

Conditions on Measurements that Determine a Triangle

1. What is the maximum and minimum whole-number side length for _____ with given side lengths of _____ cm and _____ cm? Please explain why.
2. Jill has not yet studied the angle measurement requirements to form a triangle. She begins to draw side _____ of _____ and considers the following angle measurements for _____ and _____. Describe the drawing that results from each set.

A _____ B

a. _____ and _____

b. _____ and _____

c. _____ and _____

1. Decide whether each set of three given lengths determines a triangle. For any set of lengths that does determine a triangle, use a ruler and compass to draw the triangle. Label all side lengths. For sets of lengths that do not determine a triangle, write “Does not determine a triangle,” and justify your response.
- a. cm, cm, cm
 - b. cm, cm, cm
 - c. cm, cm, cm
 - d. cm, cm, cm
 - e. cm, cm, cm
 - f. cm, cm, cm

2. For each angle measurement below, provide one angle measurement that will determine a triangle and one that will not determine a triangle. Provide a brief justification for the angle measurements that will not form a triangle. Assume that the angles are being drawn to a horizontal segment ; describe the position of the non-horizontal rays of angles and .

	: A Measurement that Determines a Triangle	: A Measurement that Doesn't Determine a Triangle	Justification for No Triangle

3. For the given side lengths, provide the minimum and maximum whole-number side lengths that determine a triangle.

Given Side Lengths	Minimum Whole Number Third Side Length	Maximum Whole Number Third Side Length
cm, cm		
cm, cm		
cm, cm		
cm, cm		

1. What is the minimum and maximum whole-number side length for $\triangle ABC$ with given side lengths of 4 cm and 6 cm? Please explain why.

Minimum: 2 cm. Maximum: 10 cm. Values above this maximum and below this minimum will not satisfy the condition that the longest side length is less than the sum of the other two side lengths.

2. Jill has not yet studied the angle measurement requirements to form a triangle. She begins to draw side AB as a horizontal segment of 8 cm and considers the following angle measurements for $\angle A$ and $\angle B$. Describe the non-horizontal rays in the drawing that results from each set.



- a. 30° and 30°

The non-horizontal rays of $\angle A$ and $\angle B$ will not intersect to form a triangle; the rays will be parallel to each other.

- b. 45° and 45°

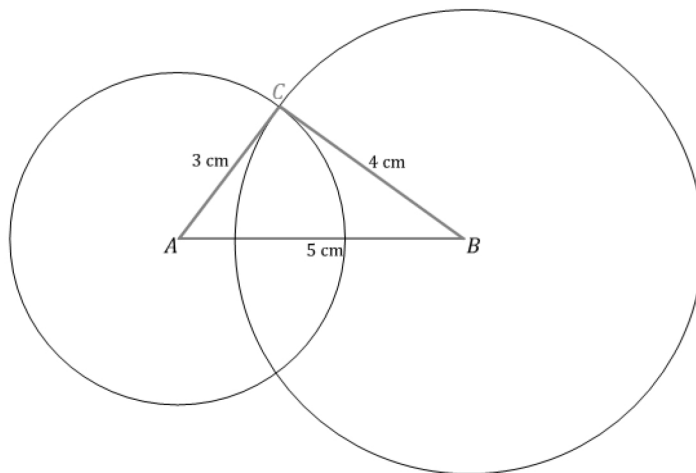
The non-horizontal rays of $\angle A$ and $\angle B$ will intersect to form a triangle.

- c. 120° and 120°

The non-horizontal rays of $\angle A$ and $\angle B$ will not intersect to form a triangle.

1. Decide whether each set of three given lengths determines a triangle. For any set of lengths that does determine a triangle, use a ruler and compass to draw the triangle. Label all side lengths. For sets of lengths that do not determine a triangle, write "Does not determine a triangle," and justify your response.

- a. 3 cm, 4 cm, 5 cm



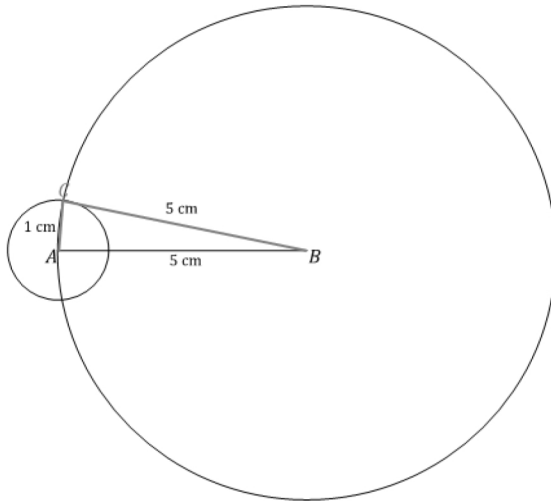
Scaffolding:

Lessons 7 and 8 demonstrate how to use a compass for questions such as Problem 1.

- b. cm, cm, cm

Does not determine a triangle; the lengths are too short to form a triangle.

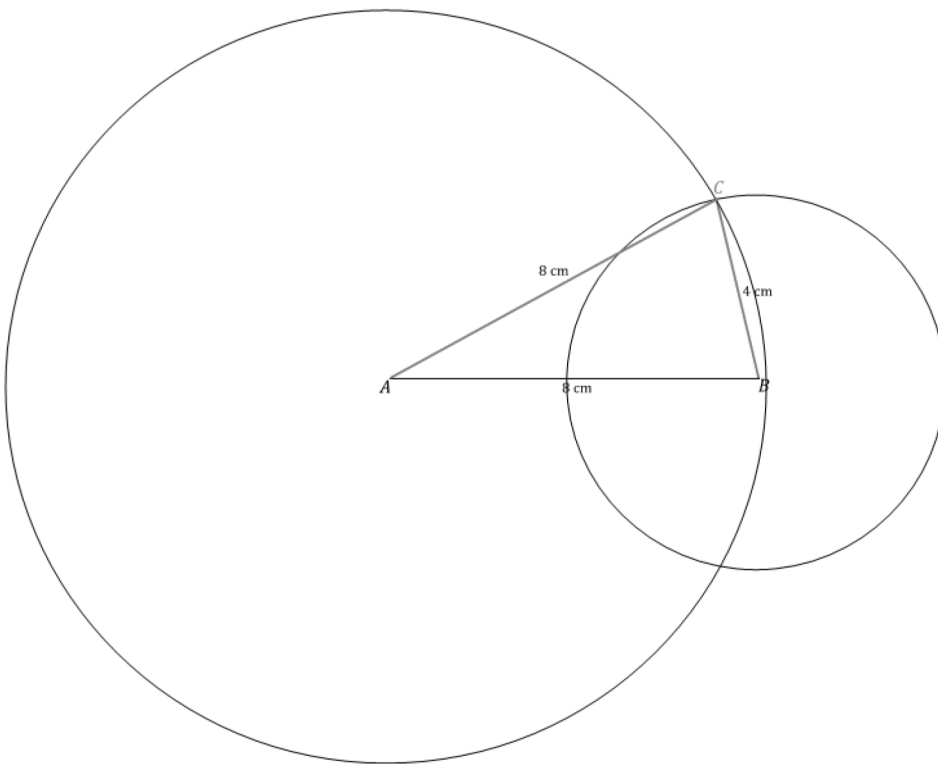
- c. cm, cm, cm



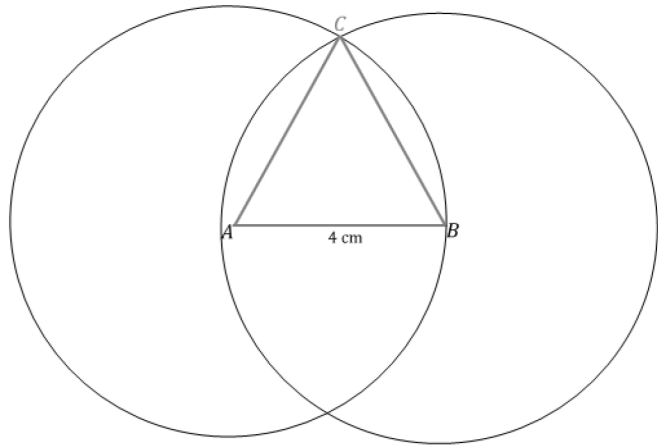
- d. cm, cm, cm

Does not determine a triangle; the lengths are too short to form a triangle.

- e. cm, cm, cm



f. cm, cm, cm



2. For each angle measurement below, provide one angle measurement that will determine a triangle and one that will not determine a triangle. Provide a brief justification for the angle measurements that will not form a triangle. Assume that the angles are being drawn to a horizontal segment ; describe the position of the non-horizontal rays of angles and .

	: A Measurement that Determines a Triangle	: A Measurement that Doesn't Determine a Triangle	Justification for No Triangle
	One possible answer:	One possible answer:	The non-horizontal rays do not intersect.
	One possible answer:	One possible answer:	The non-horizontal rays do not intersect.
	One possible answer:	One possible answer:	The non-horizontal rays do not intersect.
	One possible answer:	One possible answer:	The non-horizontal rays do not intersect.

Note:

- Measurements that determine a triangle should be less than (the measurement of).
- Measurements that do not determine a triangle should be greater than (the measurement of).

3. For the given side lengths, provide the minimum and maximum whole-number side lengths that determine a triangle.

Given Side Lengths	Minimum Whole Number Third Side Length	Maximum Whole Number Third Side Length
cm, cm	cm	cm
cm, cm	cm	cm
cm, cm	cm	cm
cm, cm	cm	cm