LESSON MAKER PRO

Diagonal Detectives

Use right-triangle models to find missing lengths.

GRADE 8 · TEKS 8.6.C

8.6.C "use models and diagrams to explain the Pythagorean theorem."

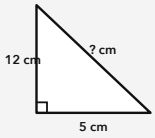
NAME _____ DATE _____

THE PYTHAGOREAN THEOREM

In a right triangle, the two shorter sides are called legs, and the longest side across from the right angle is the hypotenuse. If the legs are a and b and the hypotenuse is c, then $a^2 + b^2 = c^2$.

WORKED EXAMPLE

Find the missing hypotenuse of the right triangle.

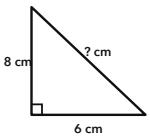


1. The legs are 5 cm and 12 cm.
2. $5^2 + 12^2 = c^2$.
3. $25 + 144 = 169$, so $c^2 = 169$.
4. $c = 13$.

Answer: 13 cm

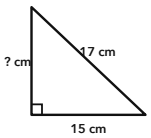
PRACTICE 6 problems

1 Find the missing hypotenuse of the right triangle.



ANSWER _____

2 Find the missing leg of the right triangle.



ANSWER _____

3 Can side lengths 7 cm, 24 cm, and 25 cm form a right triangle? Show the equation that proves your answer.

ANSWER _____

4 A right triangle has legs of 20 cm and 21 cm. Find its hypotenuse.

ANSWER _____

5 A right triangle has a hypotenuse of 26 cm and one leg of 10 cm. Find the other leg.

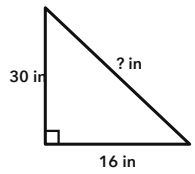
ANSWER _____

6 A right triangle has a hypotenuse of 39 cm and one leg of 36 cm. Find the other leg.

ANSWER _____

APPLY IT Show your work

1 A student needs an HDMI cable that reaches straight across a rectangular monitor from one corner to the opposite corner. The monitor is 16 inches wide and 30 inches tall. How long must the cable be?



ANSWER _____

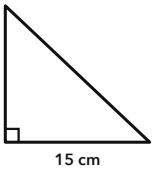
2 At an outdoor concert, Kai walks 20 meters east from the entrance and then 21 meters north to meet friends. How far would Kai be from the entrance in a straight line?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A right-triangle mural has an area of 180 square centimeters. One leg is 15 cm. Find the other leg and the hypotenuse. Explain how the area helps you find the missing lengths.



WORK SPACE AND ANSWER

ANSWER KEY

Diagonal Detectives

GRADE 8 · TEKS 8.6.C

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the missing hypotenuse of the right triangle.	**10 cm**
2	Find the missing leg of the right triangle.	**8 cm**
3	Can side lengths 7 cm, 24 cm, and 25 cm form a right triangle? Show the equation that proves your answer.	**Yes; $7^2 + 24^2 = 25^2$.**
4	A right triangle has legs of 20 cm and 21 cm. Find its hypotenuse.	**29 cm**
5	A right triangle has a hypotenuse of 26 cm and one leg of 10 cm. Find the other leg.	**24 cm**
6	A right triangle has a hypotenuse of 39 cm and one leg of 36 cm. Find the other leg.	**15 cm**

PART 2 · APPLY IT

1. **34 inches** Model the monitor diagonal as the hypotenuse of a right triangle. $16^2 + 30^2 = 1156$, and the square root of 1156 is 34.
2. **29 meters** The east and north walks are perpendicular legs of a right triangle. $20^2 + 21^2 = 841$, and the square root of 841 is 29.

CHALLENGE

The other leg is 24 cm and the hypotenuse is 29 cm. Since 1/2(15)(b) = 180, b = 24; then $15^2 + 24^2 = 29^2$.

Accept equations that correctly use the two legs and the hypotenuse. For the challenge, accept a correct area equation followed by a correct Pythagorean theorem check.