**6.1 Polygon Angle Sum Theorems - Intro** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Polygon** - a closed plane figure with at least three straight sides and angles

(Examples include, in order of number of sides: triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon, 11-gon, dodecagon, 13-gon, 14-gon, etc…)

 **Interior angles** of a polygon - angles inside a polygon formed by the intersection of two sides

 **Exterior angles** of a polygon - the angle between any side of a shape, and a line extended from the

 next side. Each exterior angle forms a linear pair with one of the interior angles



 interior Exterior angles

 angles

**Convex** Polygon - has no angles pointing inwards. More precisely, **no** interior angle can be more than 180°.

**Concave** Polygon – has an interior angle that is more than 180°. (*Think: Concave has a “cave” in it, or "caves in".*)

**Equilateral** Polygon – polygon with all sides the same length

**Equiangular** Polygon – polygon with all the interior angles the same measure (all exterior angles = too)



**Regular** Polygon – a polygon that is BOTH equilateral AND equiangular

**Diagonal** of a polygon – a segment that connects two non-consecutive vertices.

All possible diagonals can be drawn at once…

 Or diagonals can be drawn from just ONE vertex…



**Discovering the SUM of the INTERIOR ANGLES of a Polygon**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Diagram** | **Name of Polygon** | **Number of sides (n)** | **Number of triangles formed** (when drawing diagonals from one vertex) | **Sum of the****interior angles** | **Degree measure of each interior angle** (if it is a *regular* polygon) |
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|  |  |  |  |  |  |
| n-gon | Regular n-gon |  |  |  |  |

**6.1 Polygon Angle Sum Theorems (continued) - Notes** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Objective*: The students will be able to find the sum of the interior angles of a polygon and the sum of the exterior angles of a polygon.

 or 180(n – 2)

LET’S TRY:

1. Find the sum of the interior angles of an octagon.
2. How many sides does a polygon have if the sum of the interior angles is 1980o?

 (HINT: Write an equation using the formula.)



1. Find the measure of ∠Y.

YOU TRY:

1. Find the sum of the interior angles of a heptagon.
2. How many sides does a polygon have if the sum of the interior angles is 3240 o?



1. Find the measure of ∠G.

Recall…

1.  The individual cells of a honeycomb are regular hexagons. What is the measure of an interior angle of a honeycomb cell?

[\*\*\*Please note…there are 2 ways to solve this type of problem. We will use an easier method following the next theorem…]



1. What is the measure of an exterior angle of a regular nonagon?

YOU TRY 🡪 What is the measure of each exterior angle of a regular 18-gon?

\*\*\*Let’s try that easier method for each INTERIOR angle…

1. Find the measure of each interior angle of a regular nonagon.

(HINT: Think about how you can use each EXTERIOR angle to make this an easier method than in #4.)



YOU TRY 🡪 Find the measure of each interior angle of a regular dodecagon.

HW pgs. 356-357 # 1-3, 7, 8, 11, 12, 15-25 odd, 29 (for geo 21 also do #30-33, 36, 41, 45-48)