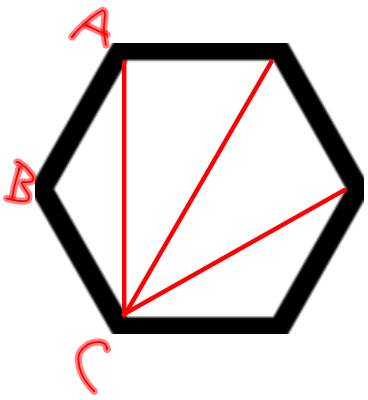
8-1 Angles of Polygons

Polygon:

* A figure made up of line segments.

Diagonal:

* A segment connecting two nonconsecutive vertices.



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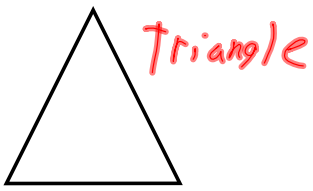
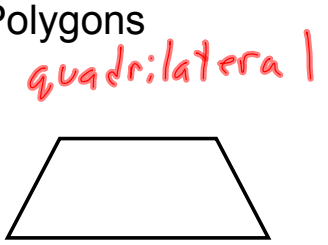
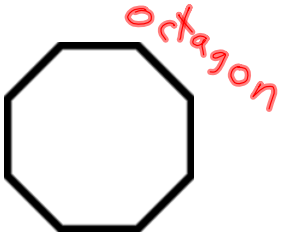






8-1 Angles of Polygons

Interior Angle Sum Theorem:

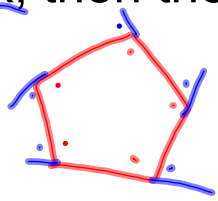
In a convex polygon with *n* sides, the sum (S) of the interior angles is 180(n - 2).

sum = number of sides

$$S = 180(n - 2)$$

Sum of Exterior Angles Theorem:

If a polygon is convex, then the sum of the angles is 360°.



8-1 Angles of Polygons

Example 1: Find the sum of the interior angles of a dodecagon.

12 sides

$S = 180(n-2)$

$S = 180(12-2)$

$S = 180(10)$

$S = 1800°$

Example 2: The measure of an interior angle of a regular polygon is 135°. Find the number of sides that the polygon has.

sides =
angles =

$135n = 180(n-2)$

$n = 8$

135° exterior
45°

180
−135
45°

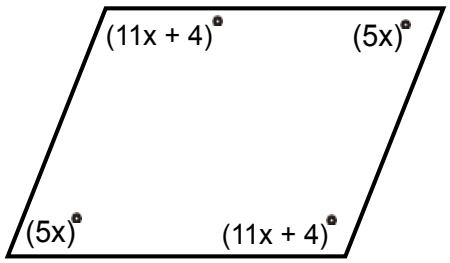
360
45
8 sides

8-1 Angles of Polygons

Example 3:

*Find the measure of each interior angle.

$S = 180(n-2)$
$S = 180(4-2)$
$S = 360°$



$11x+4+5x+11x+4+5x = 360$
$32x+8 = 360$
$-8 \quad -8$
$\frac{32x}{32} = \frac{352}{32}$
$x = 11$

$5x \to 5(11) = 55°$ ×5 → 55°
$11x+4 \to 11(11)+4 = 125°$ ×10 → 1250

Example 4: Find the measure of an exterior angle and an interior angle of a convex regular nonagon.

Ext.: $\frac{360}{9} = 40^\circ$

interior: $180 - 40 = 140^\circ$