

Using a Computer to Explore Congruent Geometrical Figures

An alternate activity to the textbook activity in Math Makes Sense, Grade 5, pp 238-240; using Geometer's Sketchpad.

To Start:

- Open "Geometer's Sketchpad"
- "File" > "Open" - find the gsp file, "congruence_quest.gsp" and open it.
- You should get a screen with a variety of polygons.

Your task:

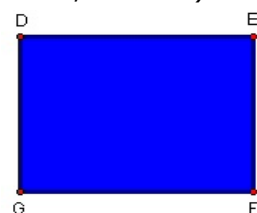
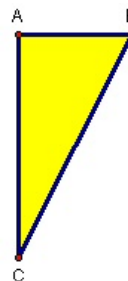
1. Your task is to find out which shapes are congruent.
2. You have several ways to test this:
 - Slide one shape over top another
 - Rotate a shape then slide it over another
 - Measure sides and/or angles
3. It is up to you to decide which of these things you will do to find out which shapes are congruent to each other.
4. Organize your answer into a table with explanations (proof) as to which shapes are congruent.

Help:

The following sections will help you with sliding, rotating, measuring sides, and measuring angles.

Naming polygons: Plane shapes are named by their vertices, starting at one vertex and following the vertices in order, usually (but not always) clockwise..

Thus, this triangle is called $\triangle ABC$ (it could also be called $\triangle BCA$, $\triangle CAB$, $\triangle ACB$, $\triangle CBA$, or $\triangle BAC$)



Thus, this quadrilateral could be named $\square DEFG$ (or, going counter-clockwise starting at D, $\square DGFE$; one could start at any vertex and go either way, as long as you go in order and don't skip a vertex – to call this $\square DFEG$ is incorrect as the points aren't in order).

Use polygon names when writing your report.

Sliding a Shape:

1. Marquee-select a shape: the entire shape (sides, vertices, and interior) will highlight;
2. Position the mouse along any side (the arrow will turn horizontal);
3. Click and drag to the new position.

Rotating a Polygon:

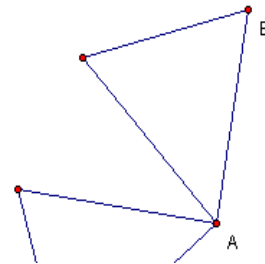
1. First, move the polygon into the center of the screen away from other polygons.
2. Click one vertex
3. Click: "Transform" > "Mark Centre" (the vertex will "glow" for a moment)
4. Marquee-select the entire polygon
5. Click: "Transform" > "Rotate"
6. Enter the number of degrees you wish to rotate the polygon: you will see the rotated image appear (if it's not right, then change the number of degrees).
7. When the polygon is rotated correctly, click the "Rotate" button.
8. If the polygon is not rotating correctly, try using a different vertex.

Now, slide the rotated polygon over another to test for congruence.

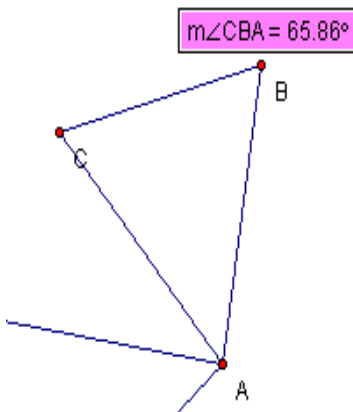
Measuring a Segment:

1. Use the select tool to select one side by clicking on the side.
2. Click: "Measure" > "Length"
3. The measurement will appear in a highlighted (pink) box.
4. You can drag this measurement over near the side you just measured.
5. Click anywhere else on the screen to clear the highlighting before you measure something else.

$m\overline{BA} = 3.70 \text{ cm}$



Measuring an Angle:



1. Use the select tool to select the three vertices that make up an angle inside a polygon
2. Whichever point you click SECOND will be the vertex of the angle. For example: In the sample, I wanted to measure the angle at "B", so I clicked "A", then "B", then "C" (I could also have clicked C-B-A: either would have worked as long as "B" was the middle one.)
3. Click: "Measure" > "Angle"
4. The measurement will appear in a highlighted (pink) box.
5. You can drag this measurement over near the side you just measured.
6. Click anywhere else on the screen to clear the highlighting before you measure something else.

Some things to note:

- If you try to do something and the selection you want is grayed out on the menu, check to see if you need to de-select something else. For example, when measuring, you must de-select a highlighted measurement before you can measure something else.
- If you are measuring things on a polygon that isn't labeled, GSP will name the points.