Geometry 8-1: *Angles of Polygons* Name_____Date_____

Review: Polygon_____ Regular Polygon_____

Draw a convex polygon:

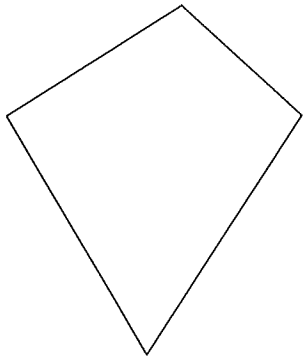
Draw a concave polygon:

Interior angles:

Exterior angles:

Investigation 1: Determine the sum of the INTERIOR angles of polygons.

1. Divide this quadrilateral into triangles. That is, draw all the diagonals from one vertex! Without measuring the angles, determine what the interior angles of this quadrilateral sum to. Explain how you got your answer.



2. Repeat this process with the following polygons and fill in the table as you do (***see page 3 for figures***):

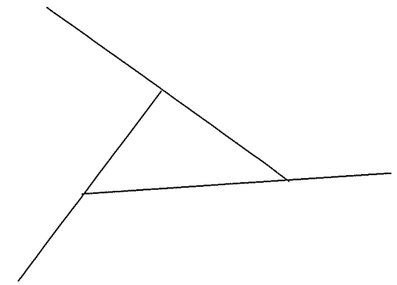
Polygon	**# of Sides**	**# of Triangles Formed**	**Interior Angle Sum of Polygons**
Triangle			
Quadrilateral			
Pentagon			
Hexagon			
Heptagon			
Octagon			

3. Now, look at the results in your table. Do you notice a pattern? Write a rule for finding the sum of the measures of the interior angles of a convex polygon with "n" sides:

n-gon			

***Investigation 2*: Determine the sum of the EXTERIOR angles of polygons (protractor required).**

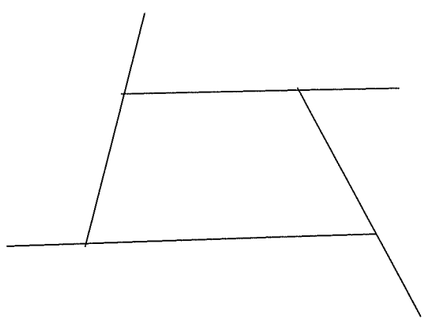
1. Measure and label the 3 exterior angles of this triangle:

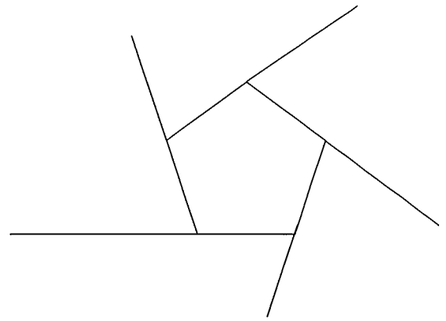


What is the sum of the three exterior angles? _____+_____+_____=_____

2. Repeat this process for this quadrilateral and pentagon. What are the sums of the exterior angles?

Quad ____+_____+_____+_____=_____ Pentagon _____+_____+_____+_____+_____=_____





3. Can you make a conjecture about the sum of the measures of the exterior angles (one at each vertex) of a convex polygon with "n" sides?

_____

******To find the measure of ONE interior angle of a regular polygon:***

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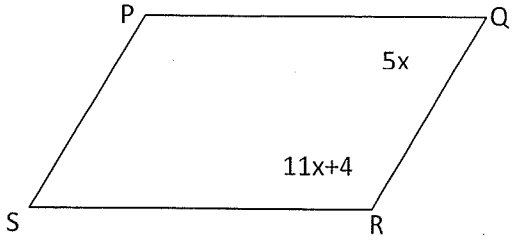
***Example*: Find the measure of an INTERIOR and EXTERIOR angle of a regular nonagaon.**

More Examples:

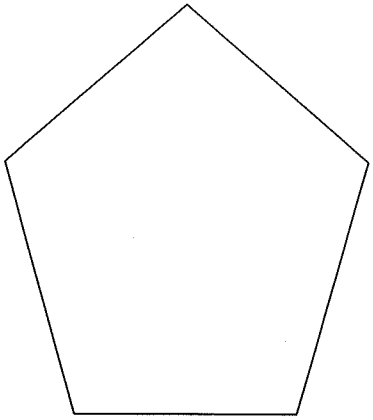
1. ***The measure of an interior angle of a regular polygon is 135°. Find the number of sides.***

2. ***Find the measure of each interior angle of PQRS if its opposite angles are congruent:***

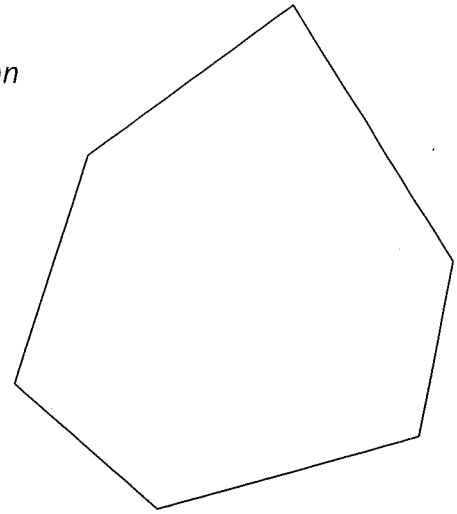


These figures are for use in filling out the table on Page 1.

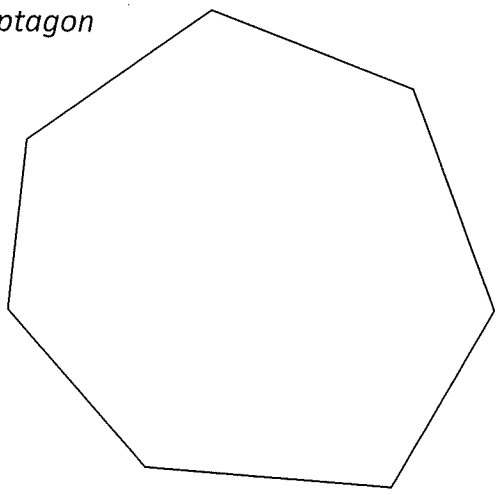
Pentagon



Hexagon



Heptagon



Octagon