LESSON MAKER PRO

# Right Triangle Detectives

*Use side lengths to find missing measures and test for right angles.*

**GRADE 8 · TEKS 8.7.C**

**8.7.C** "use the Pythagorean Theorem and its converse to solve problems; and"

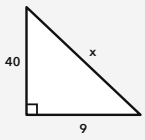
**NAME** _____ **DATE** _____

## THE SIDE-LENGTH RULE

For a right triangle, add the squares of the two legs to get the square of the hypotenuse, the longest side: $a^2 + b^2 = c^2$. To use the converse, square the two shorter sides and compare their sum with the square of the longest side. If they are equal, the triangle is right.

## WORKED EXAMPLE

Find x.

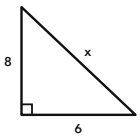



1. Write $9^2 + 40^2 = x^2$.
2. Calculate $81 + 1600 = 1681$, so $x^2 = 1681$.
3. Take the positive square root: $x = 41$.

**Answer: x = 41**

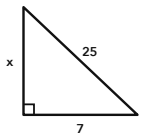
## PRACTICE 6 problems

**1** Find x.




**ANSWER** _____

**2** Find x.




**ANSWER** _____

**3** A triangle has side lengths 8, 15, and 17. Is it a right triangle? Show the comparison of squares.

**ANSWER** _____

**4** Can a triangle with side lengths 10, 11, and 15 be a right triangle? Show the comparison of squares.

**ANSWER** _____

**5** A right triangle has a hypotenuse of 29 and one leg of 20. Find the other leg, x.

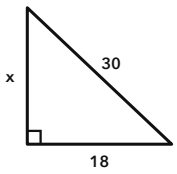
**ANSWER** _____

**6** A triangle has side lengths 11, 60, and 61. Is it a right triangle? Show the comparison of squares.

**ANSWER** _____

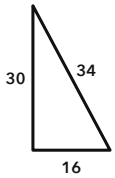
## APPLY IT Show your work

**1** A skatepark ramp is shown. Find its vertical height, x, in inches.




**ANSWER** _____

**2** Three teammates use tape to mark a triangular practice area, shown. Does the triangle have a right angle? Explain.




**ANSWER** _____

## CHALLENGE One step up

A triangular banner is a right triangle with side lengths x, x + 17, and x + 18. Find x and all three side lengths. Show an equation that supports your answer.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Right Triangle Detectives

**GRADE 8 · TEKS 8.7.C**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Find x. | **x = 10** |
| 2 | Find x. | **x = 24** |
| 3 | A triangle has side lengths 8, 15, and 17. Is it a right triangle? Show the comparison of squares. | **Yes; $8^2 + 15^2 = 64 + 225 = 289 = 17^2$.** |
| 4 | Can a triangle with side lengths 10, 11, and 15 be a right triangle? Show the comparison of squares. | **No; $10^2 + 11^2 = 221$, which is not equal to $15^2 = 225$.** |
| 5 | A right triangle has a hypotenuse of 29 and one leg of 20. Find the other leg, x. | **x = 21** |
| 6 | A triangle has side lengths 11, 60, and 61. Is it a right triangle? Show the comparison of squares. | **Yes; $11^2 + 60^2 = 121 + 3600 = 3721 = 61^2$.** |

## PART 2 · APPLY IT

1. **24 inches** Use $18^2 + x^2 = 30^2$. Then $x^2 = 576$, so x = 24.
2. **Yes; it is a right triangle because $16^2 + 30^2 = 34^2$.** The longest side is 34. Calculate $16^2 + 30^2 = 256 + 900 = 1156$, and $34^2 = 1156$.

## CHALLENGE

**x = 7; the side lengths are 7, 24, and 25. Equation: $7^2 + 24^2 = 25^2$.**

Accept equivalent equations and arithmetic that correctly use the two shorter sides as the legs and the longest side as the hypotenuse. For missing lengths, accept only the positive square root because a side length cannot be negative.