

Working with the TI-Nspire to Discover the Triangle Inequality Theorem

Prepared by Donna Roberts, MathBits.com

Name _____



Materials:

- TI-Nspire™ or TI-Nspire CAS™
- TriangleInequalityActivity.tns
- TriangleInequalityActivity.pdf
- TI-Nspire™ Software (optional)

Classroom setup:

- Can be used with students working alone or in groups of two, with one recording and one using the calculator.
- Can be used as a teacher-led demonstration.

Introduction

The following activity uses the TI-Nspire as an exploratory tool in the discovery of the Triangle Inequality Theorem. The calculator is going to help you understand the geometric rationale for this theorem by giving you a clear visual representation of what is happening.

As you use your calculator, be sure to fill in the questions on this worksheet.

1.1 1.2 1.3 *TriangleIneq...ity

Discovering the Triangle Inequality Theorem Activity

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Directions: While working on your calculator, be sure to also follow along on your worksheet. Happy calculating!!!

Use the NavPad to move the pointer near the edge of a circle. When the “hand” appears, grab the circle by “closing the hand” (Ctrl – Center NavPad) and dragging the circle larger or smaller.

Take a few minutes to change the size of the radii of the circles and see what happens to $\triangle ABE$.

1.1 1.2 1.3 *TriangleIneq...ity

AC=2.84 cm AE=2.84 cm
BD=2.93 cm AB=4.89 cm
EB=2.93 cm

Diagram showing two overlapping circles with centers A and B. Points C, E, D, and F are marked on the circles. Triangle ABE is formed by the centers and their intersection point E.

Task 1:

Set the radius of circle A close to 2 cm.
Set the radius of circle B close to 2.8 cm.

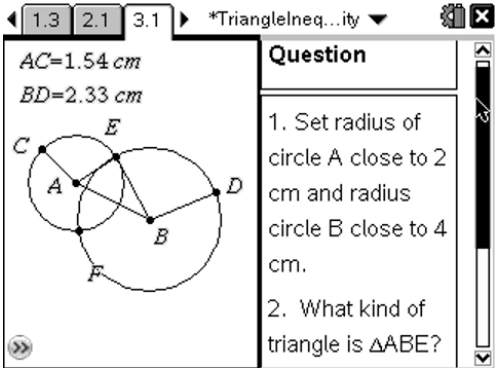
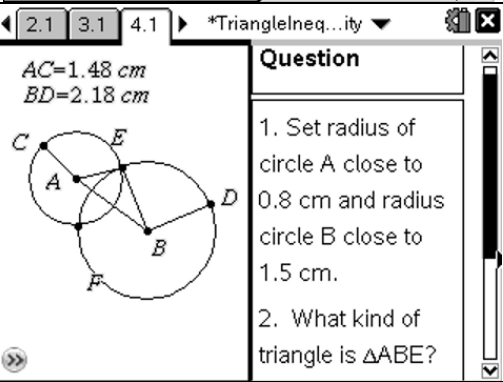
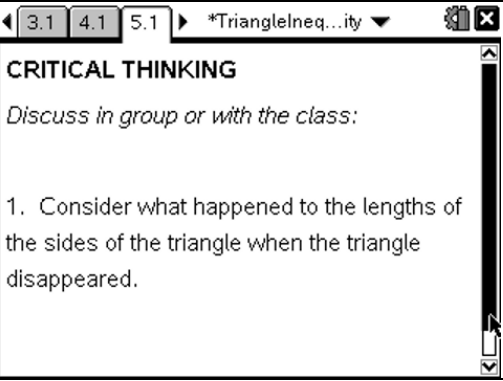
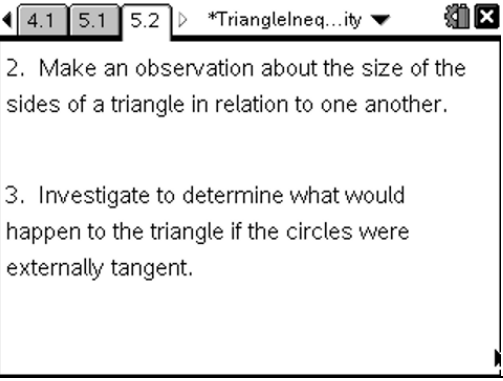
What kind of triangle is $\triangle ABE$?

1.3 2.1 3.1 *TriangleIneq...ity

AC=1.52 cm BD=2.37 cm

Question Angle -- DEG

1. Set radius of circle A close to 2 cm. and radius circle B close to 2.8 cm.
2. What kind of triangle is $\triangle ABE$?

<p>Task 2: Set the radius of circle A close to 2 cm. Set the radius of circle B close to 4 cm.</p> <p>What kind of triangle is $\triangle ABE$?</p> <hr/>	 <p>AC=1.54 cm BD=2.33 cm</p> <p>Question</p> <ol style="list-style-type: none"> 1. Set radius of circle A close to 2 cm and radius circle B close to 4 cm. 2. What kind of triangle is $\triangle ABE$?
<p>Task 3: Set the radius of circle A close to 0.8 cm. Set the radius of circle B close to 1.5 cm.</p> <p>What kind of triangle is $\triangle ABE$?</p> <hr/>	 <p>AC=1.48 cm BD=2.18 cm</p> <p>Question</p> <ol style="list-style-type: none"> 1. Set radius of circle A close to 0.8 cm and radius circle B close to 1.5 cm. 2. What kind of triangle is $\triangle ABE$?
<p>Task 4: What happened to the lengths of the sides of the triangle when the triangle disappeared?</p>	 <p>CRITICAL THINKING</p> <p><i>Discuss in group or with the class:</i></p> <ol style="list-style-type: none"> 1. Consider what happened to the lengths of the sides of the triangle when the triangle disappeared.
<p>Task 5: Make an observation about the size of the sides of a triangle in relation to one another.</p>	 <ol style="list-style-type: none"> 2. Make an observation about the size of the sides of a triangle in relation to one another. 3. Investigate to determine what would happen to the triangle if the circles were externally tangent.
<p>Task 6: What would happen to the triangle if the circles were externally tangent?</p>	<p>Task 7: Is it possible to have a triangle whose sides are 1, 1, and 2 units?</p>