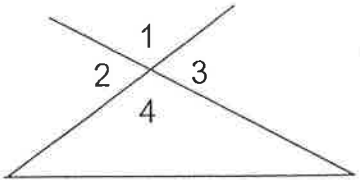
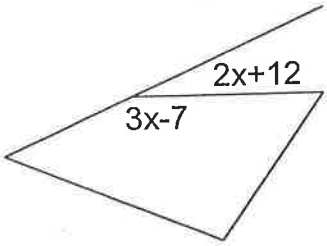
Interior and Exterior Angles

1. Which of the numbered angle(s) in the diagram are interior angle(s)?



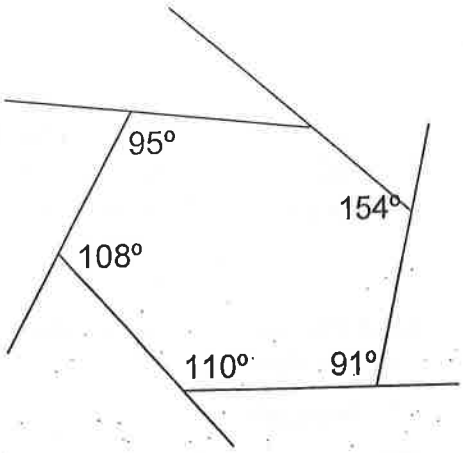
2. Which angle(s) are exterior angle(s)?

3. Write & solve an equation to find the value of x, then find the exact degree measure of the exterior angle.

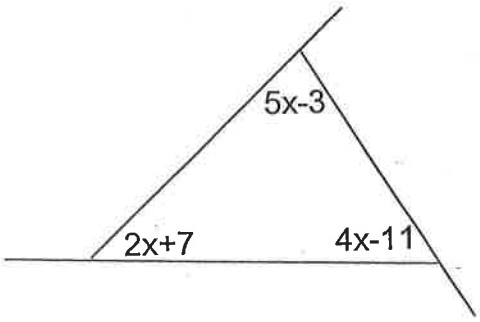


4. Label each exterior angle in the diagram, and find its degree measure.

5. What is the sum of the measures of the exterior angles?



6. Write & solve an equation to find the value of x, then find the measures of all interior AND exterior angles.



7. What is the sum of the measures of the interior angles in a regular dodecagon?

8. What is the measure of each interior angle?

9. What is the measure of each exterior angle?

10. What is the sum of the exterior angles?

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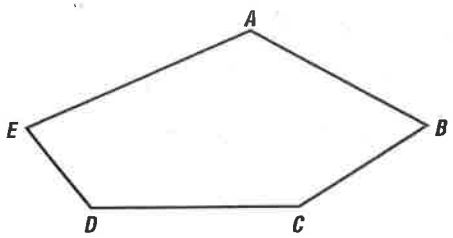
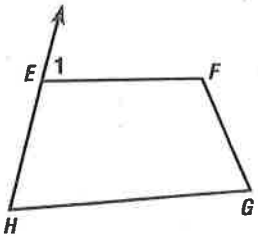
Practice Worksheet

Angles of Polygons

1. Find $m\angle E$ if $m\angle A = 160$, $m\angle B = 50$, and $m\angle C = m\angle D = 140$.



2. Find $m\angle 1$ if $m\angle G = 80$, $m\angle F = 110$, and $m\angle H = 74$.



3. What is the fewest number of sides a polygon can have?

4. In what convex polygon is the sum of the measures of the exterior angles, one per vertex, equal to the sum of the measures of the interior angles?

Find the sum of the measures of the interior angles of each convex polygon.

5. heptagon

6. octagon

7. 13-gon

The number of sides of a regular polygon is given. Find the measure of an interior and an exterior angle of the polygon.

8. 5

9. 9

10. 10

The measure of one exterior angle of a regular polygon is given. Find the number of sides.

11. 30

12. 40

13. 90

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Workbook Activity
Chapter 5, Lesson 9
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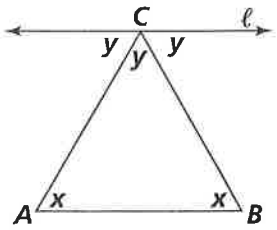
ngle Sum Theorem

EXAMPLE Use the Angle Sum Theorem or its corollary to find the measures of the angles.

The topmost angle and its two adjacent angles form line ℓ, which is equivalent to a straight angle. Therefore, the sum of the topmost angle and its adjacent angles is equal to 180°. You can solve for y by writing the following equation:

$180° = y + y + y$, which can be reduced to $180° = 3y$. Divide both sides by 3 to get $y = 60°$.

The Angle Sum Theorem allows you to solve for x. The theorem states that the sum of any triangle's angles must equal 180°. You can write the following equation:



$180° = y + x + x$

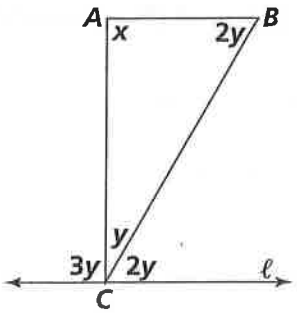
$180° = 60° + 2x$

$120° = 2x$

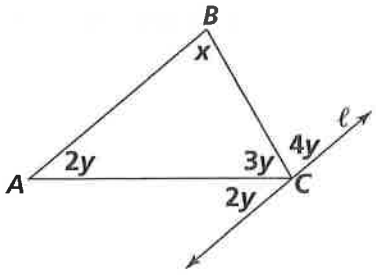
$x = 60°$ You have now found the measures of all three angles in ΔABC.

Directions Use the Angle Sum Theorem or its corollary to find the measures of the angles.

1. Angle A _____
2. Angle B _____
3. Angle C _____

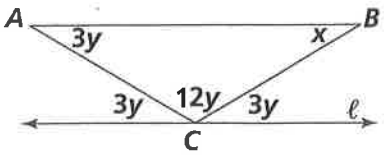


4. Angle A _____
5. Angle B _____
6. Angle C _____



7. Angle A _____
8. Angle B _____
9. Angle C _____

... $\angle A + \angle B + \angle C$ _____



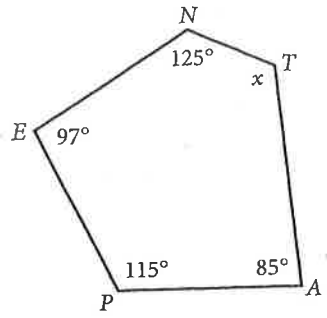
NAME _____ CLASS _____ DATE _____

Practice Masters Level A

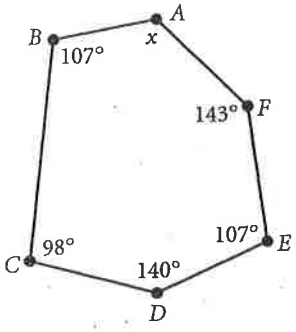
3.6 Angles in Polygons

In Exercises 1–3, find the indicated angle measures, *x*.

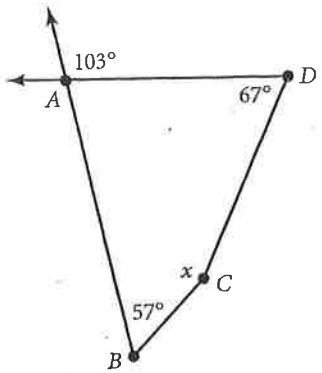
1. _____



2. _____



3. _____



For each polygon, determine the measure of an interior angle and the measure of an exterior angle.

4. a regular octagon _____

5. a regular decagon _____

For Exercises 6–7, an interior angle measure of a regular polygon is given. Find *n*, the number of sides of the polygon.

6. 140° _____

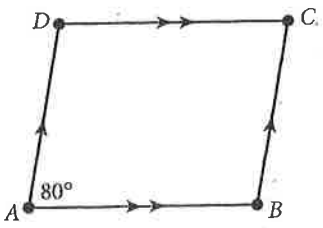
7. 156° _____

For Exercises 8–9, an exterior angle measure of a regular polygon is given. Find *n*, the number of sides of the polygon.

8. 30° _____

9. 20° _____

For Exercises 10–12, use the figure at the right to find the indicated measures.



10. m∠*D* _____

11. m∠*C* _____

12. m∠*B* _____

A regular polygon has an exterior angle measure of $(x + 3)°$ and an interior angle measure of $(13x - 33)°$.

13. Find the measure of each angle. _____

14. How many sides does this polygon have? _____

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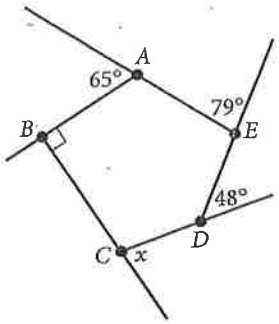
Practice Masters Level B

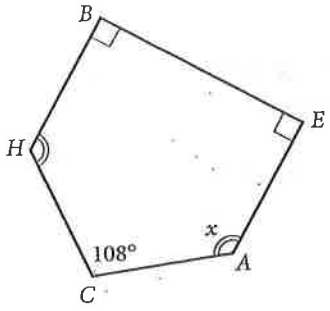
3.6 Angles in Polygons

For Exercises 1–3, find the indicated angle measure, *x*.

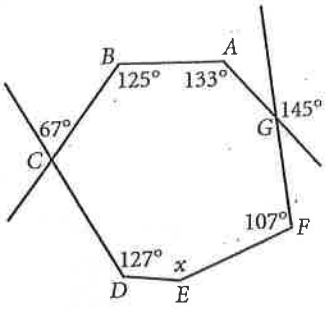
1. _____



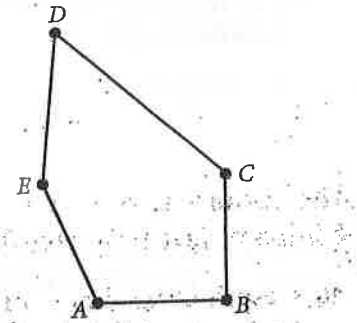
2. _____



3. _____



In the figure at the right, $m\angle A = 4x + 7$, $m\angle B = 4x - 18$, $m\angle C = 5(x - 1)$, $m\angle D = 2x + 1$, and $m\angle E = 7x - 39$. Find the indicated measures.



4. x _____

5. $m\angle A$ _____

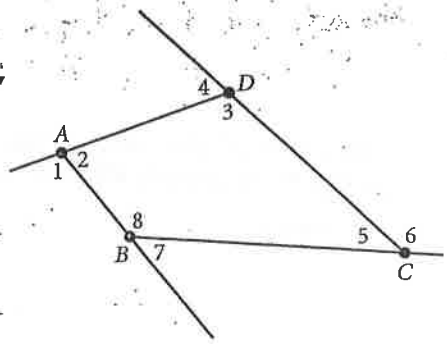
6. $m\angle B$ _____

7. $m\angle C$ _____

8. $m\angle D$ _____

9. $m\angle E$ _____

In the figure at the right, $m\angle 1 = 5x + 11$, $m\angle 4 = 3x + 1$, $m\angle 6 = 8x - 19$, and $m\angle 7 = 3x - 13$. Find the indicated measures.



10. $m\angle 2$ _____

11. $m\angle 3$ _____

12. $m\angle 8$ _____

13. $m\angle 5$ _____

14. What are the interior and exterior angle measures of a regular nonagon? _____

15. How many sides does a regular polygon with interior angle measure of 168° have? _____

16. How many sides does a regular polygon with exterior angle measure of 20° have? _____

10-2 NAME _____ DATE _____

Reteaching Worksheet

Angles of Polygons

The following two theorems involve the interior and exterior angles of a convex polygon.

Interior Angle Sum Theorem	If a convex polygon has n sides and S is the sum of the measures of its interior angles, then $S = 180(n - 2)$.
Exterior Angle Sum Theorem	If a polygon is convex, then the sum of the measures of the exterior angles, one at each vertex, is 360.

Example: Find the sum of the measures of the interior angles of a convex polygon with 13 sides.

$S = 180(n - 2)$ Interior Angle Sum Theorem
$S = 180(13 - 2)$
$S = 180(11)$
$S = 1980$

Find the sum of the measures of the interior angles of each convex polygon.

1. 10-gon

2. 16-gon

3. 30-gon

The measure of an exterior angle of a regular polygon is given. Find the number of sides of the polygon.

4. 30

5. 20

6. 5

The sum of the measures of the interior angles of a convex polygon is given. Find the number of sides in each polygon.

7. 2160

8. 6120

9. 4140

10. The measure of the interior angle of a regular polygon is 157.5. Find the number of sides of the polygon.