LESSON MAKER PRO

# Square Area Clues

*Find missing sides and test for right angles.*

**GRADE 8 · 8.GM.C.26**

**8.GM.C.26** "Informally justify the Pythagorean Theorem and its converse."

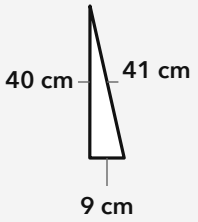
NAME _____ DATE _____

## COMPARE THE SQUARES

In a right triangle, the areas of the squares on the two shorter sides add to the area of the square on the longest side: $a^2 + b^2 = c^2$. This area relationship lets you find a missing side. It also works in reverse: if the two smaller square areas add to the largest square area, the triangle is right.

### WORKED EXAMPLE

Use square areas to decide whether the triangle shown is right.

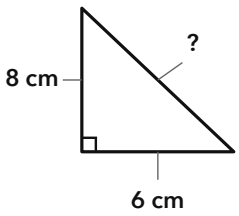



1. Square the shorter sides: $9^2 = 81$ and $40^2 = 1{,}600$.
2. Add their square areas: $81 + 1{,}600 = 1{,}681$.
3. Square the longest side: $41^2 = 1{,}681$.

**Answer: Yes. The two smaller square areas add to the largest square area, so the triangle is right.**

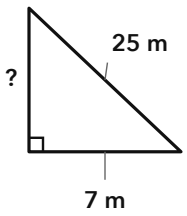
## PRACTICE 6 problems

**1** Find the missing side length.



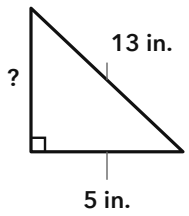

ANSWER _____

**2** Find the missing side length.



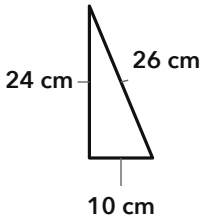

ANSWER _____

**3** Find the missing side length.




**ANSWER** _____

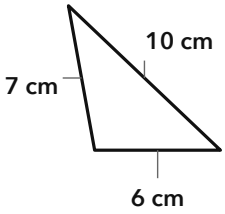
**4** Is this triangle right? Show the square-area comparison.




**ANSWER** _____

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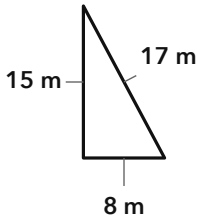
**5** Is this triangle right? Show the square-area comparison.




**ANSWER** _____

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**6** Is this triangle right? Show the square-area comparison.

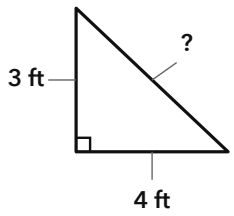



**ANSWER** _____

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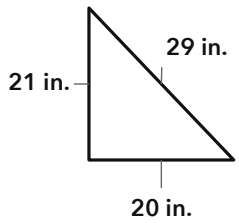
## APPLY IT Show your work

**1** A skate park builder needs the sloped length of the ramp shown. Find its length in feet.




**ANSWER** _____

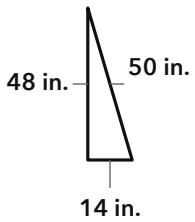
**2** A maker is cutting the triangular support shown for a gaming desk. Does it have a right angle? Use square areas to explain.




**ANSWER** _____

## CHALLENGE One step up

A builder replaces the 50 in. side shown with a 51 in. side. Is the new frame a right triangle? Compare square areas before and after the change.




WORK SPACE AND ANSWER

**ANSWER KEY**

# Square Area Clues

**GRADE 8 · 8.GM.C.26**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Find the missing side length. | **10 cm** |
| 2 | Find the missing side length. | **24 m** |
| 3 | Find the missing side length. | **12 in.** |
| 4 | Is this triangle right? Show the square-area comparison. | **Yes. $10^2 + 24^2 = 100 + 576 = 676$, and $26^2 = 676$.** |
| 5 | Is this triangle right? Show the square-area comparison. | **No. $6^2 + 7^2 = 36 + 49 = 85$, but $10^2 = 100$.** |
| 6 | Is this triangle right? Show the square-area comparison. | **Yes. $8^2 + 15^2 = 64 + 225 = 289$, and $17^2 = 289$.** |

## PART 2 · APPLY IT

1. **5 ft** The ramp is the longest side. Its length is 5 ft because $3^2 + 4^2 = 25 = 5^2$.
2. **Yes. $20^2 + 21^2 = 400 + 441 = 841$, and $29^2 = 841$.** The square areas on the two shorter sides add to the square area on the longest side. By the converse of the Pythagorean Theorem, the support has a right angle.

## CHALLENGE

**The original frame is right because $14^2 + 48^2 = 196 + 2{,}304 = 2{,}500 = 50^2$. The new frame is not right because the smaller square areas still total 2,500, but $51^2 = 2{,}601$.**

For right-triangle decisions, accept any correct comparison of the squares of the two shorter sides with the square of the longest side. Missing side lengths must include the correct units.