

Section 7.3 – Angle Relationships in Polygons

MPM1D

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Types of Polygons

Convex Polygon: All interior angles measure less than 180 degrees.

- no part of any line segment joining two points on the polygon goes outside the polygon.

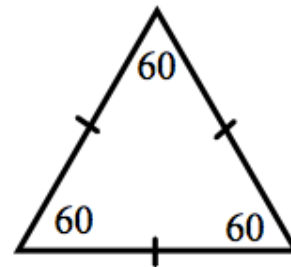


Concave Polygon: Can have interior angles greater than 180 degrees.

- parts of some line segments joining two points on the polygon go outside the polygon.



Regular Polygon: All sides are equal and all interior angles are equal.



Angle Properties in Polygons

The sum of the exterior angles of a convex polygon is 360 degrees.

For a polygon with n sides, the sum of the interior angles, in degrees, is $180(n - 2)$

For a regular polygon with n sides, the measure of each interior angle is equal to: $\frac{180(n-2)}{n}$

For a regular polygon with n sides, the measure of each exterior angle is equal to: $\frac{360}{n}$

Example 1: Calculate the sum of the interior angles of an octagon

$$180(n - 2)$$

Example 2: Calculate the measure of each of the interior angles of a *regular* octagon.

$$\frac{180(n - 2)}{n}$$

Example 3: Calculate the measure of each of the exterior angles of a *regular* octagon.

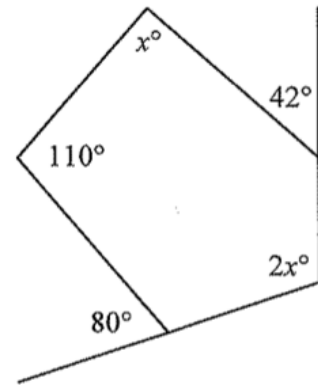
$$\frac{360}{n}$$

Example 4: How many sides does a polygon have if each of its interior angles measure 140 degrees?

Example 5: The measure of one of the exterior angles of a regular polygon is 30 degrees. How many sides does it have?

Example 6: Five angles of a hexagon have measures 100° , 110° , 120° , 130° , and 140° . What is the measure of the sixth angle?

Example 7: Solve for x .



Complete the following chart and then complete the worksheet

Polygon	Number of Sides	Sum of Interior Angles	Sum of Exterior Angles
Triangle			
Quadrilateral			
Pentagon			
Hexagon			
Heptagon			
Octagon			
Enneagon			
Decagon			