**Sum of Angles in Polygons Worksheet**

**Part 1: Drawing Polygon Shapes**

1. Each group selects 6-8 different regular polygons (two per person). Each group member is responsible for accurately drawing two polygons on separate sheets of paper. Use a ruler or straightedge to draw the shapes. *Choose from the following regular polygons:* Triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon and decagon.
2. In each polygon, draw all the diagonals from a single vertex. (Pick one vertex and connect that vertex by lines to every other vertex in the shape.) *See examples at the end of the next page.*

**Part 2: Polygon Data Table—Sides, Triangles and Angles**

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| --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** |
| **Polygon name** | **# of sides** | **# of triangles formed** | **Sum of all angles in the polygon (in degrees)** | **How many degrees is each angle in the polygon?** |
| *Example:* Triangle | 3 | 1 | 180° | 60° |
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1. Working as a group, fill in the first three columns of the table.
2. How many degrees do the angles of each triangle add to? \_\_\_\_\_\_\_\_\_\_
3. Fill in the fourth column of the table.
4. Look at the data for patterns that apply to all the polygons.   
   Write an **equation to find the sum of interior angles for a polygon with *n* sides.**

**Part 3: Test and Apply Your Equation**

1. How many degrees in the angles of a 13-gon?
2. Fill in the fifth column of the table and answer the following questions applying the equation that you derived above.
3. How many degrees are in **each** angle of a regular 13-gon?
4. How many degrees in the angles of a 23-gon?
5. How many degrees in **each** angle of a regular 23-gon?
6. Look at the data for patterns that apply to all the polygons.   
   Write an **equation to find the measure of each angle in a regular n-gon?**
7. How many degrees are in each angle of a regular quadrilateral (square)?
8. A regular pentagon?
9. A regular hexagon?

**Example vertex drawings for Parts 1 and 2. A red dot indicates a chosen vertex.**