Congruent, or Not?

AAA.8xv, SAS.8xv, SSA.8xv

Name _____

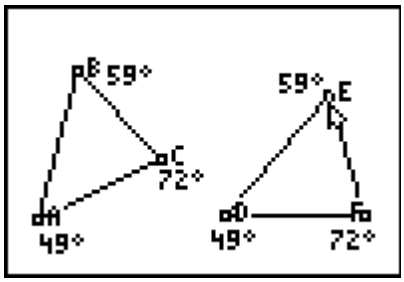
Class _____

This activity explores what makes two triangles congruent. Recall that two triangles are congruent when corresponding angles and sides have the same value. There are three cases explored:

1. Two triangles have all congruent angles.
2. Two triangles have two congruent sides, and the included angles are congruent.
3. Two triangles have two congruent sides, and two of the non-included angles are congruent.

Problem 1 – Exploring the Angle-Angle-Angle Relationship

The Angle-Angle-Angle (AAA) relationship between two triangles means that three angles in one triangle are congruent to three angles in another triangle.



Load Cabri Jr. and then open the file **AAA**.

Measure the length of each side of the two triangles. Press GRAPH, select **Measure > D.&Length**, and click on the endpoints of the segment.

Explore △*DEF* by moving point *E*. Can you create a triangle that is not congruent to triangle *ABC*? To move any of the vertices of either triangle, move the cursor over a vertex and press ALPHA. Press ENTER to release the point.

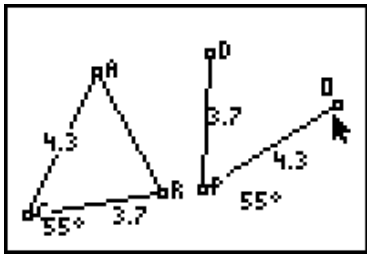
- How do the angle measures of each triangle compare?

- How do the corresponding side lengths of each triangle compare?

- Does the AAA relationship guarantee that the two triangles are congruent? Explain.

Problem 2 – Exploring the Side-Angle-Side Relationship

The Side-Angle-Side (SAS) relationship between two triangles means that two sides and an included angle in one triangle are congruent to two sides and an included angle in the other triangle.



Open the file **SAS** and explore △*CAR* and all possible triangles that can be made with vertices *P*, *O*, and *D*.

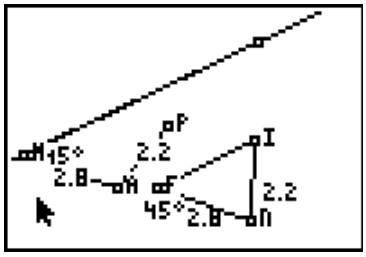
- Construct △*POD* and measure side *DO*. Can you vary the length of *DO* and still have the triangles congruent?

- Is there a △*POD* that is not congruent to △*ABC*? Explain.

- Does the SAS relationship guarantee that the two triangles are congruent? Explain.

Problem 3 – Exploring the Side-Side-Angle Relationship

The Side-Side-Angle (SSA) relationship between two triangles means that two sides and an angle not included in one triangle is congruent to two sides and an angle not included in another triangle.



Open the file **SSA** and explore △*FIN* and all possible triangles that can be made with vertices *P*, *A*, and *M*.

- Construct △*MAP* that is congruent to △*FIN*.

- Is it possible to manipulate △*MAP* so that it is not congruent to △*FIN*, while keeping the two measured sides and angle the same? Explain.

- Does the SSA relationship guarantee that the two triangles are congruent? Explain.