Name:

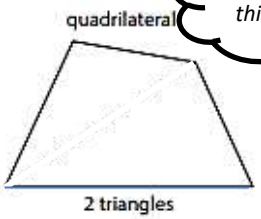
Date:
Period:

Lesson: Interior Angles of Polygons

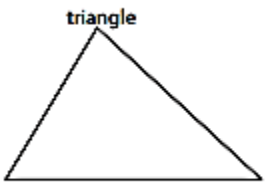
Exploring Interior Angles in Polygons

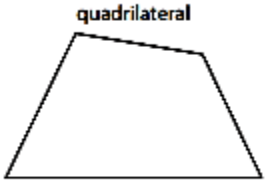
To determine the sum of the interior angles for any polygon, you can use what you know about the Triangle Sum Theorem by considering how many triangles there are in other polygons. For example, by drawing the diagonal from a vertex of a quadrilateral, you can form two triangles. Since each triangle has an angle sum of 180°, the quadrilateral must have an angle sum of $180° + 180° = 360°$.

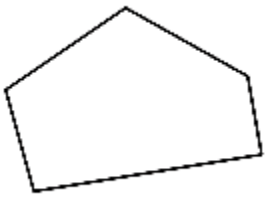
*Form **two triangles** with this 4-sided figure.*



Draw the diagonals from any one vertex for each polygon. Then state the number of triangles that are formed. The first two have already been completed.







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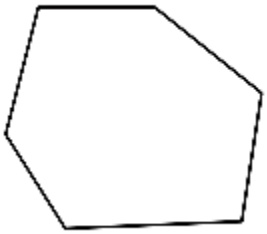

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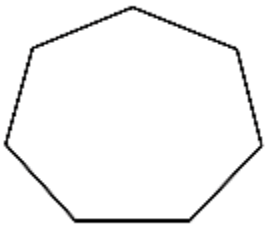

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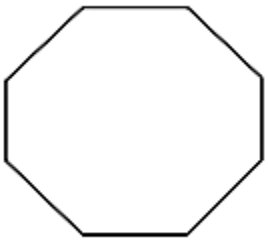

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For each polygon, identify the number of sides and triangles, and determine the angle sums. Then complete the chart. The first two have already been done for you.

Polygon	Number of Sides	Number of Triangles	Sum of Interior Angle Measures
Triangle	3	1	(1)180° = 180°
Quadrilateral	4	2	(2)180° = 360°
Pentagon	____	____	(____) 180° = _____
Hexagon	____	____	(____) 180° = _____
Decagon	____	____	(____) 180° = _____

Do you notice a pattern between the number of sides and the number of triangles? If n represents the number of sides for any polygon, how can you represent the number of triangles?

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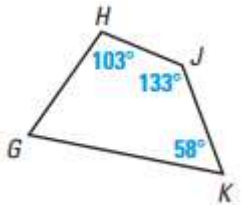
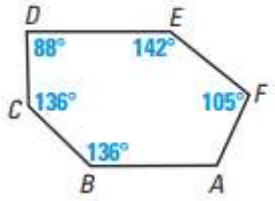
Make a conjecture for a rule that would give the sum of the interior angles for any n-gon.

Sum of interior angle measures = _____

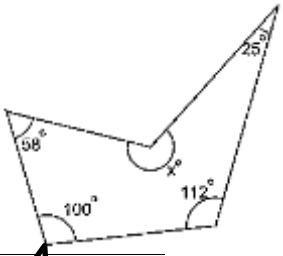
Example 1: Find the measure of **angle G** in the pictured polygon.



Example 2: Find the measure of **angle A** in the pictured polygon.

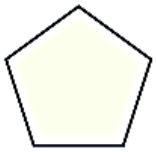


Example 3: Find the value of the unknown angle.



Example 4: How many sides does a polygon have that has an Interior angle sum of 3240°.

Definition



A polygon is **regular** when all angles are equal and all sides are equal (otherwise it is "irregular").

This is a regular pentagon (a 5-sided polygon).

Example 5: Find the measure of **an interior angle** of a **regular pentagon**.

Example 6: Find the measure of **one interior angle** of a stop sign. A stop sign is a **regular octagon**.

Wisdom Lane Middle School
Math - Grade 8
Mr. Tomeo