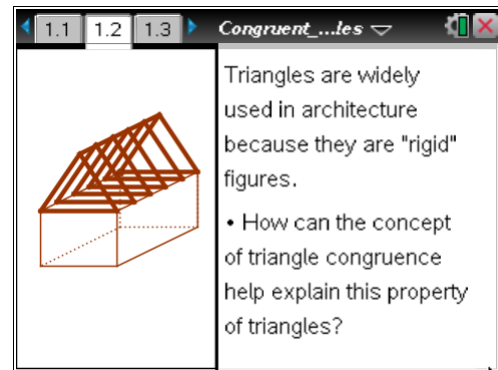




The diagram on page 1.2 shows how triangles are used in building construction. Triangles are considered “rigid” figures because their shape will remain fixed for a given set of conditions.

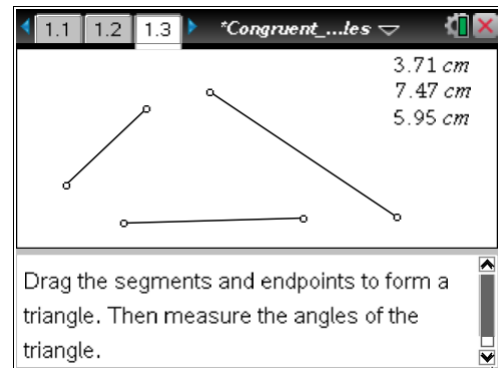
In this activity, you will explore what conditions are needed to guarantee that two triangles must be congruent. These observations can help explain this property of rigidity that triangles possess.



### Problem 1 – Investigating the SSS Congruence Theorem

Advance to page 1.3. You will see the screen at right, showing three segments with fixed lengths. Read and complete the directions at the bottom of the screen.

After you have formed a triangle and measured the angles, compare with a classmate to see if the triangles you both constructed are in fact congruent. Congruent polygons are defined as polygons in which all corresponding sides and corresponding angles are congruent.



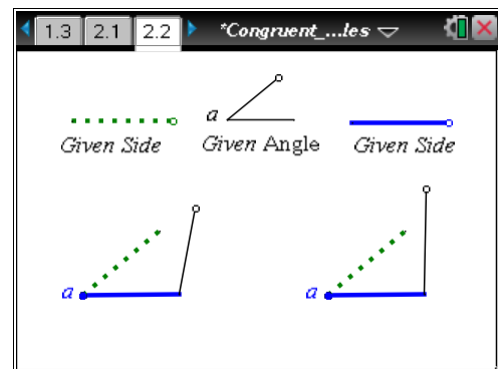
- Based on your observations, would you say that two triangles with corresponding congruent sides are congruent? Explain.

### Problem 2 – Investigating the SAS Congruence Theorem

Read the directions on page 2.1.

Advance to page 2.2. The three given conditions on the top of the screen can be altered by dragging the open points on the three figures located at the top of the screen. Notice the corresponding changes to the figures at the bottom of the screen. Complete the two triangles.

You may repeat this problem several times by changing the given sides and given angle and completing a new set of triangles.



# Congruent Triangles

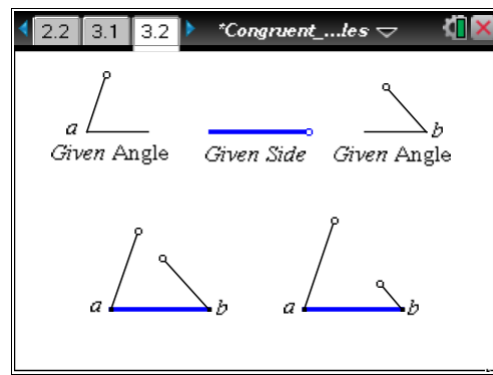
- Based on your observations, would you say that two triangles with the given corresponding congruent parts are congruent?
- Write a conjecture, in your own words, to summarize your conclusions.

## Problem 3 – Investigating the ASA Congruence Theorem

Read the directions on page 3.1.

Advance to page 3.2. The three given conditions can be altered in the same way you altered the conditions in Problem 2. Your goal is to complete the triangles.

You may repeat this problem several times by changing the given angles and given side and completing a new set of triangles.

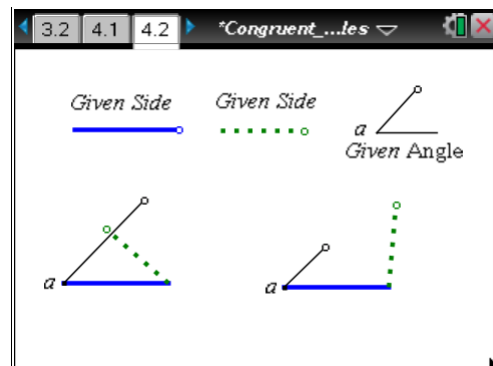


- Based on your observations, would you say that two triangles with the given corresponding congruent parts are congruent?
- Write a conjecture, in your own words, to summarize your conclusions.

## Problem 4 – Investigating the SSA Case

Read the directions on page 4.1.

Advance to page 4.2. As with before, your goal is to complete the two triangles by dragging the open points. This time, the conditions that are given are such that it is possible to create two non-congruent triangles. It is your challenge to find these non-congruent triangles.



- Based on your observations, would you say that two triangles with the given corresponding congruent parts, that is, SSA, are congruent?

# Congruent Triangles

- Can you alter the given conditions such that the two triangles must be congruent?
- This case is often referred to as the *ambiguous case*. Explain what is meant by this.

## Problem 5 – The Case of the Missing Triangle

Advance to page 5.1. Here you will see three segments, much like you did in Problem 1. Drag and manipulate the segments to form a triangle. Then, change the lengths of the segments in such a way that you cannot form a triangle. Refer to the measurements located on the screen and discuss your observations with a classmate.

- Write a conjecture about what must be true about the lengths of the segments of a triangle to ensure that a triangle can in fact be made.

