The SSA Ambiguity

by – Christine Czapleski

Activity overview

This activity allows students to investigate the reason for the ambiguity in the SSA case.

Concepts

ANY two sides and an angle does not support the fact that the triangles are congruent.

Teacher preparation

This is an excellent exercise for Geometry students who are learning about congruent triangles. It is also a good review for trig students who are studying the Law of Sines.

Classroom management tips

Students should work in pairs or in groups in order to discuss the results as they go along.

TI-Nspire Applications

Use of Notes
Interactive geometry
Manual data collection

Step-by-step directions

Insert a NOTES page to introduce the investigation.

SSA Ambiguity

by: Chris Czapleski
Grade level: 9-12
Subject: Geometry
Time required: 40 minutes
Materials: TI-Nspire
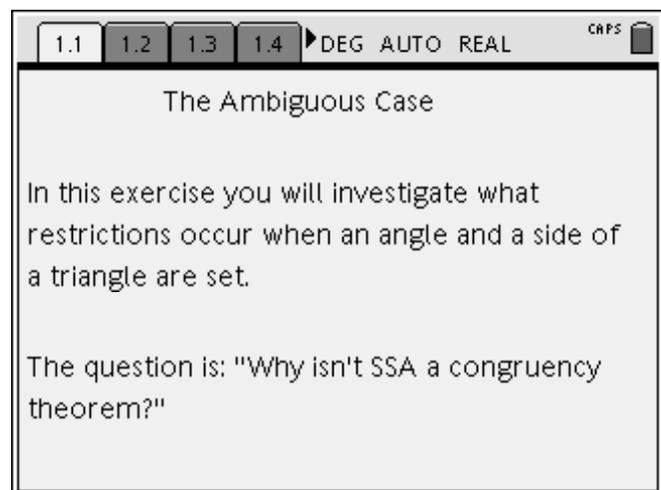
Insert an second NOTES page to give directions to the student.

Insert a GRAPHS AND GEOMETRY page, then choose tools and 6:Page Layout; 2:Select Layout; 2: Layout 2. This will give you the split screen shown at the right.

On the left hand side choose MENU; 2:VIEW; 1: HIDE AXES. You can use *ctrl g* to hide the entry line.

Choose MENU;6: POINTS AND LINES;6:RAY to draw the bottom of the triangle. To quit a tool press *esc*.
Choose MENU;6: POINTS AND LINES;5:SEGMENT to draw the side of the triangle.

Choose MENU;6: POINTS AND LINES;2: POINT ON to put a point on the ray.

Choose MENU: 1:TOOLS; 5: TEXT to label the points A,B, and C. You can also enter Drag me, and Press crtl period to capture data while you have the text tool open.

Choose MENU; 7: MEASUREMENT; 1: LENGTH to measure the side AC.

Choose MENU; 1:TOOLS; 3: ATTRIBUTES when you move it close to the measurement, it will blink. Press enter and change the precision to two decimal places and lock the length.

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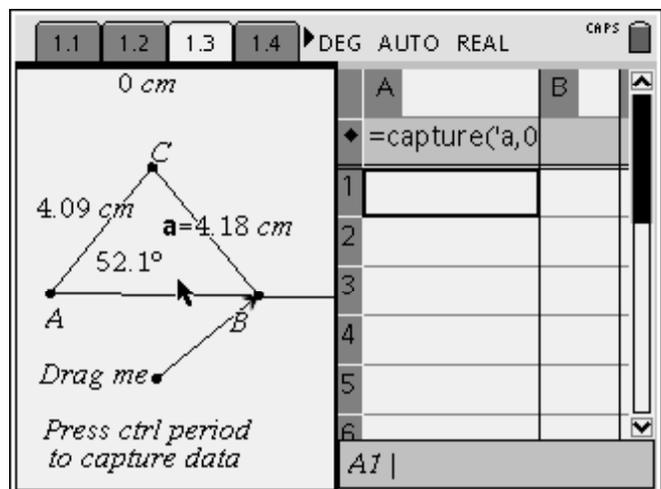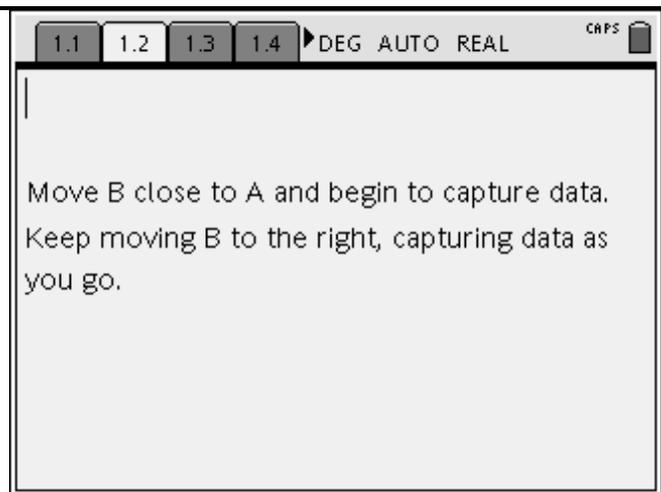
Measure angle $\angle ACB$ using MENU; 7: MEASUREMENT; 4: ANGLE. Change the attributes to one decimal precision and lock the angle.

Construct segment CB using MENU;6: POINTS AND LINES;5:SEGMENT.

Choose MENU; 7: MEASUREMENT; 1: LENGTH to measure the side CB.

Choose MENU; 1:TOOLS; 3: ATTRIBUTES when you move it close to the measurement of CB it will blink. Press enter and change the precision to two decimal places but do NOT lock the length.

Choose MENU;6: POINTS AND LINES;8:VECTOR to connect Drag me to point B.

Move the cursor to the measurement for CB, press ENTER and the number will turn gray, press *ctrl var*, label the value a.

At this point data can be collected.
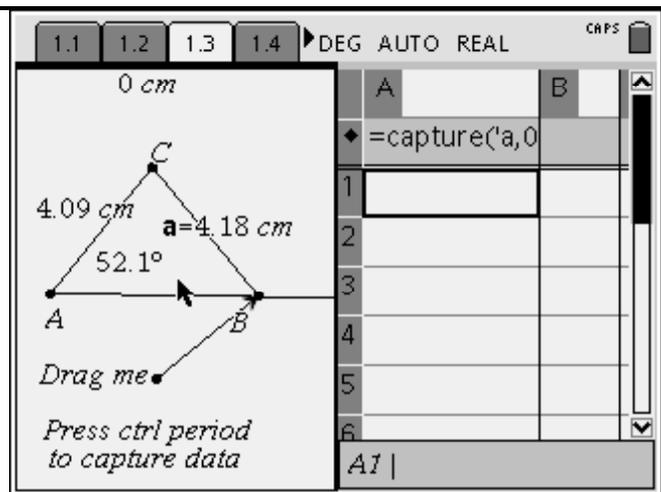
Press *ctrl tab* to move to the right hand side of the screen. From the menu choose 3: ADD LISTS & SPREADSHEET.
Place the cursor in the gray box below the letter A and choose MENU; 3:DATA; 2:DATA CAPTURE; 2:MANUAL DATA CAPTURE. Enter **a** for the variable and choose Variable Reference when the dialogue box appears.

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Add a NOTES page and insert the discussion questions.

> ◀ 1.2 1.3 **1.4** 1.5   DEG AUTO REAL   CAPS
>
> What values of "a" can form two distinct triangles?
>
> What values of "a" form exactly one triangle?
>
> Are there any values of "a" for which no triangle can be formed?
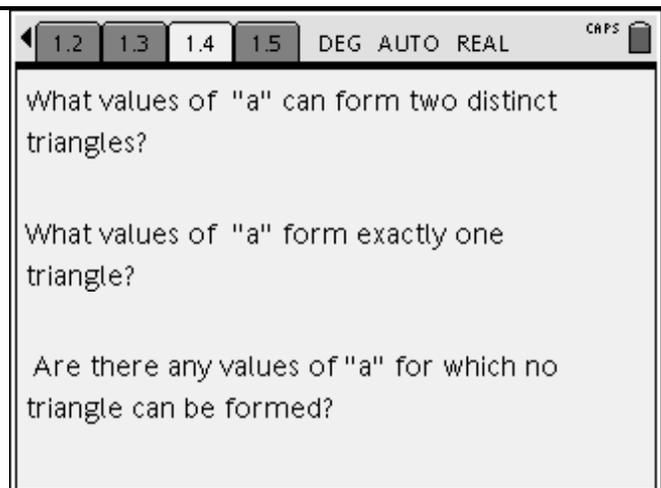
Add a final NOTES page to complete the exercise.

> ◀ 1.2 1.3 1.4 **1.5**   DEG AUTO REAL   CAPS
>
> Answer the question:
>
> Why isn't SSA a congruency theorem?
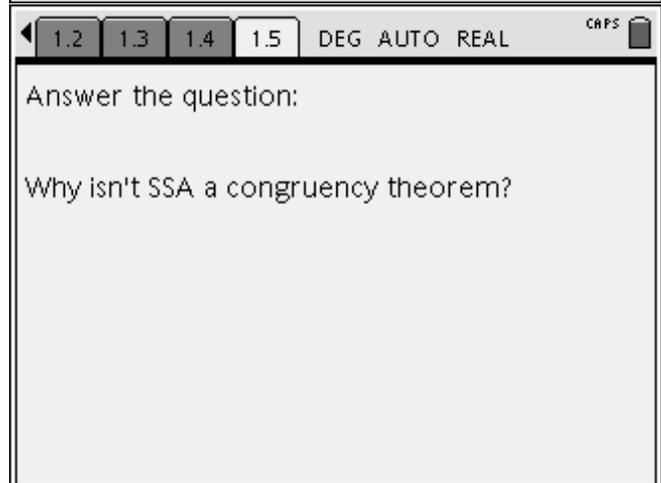
Assessment and evaluation

None for this activity.

Activity extensions

Dynamic Geometry is an excellent tool to use to investigate many concepts. The additional feature of data collection gives the student immediate data on which to base the conclusions.

Student TI-Nspire Document

Ambiguous Case.