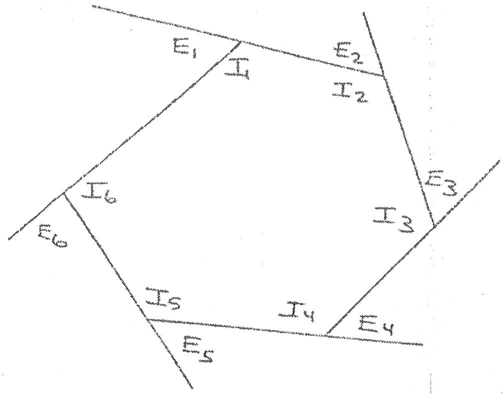
H.Geometry – Chapter 5– Definition Sheet

Section 5.2	
Recall: **Exterior Angle of a Polygon**	Forms a Linear Pair with one of the interior angles of the polygon

Investigation:

Finding the sum of the exterior angles (one at each vertex) of a polygon.



At any given vertex:

I + E = $180°$

Summing all interior and exterior angle pairs:

$$S_i + S_e = I_1 + E_1 + I_2 + E_2 + I_3 + E_3 + \dots\dots + E_n + E_n$$

$$S_i + S_E = 180 + 180 + 180 + \dots + 180$$

$$S_i + S_E = 180n$$

Solving to find sum of exterior angles (S_e)

$$S_e = 180n - S_i \leftarrow \text{But } S_i = (n-2)180$$

$$S_e = 180n - (n-2)180$$

$$S_e = 180n - (180n - 360) = 180n - 180n + 360$$

$$\therefore S_E = 360°$$

H.Geometry – Chapter 5– Definition Sheet

Exterior Angle Sum Theorem	The sum of the measure of the exterior angles (one at each vertex) is: $S_e = 360°$
Regular Polygon Exterior Angle Theorem	The measure of one exterior angle of a regular (or equiangular) polygon is: $E = \frac{360°}{n}$ **Example:** Find the measure of one exterior angle of a: Regular Octagon (8) $E = \frac{360}{8} = \boxed{45°}$ Regular 20-gon (20) $E = \frac{360}{20} = \boxed{18°}$ **Example:** One exterior angle of a regular polygon has a measure of 7.2°. How many sides does the polygon have? $n \cdot 7.2 = \frac{360}{n} \cdot n$ $\frac{7.2n}{7.2} = \frac{360}{7.2}$ $\boxed{n = 50 \text{ sides}}$

Hierarchy of Quadrilaterals
(TREE DIAGRAM)