LESSON 2.7

Study Guide
For use with pages 122–131

GOAL **Use properties of special pairs of angles.**

Vocabulary

Theorem 2.3 Right Angles Congruence Theorem: All right angles are congruent.

Theorem 2.4 Congruent Supplements Theorem: If two angles are supplementary to the same angle (or to congruent angles), then they are congruent.

Theorem 2.5 Congruent Complements Theorem: If two angles are complementary to the same angle (or to congruent angles), then they are congruent.
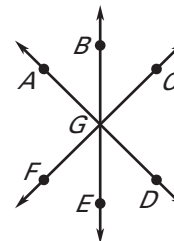
Postulate 12 Linear Pair Postulate: If two angles form a linear pair, then they are supplementary.

Theorem 2.6 Vertical Angles Congruence Theorem: Vertical angles are congruent.

EXAMPLE 1 ## Find angle measures

Complete the statement given that $m\angle AGF = 90°$.

a. $m\angle CGD = \underline{\ ?\ }$

b. If $m\angle BGF = 113°$, then $m\angle DGE = \underline{\ ?\ }$.

Solution

a. Because $\angle CGD$ and $\angle AGF$ are vertical angles, $\angle CGD \cong \angle AGF$. By the definition of congruent angles, $m\angle CGD = m\angle AGF$. So, $m\angle CGD = 90°$.

b. By the Angle Addition Postulate, $m\angle BGF = m\angle AGF + m\angle AGB$. Substitute to get $113° = 90° + m\angle AGB$. By the Subtraction Property of Equality, $m\angle AGB = 23°$. Because $\angle DGE$ and $\angle AGB$ are vertical angles, $\angle DGE \cong \angle AGB$. By the definition of congruent angles, $m\angle DGE = m\angle AGB$. So, $m\angle DGE = 23°$.

Exercises for Example 1

Complete the statement given that $m\angle BHD = m\angle CHE = 90°$.

1. $m\angle AHG = \underline{\ ?\ }$

2. $m\angle CHA = \underline{\ ?\ }$

3. If $m\angle CHD = 31°$, then $m\angle EHF = \underline{\ ?\ }$.

4. If $m\angle BHG = 125°$, then $m\angle CHF = \underline{\ ?\ }$.

5. If $m\angle EHF = 38°$, then $m\angle BHC = \underline{\ ?\ }$.
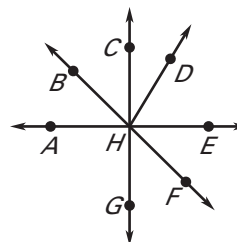
LESSON 2.7

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EXAMPLE 2 **Find angle measures**
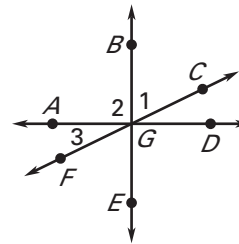
If $m\angle BGD = 90°$ and $m\angle CGD = 26°$,
find $m\angle 1$, $m\angle 2$, and $m\angle 3$.

Solution

$\angle BGC$ and $\angle CGD$ are complementary.
So, $m\angle 1 = 90° - 26° = 64°$.

$\angle AGB$ and $\angle BGD$ are supplementary.
So, $m\angle 2 = 180° - 90° = 90°$.

$\angle AGF$ and $\angle CGD$ are vertical angles.
So, $m\angle 3 = 26°$.

Exercises for Example 2

In Exercises 6 and 7, refer to Example 2.

6. Find $m\angle FGE$.

7. Find $m\angle DGE$.

EXAMPLE 3 **Use algebra**

Solve for x in the diagram.
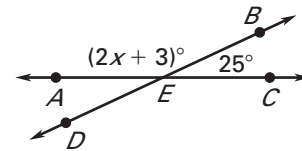
Solution

Because $\angle AEB$ and $\angle BEC$ form a linear pair, the sum of
their measures is 180°. So, you can solve for x as follows:

$(2x + 3) + 25 = 180$ Definition of supplementary angles.
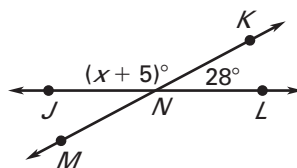
$2x + 28 = 180$ Combine like terms.

$2x = 152$ Subtract 28 from both sides.

$x = 76$ Divide each side by 2.

Exercises for Example 3

Solve for x in the diagram.

8.

9.