LESSON MAKER PRO

Find the Distance

Use right triangles to find lengths you cannot measure directly.

HIGH SCHOOL · FA.G.36

FA.G.36 "Explain and apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (8.G.7)"

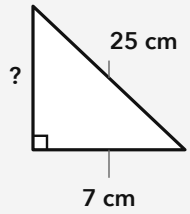
NAME _____ DATE _____

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. For a rectangular prism, you can use the rule twice to find the distance between opposite corners.

WORKED EXAMPLE

Find the unknown side length in the figure.

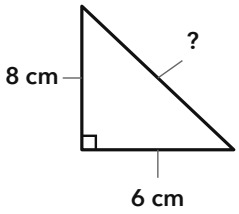


1. $7^2 + x^2 = 25^2$
2. $49 + x^2 = 625$
3. $x^2 = 625 - 49 = 576$
4. $x = 24$

Answer: 24 cm

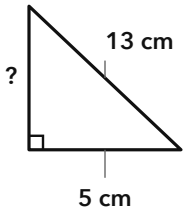
PRACTICE 6 problems

1 Find the unknown side length in the figure.



ANSWER _____

2 Find the unknown side length in the figure.

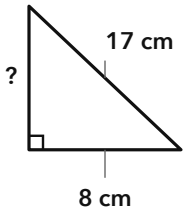


ANSWER _____

3 A right triangle has legs of 20 units and 21 units. Find its hypotenuse.

ANSWER _____

4 Find the unknown side length in the figure.

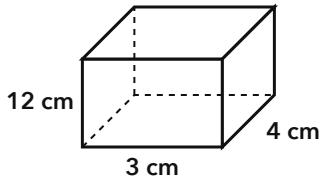


ANSWER _____

5 A right triangle has a hypotenuse of 37 units and one leg of 12 units. Find the other leg.

ANSWER _____

6 Find the straight-line distance from one bottom corner of the prism to the opposite top corner.



ANSWER _____

APPLY IT Show your work

1 At an outdoor concert, a rectangular plaza is 30 meters wide and 40 meters long. How far would you walk if you crossed it in a straight line from one corner to the opposite corner?

WORK SPACE

ANSWER _____

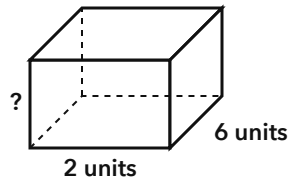
2 A rectangular shipping box for a gaming accessory is 8 inches long, 9 inches wide, and 12 inches tall. What is the straight-line distance inside the box from one bottom corner to the opposite top corner?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The straight-line distance from one bottom corner of this prism to the opposite top corner is 11 units. Find its height, and show how you know.



WORK SPACE AND ANSWER

Find the Distance

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the unknown side length in the figure.	**10 cm**
2	Find the unknown side length in the figure.	**12 cm**
3	A right triangle has legs of 20 units and 21 units. Find its hypotenuse.	**29 units**
4	Find the unknown side length in the figure.	**15 cm**
5	A right triangle has a hypotenuse of 37 units and one leg of 12 units. Find the other leg.	**35 units**
6	Find the straight-line distance from one bottom corner of the prism to the opposite top corner.	**13 cm**

PART 2 · APPLY IT

1. **50 meters** The walk is the hypotenuse of a right triangle. Its length is the square root of $30^2 + 40^2$, or 50 meters.
2. **17 inches** Use the Pythagorean Theorem across the bottom, then from that bottom diagonal to the opposite top corner. The distance squared is $8^2 + 9^2 + 12^2 = 289$, so the distance is 17 inches.

CHALLENGE

9 units. Since $2^2 + 6^2 + x^2 = 11^2$, $x^2 = 121 - 4 - 36 = 81$, so $x = 9$.

Accept a correct value with its unit for each problem. For the challenge, accept any valid use of two right triangles or the equivalent equation for the prism's corner-to-corner distance.