LESSON MAKER PRO

Right Triangle Detectives

Find missing sides and test for right triangles.

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."

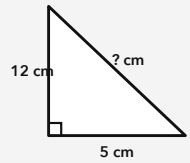
NAME _____ DATE _____

THE TRIANGLE RULE

For a right triangle, $a^2 + b^2 = c^2$, where c is the longest side. To test whether a triangle is right, square the two shorter sides and compare their sum to the longest side squared.

WORKED EXAMPLE

Find the missing side length in the triangle.



1. $5^2 + 12^2 = c^2$
2. $25 + 144 = c^2$
3. $169 = c^2$, so $c = 13$

Answer: 13 cm

PRACTICE 4 problems

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

ANSWER _____

2 A right triangle has hypotenuse 25 cm and one leg 7 cm. Find the other leg.

ANSWER _____

3 A triangle has side lengths 9 cm, 40 cm, and 41 cm. Is it a right triangle?

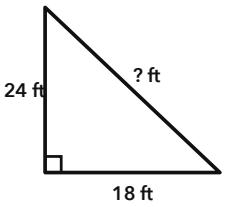
ANSWER _____

4 A triangle has side lengths 10 cm, 11 cm, and 15 cm. Is it a right triangle? Show why.

ANSWER _____

APPLY IT Show your work

1 The skate-ramp cross section is shown. How long is the ramp surface?



ANSWER _____

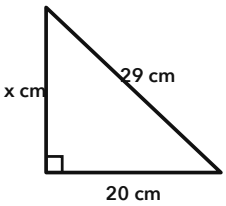
2 Three markers on a soccer field are 12 m, 16 m, and 20 m apart. Do they form a right triangle?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The triangle is right. Find x and explain how you know.



WORK SPACE AND ANSWER

ANSWER KEY

Right Triangle Detectives

GRADE 8 · 8.MG.4.e

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A right triangle has legs 8 cm and 15 cm. Find the hypotenuse.	**17 cm**
2	A right triangle has hypotenuse 25 cm and one leg 7 cm. Find the other leg.	**24 cm**
3	A triangle has side lengths 9 cm, 40 cm, and 41 cm. Is it a right triangle?	**Yes; $9^2 + 40^2 = 41^2$.**
4	A triangle has side lengths 10 cm, 11 cm, and 15 cm. Is it a right triangle? Show why.	**No; $10^2 + 11^2 = 221$, not $15^2 = 225$.**

PART 2 · APPLY IT

1. **30 ft** Use $18^2 + 24^2 = c^2$. Then $c^2 = 900$, so $c = 30$.
2. **Yes; $12^2 + 16^2 = 20^2$.** Check the converse using 20 m as the longest side. Since 144 + 256 = 400, the triangle is right.

CHALLENGE

x = 21 cm; $20^2 + x^2 = 29^2$, so $x^2 = 441$ and x = 21.

Accept correct equations and equivalent reasoning. For converse items, students must compare the sum of the two shorter sides squared with the longest side squared.