LESSON MAKER PRO

Will It Close?

Test which side lengths make a triangle.

HIGH SCHOOL · GDA.GM.G.29.b

GDA.GM.G.29.b "Identify different sets of properties necessary to define and construct figures."

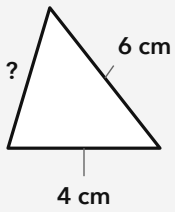
NAME _____ DATE _____

THE TRIANGLE TEST

Three side lengths define one triangle shape if the two shorter lengths add to more than the longest length. If the sum is equal to or less than the longest length, the sides cannot close.

WORKED EXAMPLE

Could the missing side measure 9 cm?



1. Add the two shorter lengths: 4 + 6 = 10.
2. Compare: 10 > 9.

Answer: Yes. These lengths define one triangle shape.

PRACTICE 4 problems

1 Sides: 5 cm, 7 cm, 13 cm. Add the shorter sides. Can they form a triangle?

ANSWER _____

2 Sides: 8 cm, 10 cm, 12 cm. Add the shorter sides. Can they form a triangle?

ANSWER _____

3 Sides: 3 cm, 11 cm, 14 cm. Add the shorter sides. Can they form a triangle?

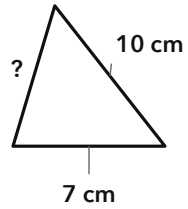
ANSWER _____

4 Sides: 2 cm, 15 cm, 16 cm. Add the shorter sides. Can they form a triangle?

ANSWER _____

APPLY IT Show your work

1 A maker wants a triangular phone stand. Will an 18 cm strut work as the missing side? Show an inequality.



ANSWER _____

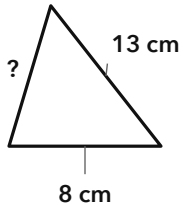
2 A game badge will have sides of 11 cm, 12 cm, and 20 cm. Do these lengths define one triangle shape? Show an inequality.

WORK SPACE

ANSWER _____

CHALLENGE One step up

How many whole-number centimeter lengths could the missing side have? State the range and explain.



WORK SPACE AND ANSWER

ANSWER KEY

Will It Close?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Sides: 5 cm, 7 cm, 13 cm. Add the shorter sides. Can they form a triangle?	**5 + 7 = 12; no.**
2	Sides: 8 cm, 10 cm, 12 cm. Add the shorter sides. Can they form a triangle?	**8 + 10 = 18; yes.**
3	Sides: 3 cm, 11 cm, 14 cm. Add the shorter sides. Can they form a triangle?	**3 + 11 = 14; no.**
4	Sides: 2 cm, 15 cm, 16 cm. Add the shorter sides. Can they form a triangle?	**2 + 15 = 17; yes.**

PART 2 · APPLY IT

1. **No; 7 + 10 = 17 < 18.** The two shorter struts total 17 cm, so an 18 cm strut cannot close the frame.
2. **Yes; 11 + 12 = 23 > 20.** The two shorter sides total more than the longest side, so the three lengths define one triangle shape.

CHALLENGE

15 lengths, from 6 cm through 20 cm. The third side must be greater than 13 - 8 = 5 cm and less than 13 + 8 = 21 cm.

Accept equivalent inequalities for the word problems. In the challenge, the endpoints 5 cm and 21 cm do not form triangles.