LESSON MAKER PRO

Measure the Space

Use right triangles and volume to solve real situations.

GRADE 8 · 8.GSR.8

8.GSR.8 "Solve contextual, geometric problems involving the Pythagorean Theorem and the volume of geometric figures to explain real phenomena."

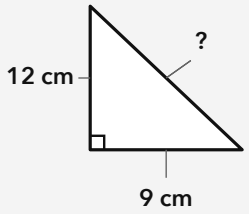
NAME _____ DATE _____

TWO POWERFUL TOOLS

For a right triangle, the legs and hypotenuse follow $a^2 + b^2 = c^2$, where c is across from the right angle. For a prism or cylinder, multiply the area of the base by the height to find volume. Use cubic units for volume.

WORKED EXAMPLE

Find the missing side length of the right triangle shown.

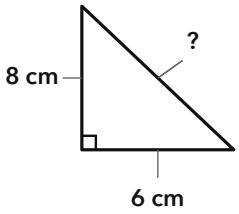


1. $9^2 + 12^2 = c^2$
2. $81 + 144 = c^2$
3. $225 = c^2$, so $c = 15$

Answer: 15 cm

PRACTICE 6 problems

1 Find the missing hypotenuse of the right triangle shown, whose legs are 6 cm and 8 cm.



ANSWER _____

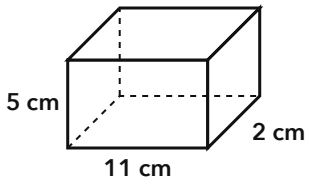
2 A rectangular prism is 7 cm long, 4 cm wide, and 3 cm high. Find its volume.

ANSWER _____

3 A right triangle has legs of 20 m and 21 m. Find the length of its hypotenuse.

ANSWER _____

4 Find the volume of the rectangular prism shown: length 11 cm, width 2 cm, height 5 cm.



ANSWER _____

5 A cylinder has a radius of 4 cm and a height of 6 cm. Find its exact volume.

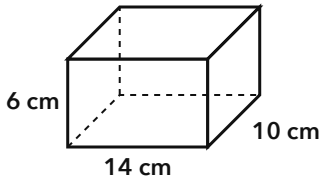
ANSWER _____

6 A rectangular prism has a volume of 336 cm^3. Its length is 8 cm and its width is 7 cm. Find its height.

ANSWER _____

APPLY IT Show your work

1 A robotics club is filling the crate shown with foam blocks to protect a competition robot. What volume of foam can the crate hold?



ANSWER _____

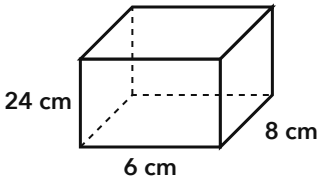
2 A student designs a rectangular scoreboard for a sports video game. The screen is 16 units wide and 30 units tall. What is the length of the diagonal from one corner to the opposite corner?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The display case shown has a 6 cm by 8 cm base and a height of 24 cm. A cable runs straight from one bottom corner to the opposite top corner. Find the cable length. Explain how you used the Pythagorean Theorem twice.



WORK SPACE AND ANSWER

Measure the Space

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the missing hypotenuse of the right triangle shown, whose legs are 6 cm and 8 cm.	**10 cm**
2	A rectangular prism is 7 cm long, 4 cm wide, and 3 cm high. Find its volume.	**84 cm³**
3	A right triangle has legs of 20 m and 21 m. Find the length of its hypotenuse.	**29 m**
4	Find the volume of the rectangular prism shown: length 11 cm, width 2 cm, height 5 cm.	**110 cm³**
5	A cylinder has a radius of 4 cm and a height of 6 cm. Find its exact volume.	**96π cm³**
6	A rectangular prism has a volume of 336 cm³. Its length is 8 cm and its width is 7 cm. Find its height.	**6 cm**

PART 2 · APPLY IT

1. **840 cm³** Multiply the three dimensions: 14 × 10 × 6 = 840. The crate holds 840 cm³ of foam.
2. **34 units** The width and height are the legs of a right triangle. $\sqrt{(16^2 + 30^2)} = \sqrt{1156} = 34$.

CHALLENGE

26 cm. First find the diagonal of the 6 cm by 8 cm base: $\sqrt{(6^2 + 8^2)} = 10$ cm. Then use 10 cm and 24 cm: $\sqrt{(10^2 + 24^2)} = 26$ cm.

Accept equivalent exact forms such as $\sqrt{1156}$ before simplification. For the challenge, accept a correct explanation that finds the base diagonal first and then uses it with the height.