

**Study Guide and Intervention**

7MR3.3, 7AF1.1

***Polygons and Angles***

An **interior angle** is any angle that lies inside a polygon. A **regular polygon** is a polygon whose sides and angles are congruent.

**Example 1** Find the sum of the measures of the interior angles of a tricontagon, which is a 30-sided polygon.

$$\begin{aligned} S &= (n - 2)180^\circ && \text{Write an equation.} \\ S &= (30 - 2)180^\circ && \text{Replace } n \text{ with 30. Subtract.} \\ S &= (28)180^\circ && \text{Multiply.} \\ S &= 5,040^\circ \end{aligned}$$

The sum of the measures of the interior angles of a tricontagon is  $5,040^\circ$ .

**Example 2** The defense department of the United States has its headquarters in a building called the Pentagon because it is shaped like a regular pentagon. What is the measure of an interior angle of a regular pentagon?

$$\begin{aligned} S &= (n - 2)180^\circ && \text{Write an equation.} \\ S &= (5 - 2)180^\circ && \text{Replace } n \text{ with 5. Subtract.} \\ S &= (3)180^\circ && \text{Multiply.} \\ S &= 540^\circ \\ 540^\circ \div 5 &= 108^\circ && \text{Divide by the number of interior angles to find the measure} \\ &&& \text{of one angle.} \end{aligned}$$

The measure of one interior angle of a regular pentagon is  $108^\circ$ .

**Exercises**

For Exercises 1–6, find the sum of the measures of the interior angles of the given polygon.

- |                      |                          |
|----------------------|--------------------------|
| 1. nonagon (9-sided) | 2. 14-gon                |
| 3. 16-gon            | 4. hendecagon (11-sided) |
| 5. 25-gon            | 6. 42-gon                |

For Exercises 7–12, find the measure of one interior angle of the given polygon. Round to the nearest hundredth if necessary.

- |            |                              |
|------------|------------------------------|
| 7. hexagon | 8. 15-gon                    |
| 9. 22-gon  | 10. icosagon (20-sided)      |
| 11. 38-gon | 12. pentacontagon (50-sided) |