13.3 Angles and Polygons

Goal: Find measures of interior and exterior angles.

Interior angle: The inside angles of a polygon.

exterior

Exterior angle: "Outside" angles → extend the side of the polygon & its adjacent to the interior angle.

Measures of Interior Angles of a Convex Polygon

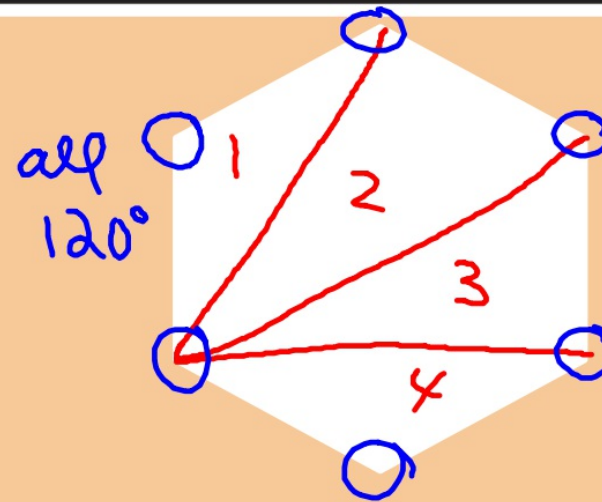The sum of the measures of the interior angles of a convex n-gon is given by the formula $(n - 2) \cdot 180°$.

The measure of an interior angle of a regular n-gon is given by

$(n - 2) \cdot 180°$

Measures of Interior Angles of a Convex Polygon

The sum of the measures of the interior angles of a convex n-gon is given by the formula $(n - 2) \cdot 180°$.

The measure of an interior angle of a regular n-gon is given by the formula $\dfrac{(n - 2) \cdot 180°}{n}$.

hexagon = 6 sides $\quad n = 6$

Sum int. angles $(6-2) \cdot 180$

$4(180) = 720°$

all $120°$

One interior angle is $\dfrac{720}{6} = 120°$

1   2   3   4

Example 1 *Finding the Sum of a Polygon's Interior Angles*
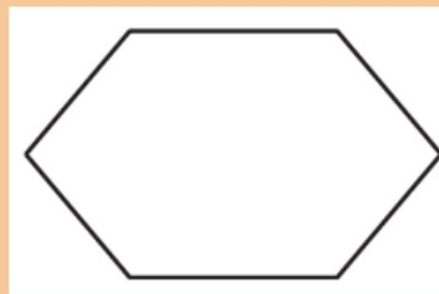
Find the sum of the measures of the interior angles of the polygon.

Solution

For a convex hexagon, $n =$

$$(n - 2) \cdot 180° = (\boxed{} - 2) \cdot 180°$$

$$S = (n-2) \cdot 180$$
$$= (6-2) \cdot 180$$
$$= 720°$$

Example 2 **Finding the Measure of an Interior Angle**

Find the measure of an interior angle of a regular octagon.

Solution

For a regular octagon, $n = 8$.

Measure of an interior angle =

Write formula.

Substitute for n.

Simplify.

$$\frac{(n-2)\cdot 180}{n} \qquad \frac{(8-2)(180)}{8} = \frac{6(180)}{8} = 135°$$

1. Find the sum of the measures of the interior angles of a convex 9-gon.

$$(9-2)(180)$$
$$= 7(180)$$
$$S = 1260°$$

2. Find the measure of an interior angle of a regular 18-gon.

$$\frac{(18-2)(180)}{18} = \frac{16(18)(10)}{18} = 160°$$