

Right Triangle Routes

Use side lengths to solve right-triangle problems.

GRADE 8 • MA.8.GR.1.1

MA.8.GR.1.1 "Apply the Pythagorean Theorem to solve mathematical and real-world problems involving unknown side lengths in right triangles."

NAME _____

DATE _____

THE BIG IDEA

In a right triangle, the two legs meet at the right angle, and the hypotenuse is across from that angle. Use $a^2 + b^2 = c^2$, where c is the hypotenuse. Square the known side lengths, then use a square root to find a missing side.

WORKED EXAMPLE

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

1. $5^2 + 12^2 = c^2$

2. $25 + 144 = c^2$

3. $169 = c^2$

4. $c = 13$

Answer: $c = 13$ 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 legs 9 m and 40 m. Find the hypotenuse, x .

ANSWER _____

- 3** A right triangle has a hypotenuse of 25 in. One leg is 7 in. Find the other leg, x .

ANSWER _____

- 4** A right triangle has legs 20 yd and 21 yd. Find the hypotenuse, x .

ANSWER _____

- 5** A right triangle has a hypotenuse of 39 ft. One leg is 36 ft. Find the other leg, x .

ANSWER _____

- 6** A right triangle has a hypotenuse of 26 cm. One leg is 10 cm. Find the other leg, x .

ANSWER _____

APPLY IT Show your work

- 1** At a skate park, a ramp is 25 feet long from the ground to a platform. The platform is 7 feet above the ground. How far is the bottom of the ramp from the point directly below the platform?

WORK SPACE

ANSWER _____

- 2** A basketball scoreboard is 20 feet above the floor. A 29-foot support cable runs diagonally from the scoreboard to a floor anchor. How far is the floor anchor from the point directly below the scoreboard?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A robot crosses a rectangular floor that is 6 meters by 8 meters by traveling along its diagonal. It then turns 90 degrees from that diagonal path and travels 24 meters. How far is the robot from its starting point? Explain how you used two right triangles.

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 legs 9 m and 40 m. Find the hypotenuse, x .	$x = 41$ m
3	A right triangle has a hypotenuse of 25 in. One leg is 7 in. Find the other leg, x .	$x = 24$ in.
4	A right triangle has legs 20 yd and 21 yd. Find the hypotenuse, x .	$x = 29$ yd
5	A right triangle has a hypotenuse of 39 ft. One leg is 36 ft. Find the other leg, x .	$x = 15$ ft
6	A right triangle has a hypotenuse of 26 cm. One leg is 10 cm. Find the other leg, x .	$x = 24$ cm

PART 2 • APPLY IT

- 24 feet** Let x be the horizontal distance. $x^2 + 7^2 = 25^2$, so $x^2 = 576$ and $x = 24$.
- 21 feet** Let x be the horizontal distance. $x^2 + 20^2 = 29^2$, so $x^2 = 441$ and $x = 21$.

CHALLENGE

26 meters. The floor diagonal is 10 meters because $6^2 + 8^2 = 10^2$. Then $10^2 + 24^2 = 26^2$.

Accept correct units and equivalent equations that identify the hypotenuse correctly. For the challenge, accept an explanation that finds the 10-meter floor diagonal before using it as a leg of the second right triangle.