Triangle Inequality Theorem
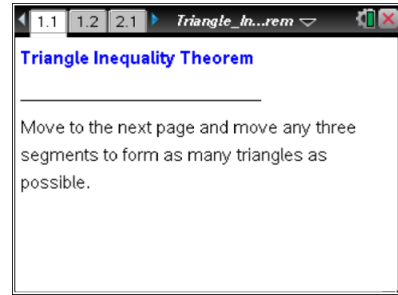## Student Activity

Name _____

Class _____

Open the TI-Nspire document *Triangle_Inequality_Theorem.tns*.

Given the measures of any 3 segments, will you always be able to make a triangle? In this activity, you will explore the answer to this question.

Triangle Inequality Theorem
_____
Move to the next page and move any three segments to form as many triangles as possible.

Move to page 1.2.

Press ctrl ▶ and ctrl ◀ to navigate through the lesson.

1. Move any 3 segments to form as many triangles as possible. You can move the segments by grabbing and dragging the open circles, and you can rotate the segments by grabbing and dragging the closed circles. Record your results below.

Successful Combinations	Unsuccessful Combinations

2. Make a conjecture about why some of these combinations work and why some of them do not work.

Move to page 2.1.

3. Grab the closed circles at the end of the segments and move the segments to form a triangle. If a triangle can be formed, the inside of the triangle will be shaded.
   a. Use ▲ and ▼ to generate at least 5 sets of sides. Record your results for each set in the table below.

Side 1	Side 2	Base	Success? Yes or No

b.   Make 2 observations based on your table.

4.   Jesse has 3 pieces of wood. The pieces measure 7 inches, 10 inches, and 14 inches.
     Tyrone has 3 pieces of wood that measure 6 inches, 11 inches, and 3 inches. Will they
     each be able to create a triangle? Why or why not?

5.   Make a conjecture about the relationship of the measures of the sides of a triangle.
     Justify your conjecture.

6.   Given a triangle with side lengths x, y, and z, which of the following is true? Justify your
     reasoning.
     a. $x + y > z$

     b. $x + z > y$

     c. $z + y > x$

7.   Given the lengths of 2 sides of a triangle, what are the possible measures for the length
     of the third side?
     a.   4 inches and 7 inches

     b.   10 centimeters and 10 centimeters

     c.   11 inches and 12 inches

     d.   0.5 centimeter and 2.5 centimeters