

LESSON
5.5**Study Guide**

For use with pages 328–334

GOAL Find possible side lengths of a triangle.**Vocabulary**

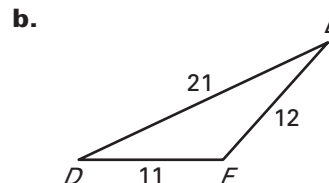
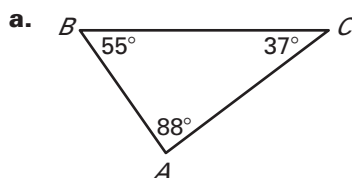
Theorem 5.10: If one side of a triangle is longer than another side, then the angle opposite the longer side is larger than the angle opposite the shorter side.

Theorem 5.11: If one angle of a triangle is larger than another angle, then the side opposite the larger angle is longer than the side opposite the smaller side.

Theorem 5.12 Triangle Inequality Theorem: The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

EXAMPLE 1 Write measurements in order from least to greatest

Write the measurements of the triangle in order from least to greatest.

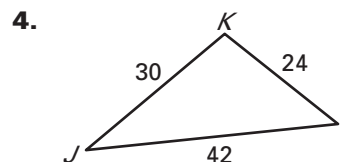
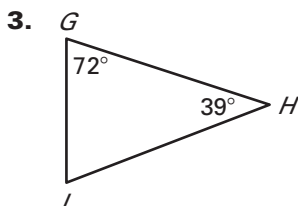
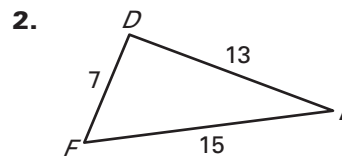
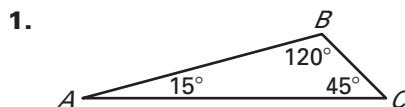
**Solution**

a. $m\angle C < m\angle B < m\angle A$
 $AB < AC < BC$

b. $m\angle E < m\angle D < m\angle F$
 $DF < EF < DE$

Exercises for Example 1

Write the measurements of the triangle in order from least to greatest.



LESSON
5.5**Study Guide** *continued*
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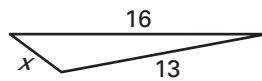
5. A triangle has sides that are about 33, 18, and 24 centimeters long and angles of about 32° , 103° , and 45° . Sketch and label a diagram with the shortest side on the bottom and the largest angle at the left.
6. A right triangle has sides that are 16, 34, and 30 inches long and angles of 90° , about 28° , and about 62° . Sketch and label a diagram with the shortest side on the bottom and the right angle at the left.

EXAMPLE 2 Find possible side lengths

A triangle has one side of length 13 and another side of length 16. Describe the possible lengths of the third side.

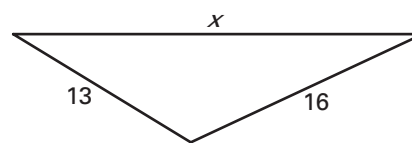
Solution

Let x represent the length of the third side. Draw diagrams to help visualize the small and large values of x . Then use the Triangle Inequality Theorem to write and solve the inequalities.

Small values of x 

$$x + 13 > 16$$

$$x > 3$$

Large values of x 

$$13 + 16 > x$$

$$29 > x, \text{ or } x < 29$$

The length of the third side must be greater than 3 and less than 29.

Exercises for Example 2

Two sides of a triangle are given. Describe the possible lengths of the third side.

- | | |
|------------------------------------|-----------------------------|
| 7. 2 centimeters and 5 centimeters | 8. 7 inches and 12 inches |
| 9. 4 feet and 10 feet | 10. 11 meters and 10 meters |
| 11. 9 inches and 25 inches | 12. 1 mile and 8 miles |