

**Reteaching with Practice**

For use with pages 44–50

**GOAL****Identify vertical angles and linear pairs and identify complementary and supplementary angles****VOCABULARY**

Two angles are **vertical angles** if their sides form two pairs of opposite rays.

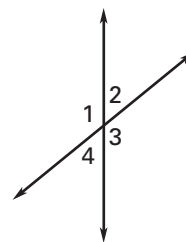
Two adjacent angles are a **linear pair** if their noncommon sides are opposite rays.

Two angles are **complementary angles** if the sum of their measures is  $90^\circ$ . Each angle is the **complement** of the other.

Two angles are **supplementary angles** if the sum of their measures is  $180^\circ$ . Each angle is the **supplement** of the other.

**EXAMPLE 1****Identifying Vertical Angles and Linear Pairs**

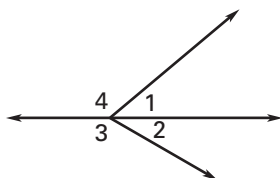
- Are  $\angle 1$  and  $\angle 3$  vertical angles?
- Are  $\angle 2$  and  $\angle 4$  a linear pair?
- Are  $\angle 1$  and  $\angle 4$  a linear pair?

**SOLUTION**

- Yes. The sides of the angles form two pairs of opposite rays.
- No. The angles are not adjacent.
- Yes. The angles are adjacent and their noncommon sides are opposite rays.

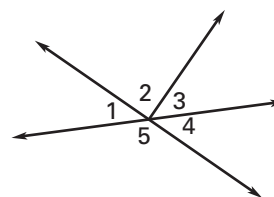
**Exercises for Example 1****Use the figure to answer the questions.**

1.



- Are  $\angle 1$  and  $\angle 2$  a linear pair?
- Are  $\angle 1$  and  $\angle 3$  vertical angles?
- Are  $\angle 1$  and  $\angle 4$  a linear pair?
- Are  $\angle 2$  and  $\angle 4$  vertical angles?

2.



- Are  $\angle 1$  and  $\angle 5$  a linear pair?
- Are  $\angle 1$  and  $\angle 2$  a linear pair?
- Are  $\angle 1$  and  $\angle 4$  vertical angles?
- Are  $\angle 3$  and  $\angle 5$  vertical angles?

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## EXAMPLE 2 Finding Angle Measures

Solve for  $x$  in the diagram at the right.  
Then find the angle measures.

### SOLUTION

Use the fact that vertical angles are congruent.

$$\begin{aligned}(7x - 25)^\circ &= (5x + 15)^\circ \\ x &= 20\end{aligned}$$

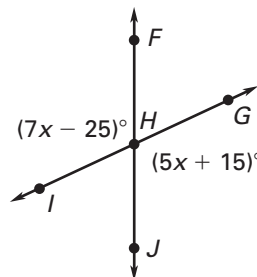
Use substitution to find the angle measures.

$$m\angle FHI = (7x - 25)^\circ = (7 \cdot 20 - 25)^\circ = 115^\circ$$

$$m\angle GHJ = (5x + 15)^\circ = (5 \cdot 20 + 15)^\circ = 115^\circ$$

Next, realize that  $\angle FHI$  and  $\angle FHG$  are a linear pair. So, the measures of these two angles must sum to  $180^\circ$ . So,  $m\angle FHG = 180^\circ - 115^\circ$ , so  $m\angle FHG = 65^\circ$ .

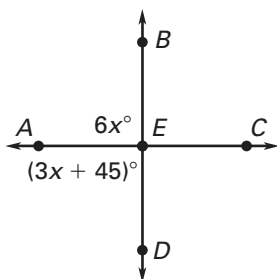
Finally, notice that  $\angle FHG$  and  $\angle IHJ$  are vertical angles. So,  $m\angle IHJ = 65^\circ$ .



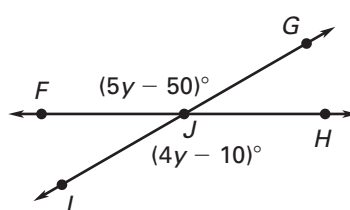
### Exercises for Example 2

Solve for  $x$  and  $y$ , then find the angle measures.

3.



4.



## EXAMPLE 3 Finding Measures of Complements and Supplements

- Given that  $\angle E$  is a complement of  $\angle F$  and  $m\angle E = 68^\circ$ , find  $m\angle F$ .
- Given that  $\angle G$  is a supplement of  $\angle H$  and  $m\angle G = 152^\circ$ , find  $m\angle H$ .

### SOLUTION

$$\text{a. } m\angle F = 90^\circ - m\angle E = 90^\circ - 68^\circ = 22^\circ$$

$$\text{b. } m\angle H = 180^\circ - m\angle G = 180^\circ - 152^\circ = 28^\circ$$

### Exercises for Example 3

Find the measure of the angle.

- Given that  $\angle A$  is a complement of  $\angle B$  and  $m\angle B = 81^\circ$ , find  $m\angle A$ .
- Given that  $\angle C$  is a supplement of  $\angle D$  and  $m\angle C = 27^\circ$ , find  $m\angle D$ .