

Triangle Test Lab

Use side lengths to test triangles and right triangles.

GRADE 8 • MA.8.GR.1.3

MA.8.GR.1.3 "Use the Triangle Inequality Theorem to determine if a triangle can be formed from a given set of sides. Use the converse of the Pythagorean Theorem to determine if a right triangle can be formed from a given set of sides."

NAME _____

DATE _____

TWO IMPORTANT CHECKS

First, add the two shorter side lengths. Their sum must be greater than the longest side for a triangle to form. Then compare the squares of the two shorter sides with the square of the longest side. If the sums are equal, the triangle is a right triangle.

WORKED EXAMPLE

Determine whether side lengths 12, 35, and 37 form a triangle and whether it is a right triangle.

1. The longest side is 37.
2. $12 + 35 = 47$, and $47 > 37$, so a triangle can form.
3. $12^2 + 35^2 = 144 + 1225 = 1369$.
4. $37^2 = 1369$, so the triangle is right.

Answer: Yes, the side lengths form a right triangle.

PRACTICE 6 problems

- 1** Side lengths: 6, 7, and 11. Can a triangle form? If so, is it a right triangle?

ANSWER _____

- 2** Side lengths: 4, 5, and 10. Can a triangle form?

ANSWER _____

- 3** Side lengths: 7, 24, and 25. Can a triangle form? If so, is it a right triangle?

ANSWER _____

- 4** Side lengths: 10, 10, and 14. Can a triangle form? If so, is it a right triangle?

ANSWER _____

- 5** Side lengths: 2, 6, and 8. Can a triangle form?

ANSWER _____

- 6** Side lengths: 9, 40, and 41. Can a triangle form? If so, is it a right triangle?

ANSWER _____

APPLY IT Show your work

- 1** A student in the theater club is building a triangular frame with rods measuring 13 cm, 14 cm, and 19 cm. Can the rods make a triangle? If so, will the frame be a right triangle?

WORK SPACE

ANSWER _____

- 2** A student designs a triangular ramp brace for a skate park model. The brace has sides measuring 20 cm, 21 cm, and 29 cm. Can the brace form a triangle? If so, is it a right triangle?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

The side lengths of a triangle are 16, 30, and x , where x is a whole number. The triangle is a right triangle. Find every possible value of x . Explain how you know.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Side lengths: 6, 7, and 11. Can a triangle form? If so, is it a right triangle?	A triangle can form. It is not a right triangle.
2	Side lengths: 4, 5, and 10. Can a triangle form?	No, a triangle cannot form.
3	Side lengths: 7, 24, and 25. Can a triangle form? If so, is it a right triangle?	A triangle can form. It is a right triangle.
4	Side lengths: 10, 10, and 14. Can a triangle form? If so, is it a right triangle?	A triangle can form. It is not a right triangle.
5	Side lengths: 2, 6, and 8. Can a triangle form?	No, a triangle cannot form.
6	Side lengths: 9, 40, and 41. Can a triangle form? If so, is it a right triangle?	A triangle can form. It is a right triangle.

PART 2 • APPLY IT

- The rods can make a triangle, but the frame is not a right triangle.** $13 + 14 = 27$, and $27 > 19$, so a triangle forms. $13^2 + 14^2 = 365$, while $19^2 = 361$, so it is not right.
- The brace can form a right triangle.** $20 + 21 = 41$, and $41 > 29$, so a triangle forms. $20^2 + 21^2 = 400 + 441 = 841$, and $29^2 = 841$.

CHALLENGE

$x = 34$. If x is the longest side, $16^2 + 30^2 = 256 + 900 = 1156 = 34^2$. If 30 were the longest side, then $16^2 + x^2 = 30^2$, so $x^2 = 644$, which is not a whole-number square.

Accept equivalent yes or no statements that correctly identify whether a triangle forms and whether it is right. For explanations, require a comparison of the two shorter sides with the longest side and a correct square comparison.