

Right Triangle Quest

Use square-number relationships to solve and check triangles.

GRADE 8 • 8.MG.4

8.MG.4 "The student will apply the Pythagorean Theorem to solve problems involving right triangles, including those in context. Verify the Pythagorean Theorem using diagrams, concrete materials, and measurement..."

NAME _____

DATE _____

THE BIG IDEA

A right triangle has one 90-degree angle. The two sides that touch the 90-degree angle are legs, and the side across from it is the hypotenuse. To find a missing side, use $\text{leg}^2 + \text{leg}^2 = \text{hypotenuse}^2$, and to check whether a triangle is right, test whether the two shorter sides squared add to the longest side squared.

WORKED EXAMPLE

A right triangle has legs 5 cm and 12 cm. Find x , the hypotenuse.

1. Write: $5^2 + 12^2 = x^2$.
2. Calculate: $25 + 144 = x^2$.
3. $169 = x^2$, so $x = 13$.

Answer: 13 cm

PRACTICE 6 problems

- 1** In right triangle ABC, angle B is 90 degrees. Name the hypotenuse.

ANSWER _____

- 2** A right triangle has legs 9 cm and 40 cm. Find x , the hypotenuse.

ANSWER _____

- 3** A right triangle has hypotenuse 29 m and one leg 21 m. Find x , the other leg.

ANSWER _____

- 4** The side lengths are 7 in., 24 in., and 25 in. Is the triangle a right triangle? Write yes or no.

ANSWER _____

- 5** The side lengths are 10 cm, 15 cm, and 20 cm. Is the triangle a right triangle? Write yes or no.

ANSWER _____

- 6** In right triangle DEF, angle F is 90 degrees. Which two sides are the legs?

ANSWER _____

APPLY IT Show your work

- 1** A game designer is planning a rectangular game screen that is 18 cm wide and 24 cm tall. What is the length of the diagonal across the screen?

WORK SPACE

ANSWER _____

- 2** A robotics team marks three floor points that are 16 m, 30 m, and 34 m apart. Do the three points form a right triangle?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A right triangle has a hypotenuse of 25 cm and one leg of 7 cm. Find the perimeter of the triangle.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	In right triangle ABC, angle B is 90 degrees. Name the hypotenuse.	AC
2	A right triangle has legs 9 cm and 40 cm. Find x, the hypotenuse.	41 cm
3	A right triangle has hypotenuse 29 m and one leg 21 m. Find x, the other leg.	20 m
4	The side lengths are 7 in., 24 in., and 25 in. Is the triangle a right triangle? Write yes or no.	Yes
5	The side lengths are 10 cm, 15 cm, and 20 cm. Is the triangle a right triangle? Write yes or no.	No
6	In right triangle DEF, angle F is 90 degrees. Which two sides are the legs?	DF and EF

PART 2 • APPLY IT

1. **30 cm** Use $18^2 + 24^2 = x^2$. Since $324 + 576 = 900$, $x = 30$.
2. **Yes** Test the longest side: $16^2 + 30^2 = 34^2$. Since $256 + 900 = 1156$, the triangle is right.

CHALLENGE

56 cm

Accept correct equations and square-root work, even if students write the sides in a different order. For right-triangle checks, students must compare the two shorter sides with the longest side.