

Right Triangle Quest

Use side lengths to solve right-triangle puzzles.

GRADE 8 • MA.8.GR.1

MA.8.GR.1 "Develop an understanding of the Pythagorean Theorem and angle relationships involving triangles."

NAME _____

DATE _____

THE PYTHAGOREAN RULE

In a right triangle, the two shorter sides are called legs, and the longest side is the hypotenuse. Use $a^2 + b^2 = c^2$, where c is the hypotenuse opposite the right angle.

WORKED EXAMPLE

A right triangle has legs 9 cm and 40 cm. Find the hypotenuse, c .

1. Write the equation: $9^2 + 40^2 = c^2$.
2. Square the legs: $81 + 1600 = c^2$.
3. Add: $1681 = c^2$.
4. Take the square root: $c = 41$.

Answer: 41 cm

PRACTICE 6 problems

- 1** A right triangle has legs 6 cm and 8 cm. Find the hypotenuse, x .

ANSWER _____

- 2** A right triangle has a hypotenuse of 25 cm and one leg of 7 cm. Find the other leg, x .

ANSWER _____

- 3** Do side lengths 10 cm, 24 cm, and 26 cm form a right triangle?

ANSWER _____

- 4** A right triangle has legs 11 cm and 60 cm. Find the hypotenuse, x .

ANSWER _____

- 5** A right triangle has a hypotenuse of 20 cm and one leg of 16 cm. Find the other leg, x .

ANSWER _____

- 6** A right triangle has a hypotenuse of 29 cm and one leg of 21 cm. Find the other leg, x .

ANSWER _____

APPLY IT Show your work

- 1** A skateboard ramp rises 18 inches and extends 24 inches along the ground. How long is the ramp surface?

WORK SPACE

ANSWER _____

- 2** A gaming monitor is 28 cm wide and 45 cm tall. What is the distance from one corner of the screen to the opposite corner?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A right triangle has legs x cm and $x + 7$ cm. Its hypotenuse is 17 cm. Find x and explain why the other solution to the equation does not work.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A right triangle has legs 6 cm and 8 cm. Find the hypotenuse, x .	$x = 10$ cm
2	A right triangle has a hypotenuse of 25 cm and one leg of 7 cm. Find the other leg, x .	$x = 24$ cm
3	Do side lengths 10 cm, 24 cm, and 26 cm form a right triangle?	Yes, because $10^2 + 24^2 = 26^2$.
4	A right triangle has legs 11 cm and 60 cm. Find the hypotenuse, x .	$x = 61$ cm
5	A right triangle has a hypotenuse of 20 cm and one leg of 16 cm. Find the other leg, x .	$x = 12$ cm
6	A right triangle has a hypotenuse of 29 cm and one leg of 21 cm. Find the other leg, x .	$x = 20$ cm

PART 2 • APPLY IT

- 30 inches** Model the ramp, ground, and rise as a right triangle. $18^2 + 24^2 = 900$, so the ramp surface is 30 inches.
- 53 cm** The width, height, and diagonal form a right triangle. $28^2 + 45^2 = 2809$, and $\sqrt{2809} = 53$.

CHALLENGE

$x = 8$. The other solution is $x = -15$, which cannot be a side length. The legs are 8 cm and 15 cm.

Accept correct equations and equivalent work that uses the Pythagorean Theorem. For problem 3, accept yes only when the student shows or states that the squared side lengths satisfy the theorem.