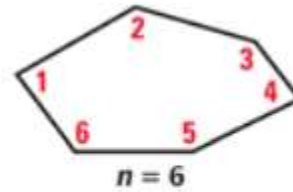


8.1 Find Angle Measures in Polygons

THEOREM 8.1 Polygon Interior Angles Theorem

The sum of the measures of the interior angles of a convex n -gon is $(n - 2) \cdot 180^\circ$.

$$m\angle 1 + m\angle 2 + \cdots + m\angle n = (n - 2) \cdot 180^\circ$$



COROLLARY TO THEOREM 8.1 Interior Angles of a Quadrilateral

The sum of the measures of the interior angles of a quadrilateral is 360° .

EXAMPLE 1 Find the sum of angle measures in a polygon

Find the sum of the measures of the interior angles of a convex octagon.



Solution

An octagon has 8 sides. Use the Polygon Interior Angles Theorem.

$$\begin{aligned}(n - 2) \cdot 180^\circ &= (8 - 2) \cdot 180^\circ && \text{Substitute 8 for } n. \\ &= 6 \cdot 180^\circ && \text{Subtract.} \\ &= 1080^\circ && \text{Multiply.}\end{aligned}$$

► The sum of the measures of the interior angles of an octagon is 1080° .

EXAMPLE 3 Find an unknown interior angle measure

xy ALGEBRA Find the value of x in the diagram shown.



Solution

The polygon is a quadrilateral. Use the Corollary to the Polygon Interior Angles Theorem to write an equation involving x . Then solve the equation.

$$\begin{aligned}x^\circ + 108^\circ + 121^\circ + 59^\circ &= 360^\circ && \text{Corollary to the Polygon Interior Angles} \\ &&& \text{Theorem} \\ x + 288 &= 360 && \text{Combine like terms.} \\ x &= 72 && \text{Subtract 288 from each side.}\end{aligned}$$

