LESSON MAKER PRO

Triangle Truth Test

Use squares and square roots to solve right-triangle situations.

GRADE 8 · 8.MG.4.e

8.MG.4.e "Apply the Pythagorean Theorem, and its converse, to solve problems involving right triangles in context."

NAME _____ DATE _____

THE BIG IDEA

In a right triangle, the two shorter sides and the longest side follow a^2 + b^2 = c^2. Put the longest side in c before you calculate. To test whether a triangle is right, check whether the equation is true.

WORKED EXAMPLE

A right triangle has legs 8 cm and 15 cm. Find the hypotenuse x.

1. Use a^2 + b^2 = x^2.
2. 8^2 + 15^2 = x^2.
3. 64 + 225 = 289, so x = sqrt(289) = 17.

Answer: 17 cm

PRACTICE 6 problems

1 A right triangle has legs 7 units and 24 units. Find the hypotenuse x.

ANSWER _____

2 A right triangle has a hypotenuse of 41 units and one leg of 9 units. Find the other leg x.

ANSWER _____

3 Do side lengths 20 units, 21 units, and 29 units form a right triangle? Show the equation you use.

ANSWER _____

4 Do side lengths 10 units, 24 units, and 27 units form a right triangle? Show the equation you use.

ANSWER _____

5 A right triangle has two legs that are each 10 units long. Find the hypotenuse x in simplest form.

ANSWER _____

6 A right triangle has a hypotenuse of 53 units and one leg of 28 units. Find the other leg x.

ANSWER _____

APPLY IT Show your work

1 A skateboard ramp is 29 feet long and rises 20 feet from the ground. The ramp, the ground, and the vertical rise form a right triangle. How far is the bottom of the ramp from the point directly below its top?

WORK SPACE

ANSWER _____

2 A gaming club wants a rectangular video wall that is 33 inches tall and 56 inches wide. Will a 65-inch diagonal brace reach exactly from one corner to the opposite corner?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

The art club is making a rectangular backdrop with a diagonal of 85 feet. One side is 77 feet long. Find the other side length and the total amount of border trim needed for all four sides.

_____

_____

ANSWER KEY

Triangle Truth Test

GRADE 8 · 8.MG.4.e

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A right triangle has legs 7 units and 24 units. Find the hypotenuse x.	**25 units**
2	A right triangle has a hypotenuse of 41 units and one leg of 9 units. Find the other leg x.	**40 units**
3	Do side lengths 20 units, 21 units, and 29 units form a right triangle? Show the equation you use.	**Yes, because 20^2 + 21^2 = 29^2.**
4	Do side lengths 10 units, 24 units, and 27 units form a right triangle? Show the equation you use.	**No, because 10^2 + 24^2 does not equal 27^2.**
5	A right triangle has two legs that are each 10 units long. Find the hypotenuse x in simplest form.	**10sqrt(2) units**
6	A right triangle has a hypotenuse of 53 units and one leg of 28 units. Find the other leg x.	**45 units**

PART 2 · APPLY IT

1. **21 feet** Use x^2 + 20^2 = 29^2. Then x^2 = 441, so x = 21.
2. **Yes, because 33^2 + 56^2 = 65^2.** Check the converse using the longest length as the hypotenuse. Since 1089 + 3136 = 4225 and 65^2 = 4225, the brace fits exactly.

CHALLENGE

The other side is 36 feet, and 226 feet of border trim are needed.

Accept equivalent equations and correct work for all triangle tests. For the radical answer, accept 10sqrt(2) or $10\sqrt{2}$, but do not accept a decimal approximation as the simplest exact form.