

Sum of Angles in Polygons Worksheet

Part 1: Drawing Polygon Shapes

- 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.
- 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

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?
<i>Example:</i> Triangle	3	1	180°	60°

- Working as a group, fill in the first three columns of the table.
- How many degrees do the angles of each triangle add to? _____
- Fill in the fourth column of the table.
- 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

7. How many degrees in the angles of a 13-gon?

8. Fill in the fifth column of the table and answer the following questions applying the equation that you derived above.
 - A. How many degrees are in **each** angle of a regular 13-gon?

 - B. How many degrees in the angles of a 23-gon?

 - C. How many degrees in **each** angle of a regular 23-gon?

9. 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?**
 - A. How many degrees are in each angle of a regular quadrilateral (square)?

 - B. A regular pentagon?

 - C. A regular hexagon?

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

