Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Unit 5 – Sum of Exterior Angles in a Polygon Investigation**

Monica

Geometry Period: \_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Directions:** Yesterday we looked at the sum of **interior** angles in polygons. Today we’re going to explore the sum of **exterior** angles in polygons. Follow the directions below.

**STEP 1:** Use the ray tool to construct each polygon with each side extended in one direction. Be sure to construct the polygon without creating extra points. Your initial sketch should have the same number of points (vertices) as sides. If your polygon didn’t end up convex, drag a vertex to make it convex.

**STEP 2:** Construct a point on each ray outside of the polygon so that you’ll be able to measure exterior angles. (You can construct all of the points at once by selecting all of the rays, then selecting “Points on Rays” under the “Construct” menu.)

**STEP 3:**  Measure each **exterior** angle. Be careful to measure the correct ones!

**STEP 4:** Calculate the sum of the exterior angles. To do this, choose “Calculate” under the “Measure” menu to open the calculator. Click once on a measurement to enter it into a calculation. Hit “+” and then the next measurement. Repeat this process until all of the angles have been selected. Then hit “OK”.

|  |  |  |
| --- | --- | --- |
| **NUMBER OF SIDES** | **SKETCH OF POLYGON** | **SUM OF EXTERIOR ANGLES** |
| **3** |  |  |
| **4** |  |  |
| **5** |  |  |
| **6** |  |  |
| **8** |  |  |
| **10** |  |  |

**QUESTION #1:** Write a conjecture about the sum of the measures of the exterior angles in any polygon.

**QUESTION #2:** A **regular polygon is a polygon with all equal sides and angles**. How can youdetermine the measure of one exterior angle of a regular polygon? Use your rule to determine the measure of one exterior angle in a regular hexagon.

**QUESTION #3:** The measure of one exterior angle in a regular polygon is 45°. How many sides does the polygon have? What is the name of this shape?

**QUESTION #4:** In what type of figure is the sum of the exterior angles equal to the sum of the interior angles?

**QUESTION #5:** The pentagon in the diagram below is formed by five rays. What is the degree measure of angle *x*?

