LESSON MAKER PRO

Triangle Detectives

Use side lengths to uncover a triangle's angles.

GRADE 8 · 8.GR.B.4.b

8.GR.B.4.b "Use the converse of the Pythagorean Theorem to determine whether a set of three side lengths forms a right triangle, and extend this reasoning to identify whether a triangle is acute or obtuse using Pythagorean inequalities."

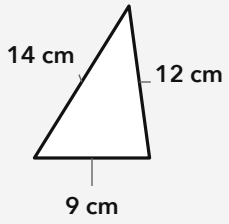
NAME _____ DATE _____

COMPARE THE SQUARES

First, check that the two shorter sides add to more than the longest side. Add the squares of the shorter sides and compare the sum with the square of the longest side. Equal means right, greater means acute, and less means obtuse. Sketches are not to scale.

WORKED EXAMPLE

Classify the triangle shown.



1. $9 + 12 > 14$, so the sides form a triangle.
2. $9^2 + 12^2 = 81 + 144 = 225$.
3. $14^2 = 196$, and $225 > 196$.

Answer: Acute triangle

PRACTICE 4 problems

1 Classify a triangle with sides 3 cm, 4 cm, and 5 cm.

ANSWER _____

2 Classify a triangle with sides 6 cm, 8 cm, and 11 cm.

ANSWER _____

3 Classify a triangle with sides 4 cm, 6 cm, and 7 cm.

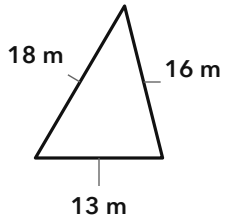
ANSWER _____

4 Classify a triangle with sides 8 cm, 15 cm, and 17 cm.

ANSWER _____

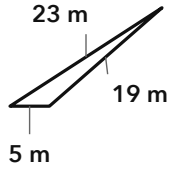
APPLY IT Show your work

1 A game map marks a triangular safe zone. Classify its triangle and show the square comparison.



ANSWER _____

2 A bike course follows the three sides of a triangular loop. Classify the loop and show the square comparison.



ANSWER _____

CHALLENGE One step up

Keep two sides of a triangle at 7 cm and 8 cm. What is the greatest whole-number length for the third side that makes an acute triangle? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

Triangle Detectives

GRADE 8 · 8.GR.B.4.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Classify a triangle with sides 3 cm, 4 cm, and 5 cm.	**Right triangle**
2	Classify a triangle with sides 6 cm, 8 cm, and 11 cm.	**Obtuse triangle**
3	Classify a triangle with sides 4 cm, 6 cm, and 7 cm.	**Acute triangle**
4	Classify a triangle with sides 8 cm, 15 cm, and 17 cm.	**Right triangle**

PART 2 · APPLY IT

1. **Acute triangle** $13^2 + 16^2 = 425$, which is greater than $18^2 = 324$.
2. **Obtuse triangle** $5 + 19 > 23$, so the loop forms a triangle. Since $5^2 + 19^2 = 386$ is less than $23^2 = 529$, it is obtuse.

CHALLENGE

10 cm. The shorter sides have a square sum of $7^2 + 8^2 = 113$. Since $10^2 = 100 < 113$, the triangle is acute, but $11^2 = 121 > 113$.

Accept a classification without written work for Part 1. For the challenge, accept any explanation that shows 10 cm works and every greater whole-number length cannot make an acute triangle.