10.4 - 10.5 Notes
Interior and Exterior Angles of Polygons

Chapter 10 Vocab:

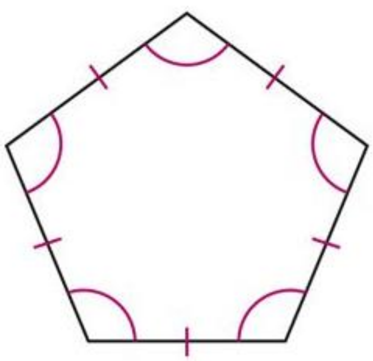
A <u>convex polygon</u> is defined as a polygon with each of its *interior angles* less than 180°. This means that all the vertices of the polygon will point outwards.

A <u>concave polygon</u> is a polygon with one or more *interior angles* greater than 180°. It looks like a vertex has been 'pushed in' towards the inside of the polygon. ** Think- "it *caves* inwards" **

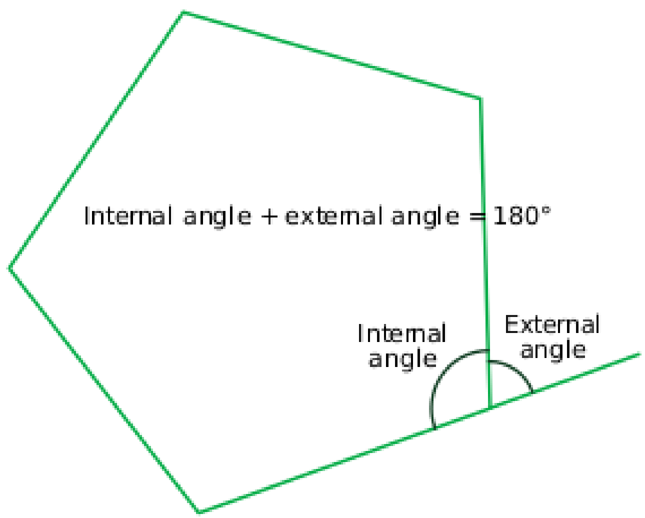
<u>Interior Angle of a polygon</u> is an angle which faces the inside of the polygon and is formed by consecutive sides of a polygon.

<u>Exterior Angle of a polygon</u> is formed adjacent to each interior angle by extending one side of each vertex of the polygon.

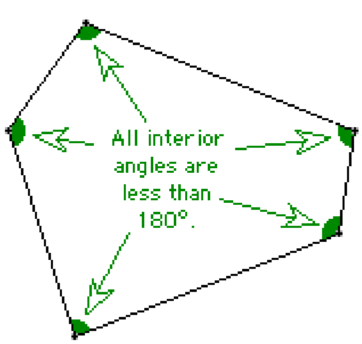
<u>Regular polygon:</u> a polygon is regular when all angles are congruent and all sides are congruent. (equilateral and equiangular)



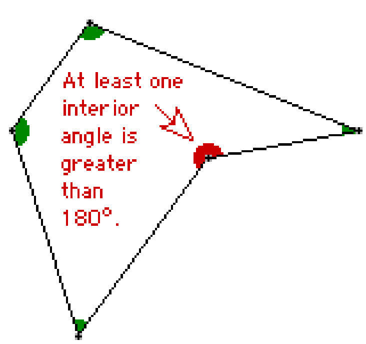
Regular pentagon



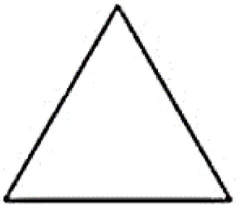
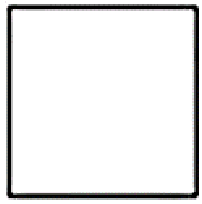
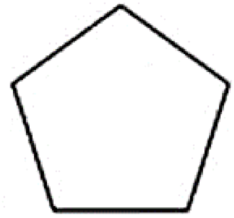
CONVEX PENTAGON

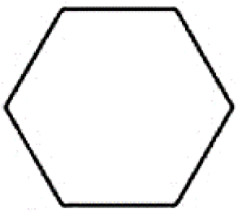
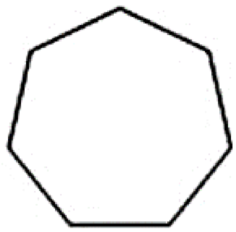
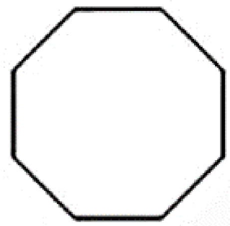


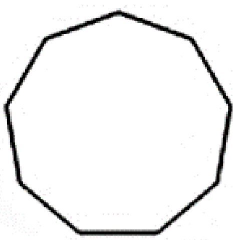
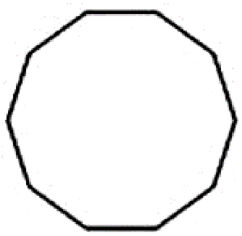
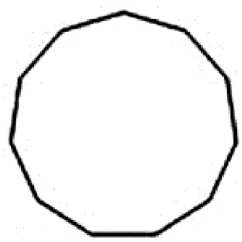
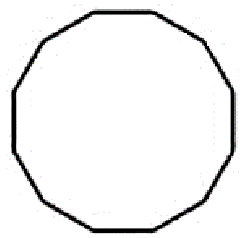
CONCAVE PENTAGON



<u>Naming Polygons:</u> Polygons are named by using the Greek prefix of their number of sides and the suffix *-gon*.

Choose one vertex in each polygon and draw all possible diagonals from that vertex.

Number of Sides of Polygon										
Number of Diagonals Drawn										
Number of Triangles Formed										
Sum of the Measure of Interior Angles										

Interior Angles:

We can use the table to derive the formula for the sum of interior angles of an *n*-sided polygon:

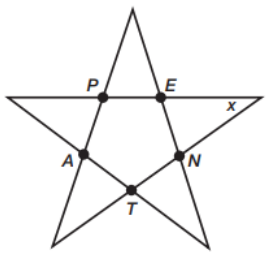
$$180°(n-2)$$

**multiply the # of triangles formed by 180°

If a regular polygon has *n* sides, you can find the measure of each individual angle using:

$$\frac{180°(n-2)}{n}$$

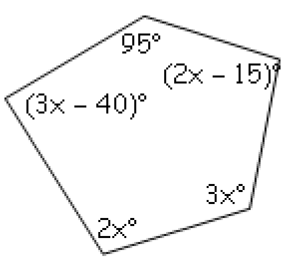
1. *PENTA* is a regular pentagon. Solve for *x*.



2. The Susan B. Anthony dollar coin minted in 1999 features a regular 11-gon, or hendecagon, inside a circle on both sides of the coin.

What is the measure of each interior angle of the regular hendecagon?

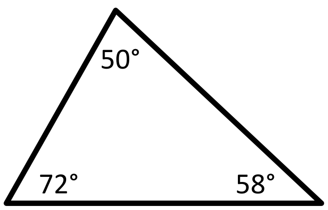
3. Find the value of x.

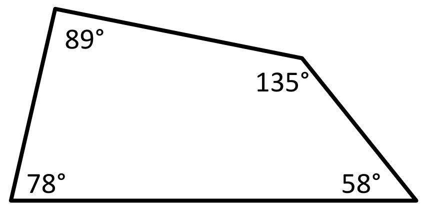


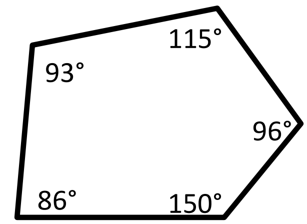
4-a. What is the sum of the interior angles of a polygon with 22 sides?

4-b. What would each interior angle measure if the polygon was regular?

Exterior Angles: each interior angle of a polygon can be paired with an interior angle







Number of Sides of the Polygon	3	4	5	6	10	20
Number of Linear Pairs Formed						
Sum of Measures of Linear Pairs						
Sum of Measures of Interior Angles						
Sum of Measures of Exterior Angles						

The sum of the exterior angle measures of all polygons is always equal to _____________

The measure of each exterior angle of an *n*-sided ***regular*** polygon can be found using:

$$\frac{360°}{n}$$

1. If the measure of each exterior angle of a regular polygon is 18°, how many sides does it have?

2. Find the value of each variable.