LESSON MAKER PRO

Find the Distance

Use right triangles to find missing lengths.

GRADE 8 · MT.8.G.7

MT.8.G.7 "Apply the Pythagorean Theorem to determine unknown side lengths in right triangle problems, including problems in context in two and three dimensions..."

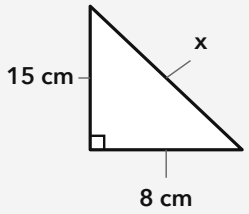
NAME _____ DATE _____

THE RIGHT TRIANGLE RULE

In a right triangle, the squares of the two legs add to the square of the hypotenuse: $a^2 + b^2 = c^2$. The hypotenuse is opposite the right angle. To find a missing leg, subtract the known leg's square from the hypotenuse's square, then take the square root.

WORKED EXAMPLE

Find x in the triangle.

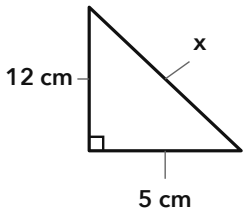


1. $x^2 = 8^2 + 15^2$
2. $x^2 = 64 + 225 = 289$
3. x = 17 because $17^2 = 289$

Answer: 17 cm

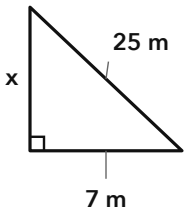
PRACTICE 6 problems

1 Find x in the triangle.



ANSWER _____

2 Find x in the triangle.

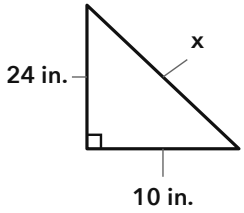


ANSWER _____

3 A right triangle has legs of 9 cm and 40 cm. Find the hypotenuse.

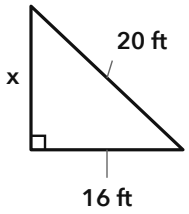
ANSWER _____

4 Find x in the triangle.



ANSWER _____

5 Find x in the triangle.



ANSWER _____

6 A right triangle has a hypotenuse of 61 mm and a leg of 60 mm. Find the other leg.

ANSWER _____

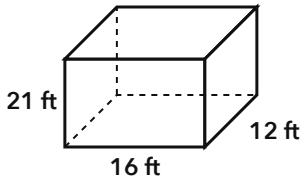
APPLY IT Show your work

1 During basketball practice, you move 18 feet east and then 24 feet north. How far are you from your starting point in a straight line?

WORK SPACE

ANSWER _____

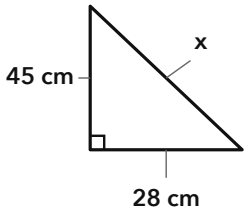
2 At an outdoor art show hosted by Little Big Horn College, a light sits directly above one corner of the booth shown. A cable runs straight from the light to the opposite corner on the ground. How long is the cable?



ANSWER _____

CHALLENGE One step up

A classmate says x is 17 because 45 - 28 = 17. Find x and explain why the classmate's method does not work.



WORK SPACE AND ANSWER

ANSWER KEY

Find the Distance

GRADE 8 · MT.8.G.7

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find x in the triangle.	**13 cm**
2	Find x in the triangle.	**24 m**
3	A right triangle has legs of 9 cm and 40 cm. Find the hypotenuse.	**41 cm**
4	Find x in the triangle.	**26 in.**
5	Find x in the triangle.	**12 ft**
6	A right triangle has a hypotenuse of 61 mm and a leg of 60 mm. Find the other leg.	**11 mm**

PART 2 · APPLY IT

1. **30 feet** The two moves are perpendicular, so the straight-line distance is the hypotenuse. Its length is $\sqrt{(18^2 + 24^2)} = \sqrt{900} = 30$ feet.
2. **29 feet** The diagonal across the booth's floor is $\sqrt{(12^2 + 16^2)} = 20$ feet. The cable is $\sqrt{(20^2 + 21^2)} = 29$ feet.

CHALLENGE

x = 53 cm. The legs must be squared and added: $28^2 + 45^2 = 2809 = 53^2$. Subtracting the legs does not find the hypotenuse.

In the challenge, accept any explanation that correctly applies the Pythagorean Theorem and identifies 53 cm as the hypotenuse. The floor diagonal in the second word problem is 20 feet.