5-4 Study Guide and Intervention
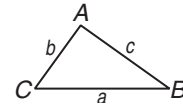
The Triangle Inequality

The Triangle Inequality If you take three straws of lengths 8 inches, 5 inches, and 1 inch and try to make a triangle with them, you will find that it is not possible. This illustrates the Triangle Inequality Theorem.

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 **The measures of two sides of a triangle are 5 and 8. Find a range for the length of the third side.**

By the Triangle Inequality, all three of the following inequalities must be true.

$$5 + x > 8 \qquad 8 + x > 5 \qquad 5 + 8 > x$$
$$x > 3 \qquad\quad x > -3 \qquad\quad 13 > x$$

Therefore x must be between 3 and 13.

Exercises

Determine whether the given measures can be the lengths of the sides of a triangle. Write *yes* or *no*.

1. 3, 4, 6   **2.** 6, 9, 15

3. 8, 8, 8   **4.** 2, 4, 5

5. 4, 8, 16   **6.** 1.5, 2.5, 3

Find the range for the measure of the third side given the measures of two sides.

7. 1 and 6   **8.** 12 and 18

9. 1.5 and 5.5   **10.** 82 and 8

11. Suppose you have three different positive numbers arranged in order from least to greatest. What single comparison will let you see if the numbers can be the lengths of the sides of a triangle?

Lesson 5-4