LESSON MAKER PRO

Shortcuts and Straight Lines

Find missing lengths with right triangles.

GRADE 8 · 8.GR.B.5

8.GR.B.5 "Apply the Pythagorean Theorem to solve problems in context. Determine unknown side lengths in right triangles. Find the distance between two points in a coordinate system using the Pythagorean Theorem."

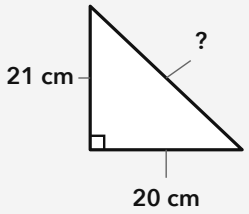
NAME _____ DATE _____

THE BIG IDEA

In a right triangle, the longest side is the hypotenuse. If the legs are a and b and the hypotenuse is c, then $a^2 + b^2 = c^2$. On a coordinate grid, horizontal and vertical changes can be the legs.

WORKED EXAMPLE

Find the missing side.



1. $x^2 = 20^2 + 21^2$
2. $x^2 = 400 + 441 = 841$
3. $x = 29$

Answer: 29 cm

PRACTICE 4 problems

1 A right triangle has legs of 6 cm and 8 cm. Find its hypotenuse.

ANSWER _____

2 A right triangle has a hypotenuse of 13 ft and a leg of 5 ft. Find the other leg.

ANSWER _____

3 A right triangle has a hypotenuse of 25 m and a leg of 7 m. Find the other leg.

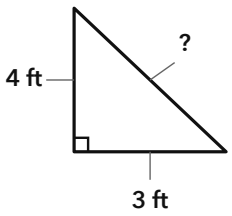
ANSWER _____

4 A right triangle has legs of 9 in. and 40 in. Find its hypotenuse.

ANSWER _____

APPLY IT Show your work

1 A skate ramp follows the slanted side shown. How long is the ramp?



ANSWER _____

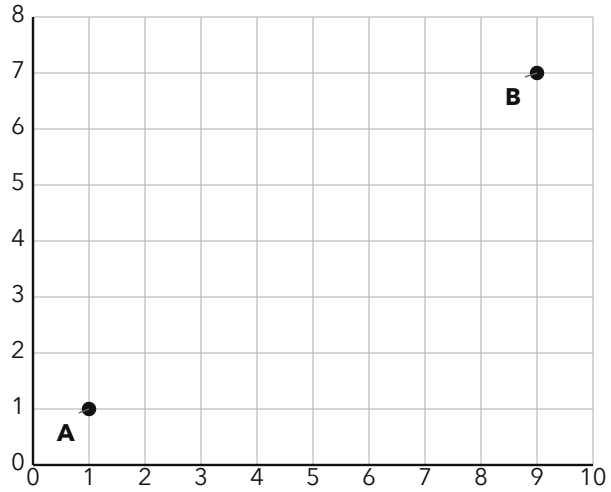
2 A game screen is 16 in. tall and 30 in. wide. How long is its diagonal?

WORK SPACE

ANSWER _____

CHALLENGE One step up

On the grid, travel from A to B along grid lines, moving only right and up, or go straight from A to B. How many units shorter is the straight route? Show your reasoning.



WORK SPACE AND ANSWER

ANSWER KEY

Shortcuts and Straight Lines

GRADE 8 · 8.GR.B.5

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A right triangle has legs of 6 cm and 8 cm. Find its hypotenuse.	**10 cm**
2	A right triangle has a hypotenuse of 13 ft and a leg of 5 ft. Find the other leg.	**12 ft**
3	A right triangle has a hypotenuse of 25 m and a leg of 7 m. Find the other leg.	**24 m**
4	A right triangle has legs of 9 in. and 40 in. Find its hypotenuse.	**41 in.**

PART 2 · APPLY IT

1. **5 ft** The ramp is the hypotenuse. Its length is $\sqrt{(3^2 + 4^2)} = 5$ ft.
2. **34 in.** The diagonal is the hypotenuse of a right triangle. $\sqrt{(16^2 + 30^2)} = 34$ in.

CHALLENGE

4 units shorter. The grid-line route is 8 + 6 = 14 units. The straight route is $\sqrt{(8^2 + 6^2)} = 10$ units, and 14 − 10 = 4.

Accept equivalent Pythagorean Theorem setups. For the challenge, students must compare the 14-unit grid-line route with the 10-unit straight route.