CHAPTER 6

Polygons and Quadrilaterals

6-1 The Polygon Angle-Sum Theorems

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G.SRT.5 Use congruence . . . criteria to solve problems and prove relationships in geometric figures.

Objectives To find the sum of the measures of the interior angles of a polygon
To find the sum of the measures of the exterior angles of a polygon

take note

Theorem 6-1 Polygon Angle-Sum Theorem

The sum of the measures of the interior angles of an n-gon is $(n - 2)180$.
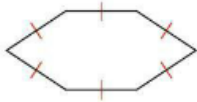
$$180(n-2)$$

© ✓ **Got It?** **1. a.** What is the sum of the interior angle measures of a 17-gon?
b. Reasoning The sum of the interior angle measures of a polygon is 1980. How can you find the number of sides in the polygon?
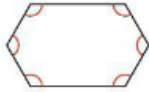
a. $180(17-2)$
$180(15)$
$2700°$

b. $180(n-2) = 1980$
$180n - 360 = 1980$
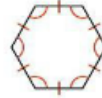$180n = 2340$
$n = 13$
13-gon

An **equilateral polygon** is a polygon with all sides congruent.

An **equiangular polygon** is a polygon with all angles congruent.

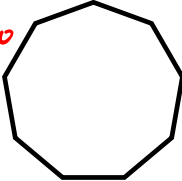A **regular polygon** is a polygon that is both equilateral and equiangular.

take note

Corollary to the Polygon Angle-Sum Theorem

The measure of each interior angle of a regular n-gon is $\frac{(n-2)180}{n}$.

✅ **Got It? 2.** What is the measure of each interior angle in a regular nonagon?

$$\frac{180(9-2)}{9} = \frac{180(7)}{9} = \frac{1260}{9} = 140°$$

1 interior ∠ of a ? regular polygon is 108°
How many sides?

$$\frac{180(n-2)}{n} = 108$$

$$180(n-2) = 108n$$

$$180n - 360 = 108n$$

$$-360 = -72n$$

$$5 = n$$

pentagon

regular pentagon

perimeter = 20 in
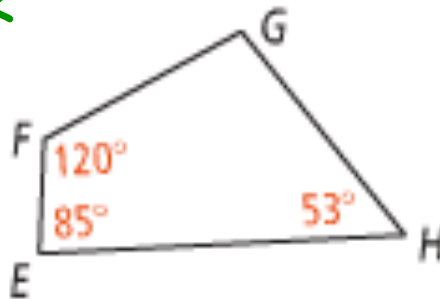
1 side = ?

$$\frac{20}{5} = 4 \text{ in}$$

Got It? 3. What is $m\angle G$ in quadrilateral *EFGH*?
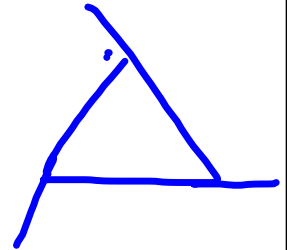
180(4-2)
180(2)
360°

120 + 85 + 53 + m∠G = 360

258 + m∠G = 360
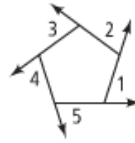
m∠G = 102°

Theorem 6-2   Polygon Exterior Angle-Sum Theorem

The sum of the measures of the exterior angles of a polygon, one at each vertex, is 360.

For the pentagon, $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 + m\angle 5 = 360$.

Got It?   4. What is the measure of an exterior angle of a regular nonagon?

of
Sides
n

$9x = 360$

$x = 40°$

1 exterior $\angle$ of a ~regular~ polygon $= 20°$

How many sides?

$n(20) = 360$

$n = 18$

18-gon

6.1
Name
pg. 356-357   # 8-24 even
                29-31
                32-36 even

Notes 6.2   45-48