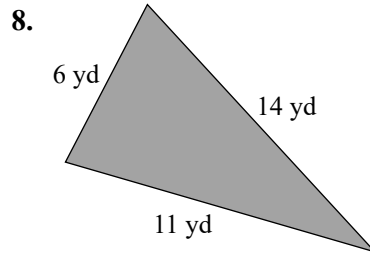
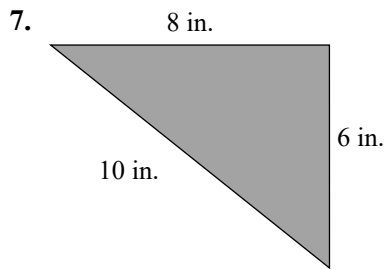
Practice

Evaluate each expression.

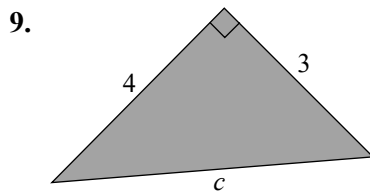
5. $\sqrt{36}$

6. $\sqrt{225}$

Use the Pythagorean Theorem to determine whether or not each triangle is a right triangle.



Find the hypotenuse for the given right triangle accurate to the nearest hundredth.

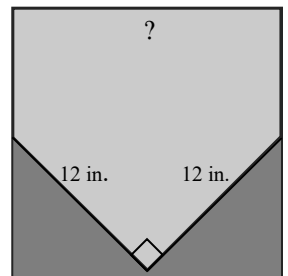


Applications

Solve.

10. The base of a fire engine ladder is 30 feet from a building and reaches to a third floor window 50 feet above ground level. Find the length of the ladder to the nearest hundredth of a foot.

11. The shape of home plate in the game of baseball can be created by cutting off two triangular pieces at the corners of a square, as shown in the figure. If each of the triangular pieces has a hypotenuse of 12 inches and legs of equal length, what is the length of one side of the original square, to the nearest tenth of an inch?



Writing & Thinking

12. Explain the connection between a perfect square and its square root. Give an example.