

NAME

DATE

PERIOD

Unit 8, Lesson 8: Finding Unknown Side Lengths

Let's find missing side lengths of right triangles.

8.1: Which One Doesn't Belong: Equations

Which one doesn't belong?

$$3^2 + b^2 = 5^2$$

$$b^2 = 5^2 - 3^2$$

$$3^2 + 5^2 = b^2$$

$$3^2 + 4^2 = 5^2$$

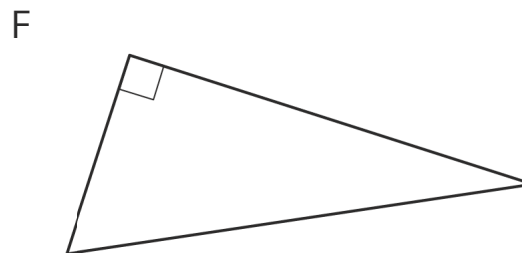
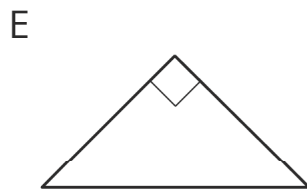
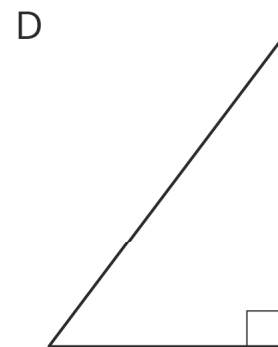
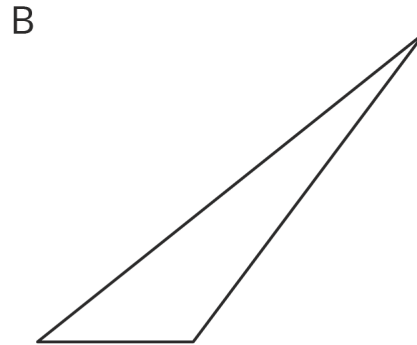
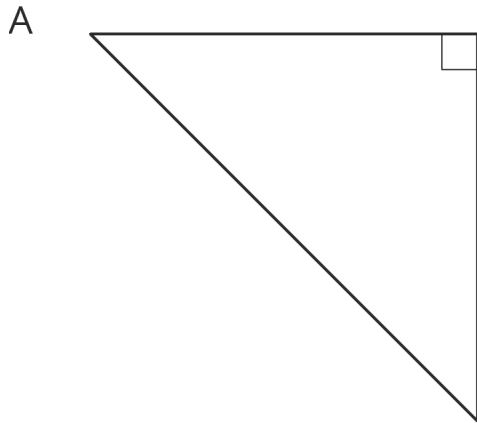
NAME _____

DATE _____

PERIOD _____

8.2: Which One Is the Hypotenuse?

Label all the hypotenuses with c .



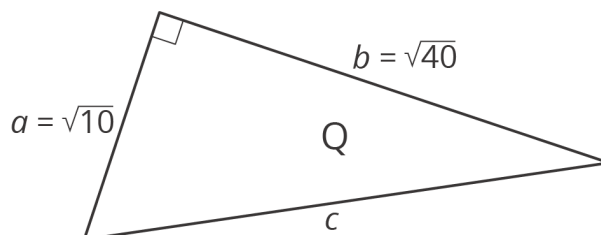
NAME _____

DATE _____

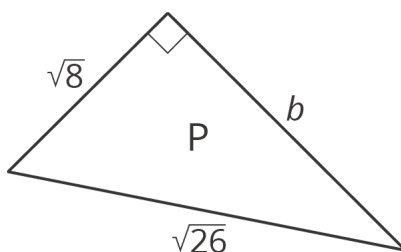
PERIOD _____

8.3: Find the Missing Side Lengths

1. Find c .



2. Find b .



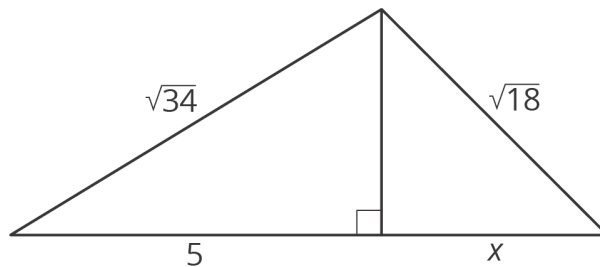
3. A right triangle has sides of length 2.4 cm and 6.5 cm. What is the length of the hypotenuse?
4. A right triangle has a side of length $\frac{1}{4}$ and a hypotenuse of length $\frac{1}{3}$. What is the length of the other side?

NAME _____

DATE _____

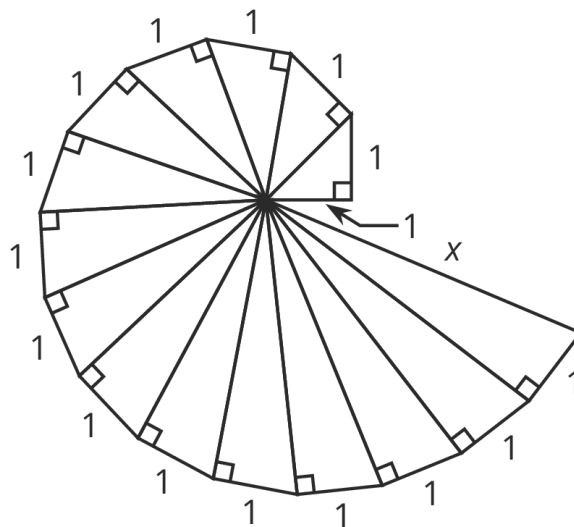
PERIOD _____

5. Find the value of x in the figure.



Are you ready for more?

The spiral in the figure is made by starting with a right triangle with both legs measuring one unit each. Then a second right triangle is built with one leg measuring one unit, and the other leg being the hypotenuse of the first triangle. A third right triangle is built on the second triangle's hypotenuse, again with the other leg measuring one unit, and so on.



Find the length, x , of the hypotenuse of the last triangle constructed in the figure.

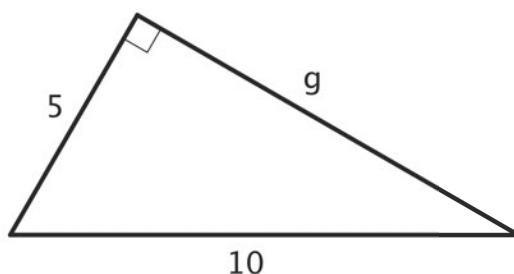
NAME

DATE

PERIOD

Lesson 8 Summary

There are many examples where the lengths of two legs of a right triangle are known and can be used to find the length of the hypotenuse with the Pythagorean Theorem. The Pythagorean Theorem can also be used if the length of the hypotenuse and one leg is known, and we want to find the length of the other leg. Here is a right triangle, where one leg has a length of 5 units, the hypotenuse has a length of 10 units, and the length of the other leg is represented by g .



Start with $a^2 + b^2 = c^2$, make substitutions, and solve for the unknown value. Remember that c represents the hypotenuse: the side opposite the right angle. For this triangle, the hypotenuse is 10.

$$\begin{aligned}a^2 + b^2 &= c^2 \\5^2 + g^2 &= 10^2 \\g^2 &= 10^2 - 5^2 \\g^2 &= 100 - 25 \\g^2 &= 75 \\g &= \sqrt{75}\end{aligned}$$

Use estimation strategies to know that the length of the other leg is between 8 and 9 units, since 75 is between 64 and 81. A calculator with a square root function gives $\sqrt{75} \approx 8.66$.

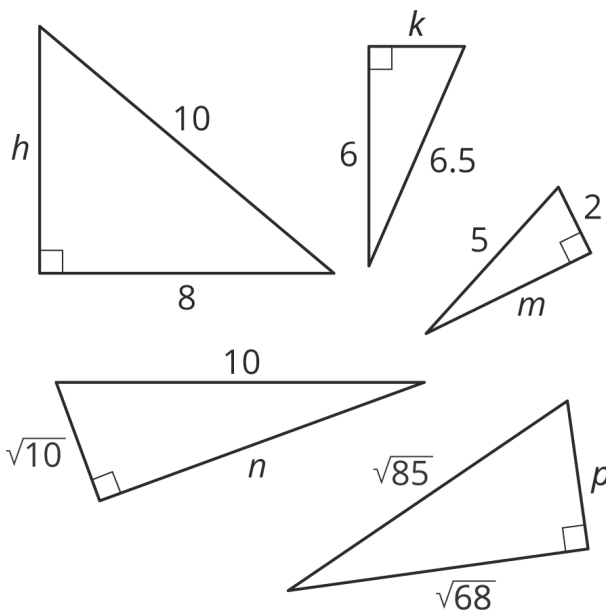
NAME _____

DATE _____

PERIOD _____

Unit 8, Lesson 8: Finding Unknown Side Lengths

Find the exact value of each variable that represents a side length in a right triangle.

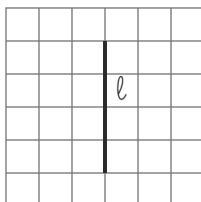


- 1.
2. A right triangle has side lengths of a , b , and c units. The longest side has a length of c units. Complete each equation to show three relations among a , b , and c .
 - a. $c^2 =$
 - b. $a^2 =$
 - c. $b^2 =$

(from Unit 8, Lesson 7)

3. What is the exact length of each line segment? Explain or show your reasoning. (Each grid square represents 1 square unit.)

a.

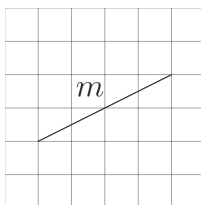


b.

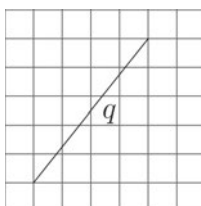
NAME

DATE

PERIOD



c.



(from Unit 8, Lesson 7)

4. In 2015, there were roughly 1×10^6 high school football players and 2×10^3 professional football players in the United States. About how many times more high school football players are there? Explain how you know.

(from Unit 7, Lesson 15)

5. Evaluate:

a. $\left(\frac{1}{2}\right)^3$

b. $\left(\frac{1}{2}\right)^{-3}$

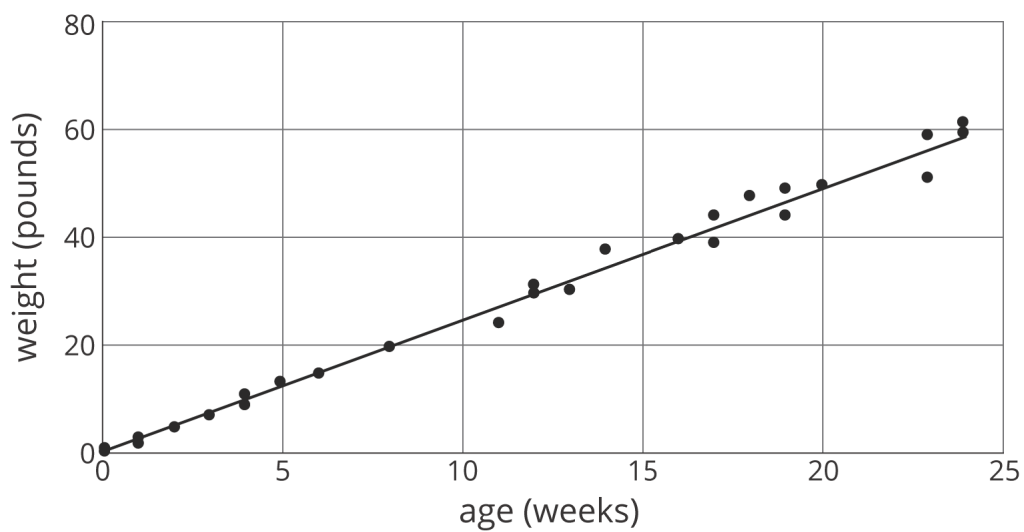
(from Unit 7, Lesson 6)

6. Here is a scatter plot of weight vs. age for different Dobermans. The model, represented by $y = 2.45x + 1.22$, is graphed with the scatter plot. Here, x represents age in weeks, and y represents weight in pounds.

NAME _____

DATE _____

PERIOD _____



a. What does the slope mean in this situation?

b. Based on this model, how heavy would you expect a newborn Doberman to be?

(from Unit 6, Lesson 6)