

### 3-2 Study Guide and Intervention *(continued)*

#### Angles and Parallel Lines

**Algebra and Angle Measures** Algebra can be used to find unknown values in angles formed by a transversal and parallel lines.

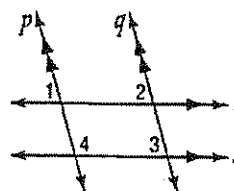
**Example** If  $m\angle 1 = 3x + 15$ ,  $m\angle 2 = 4x - 5$ ,  $m\angle 3 = 5y$ , and  $m\angle 4 = 6z + 3$ , find  $x$  and  $y$ .

$p \parallel q$ , so  $m\angle 1 = m\angle 2$   
because they are corresponding angles.

$$\begin{aligned} 3x + 15 &= 4x - 5 \\ 3x + 15 - 3x &= 4x - 5 - 3x \\ 15 &= x - 5 \\ 15 + 5 &= x - 5 + 5 \\ 20 &= x \end{aligned}$$

$r \parallel s$ , so  $m\angle 2 = m\angle 3$   
because they are corresponding angles.

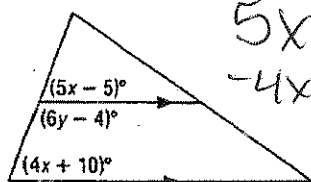
$$\begin{aligned} m\angle 2 &= m\angle 3 \\ 75 &= 5y \\ \frac{75}{5} &= \frac{5y}{5} \\ 15 &= y \end{aligned}$$



#### Exercises

Find  $x$  and  $y$  in each figure.

1.

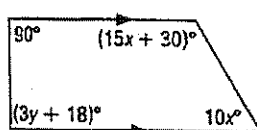


$$\begin{aligned} 5x - 5 &= 4x + 10 \\ -4x & \quad -4x \\ x - 5 &= 10 \\ x &= 15 \end{aligned}$$

$$70 + 6y - 4 = 180$$

$$66 + 6y = 180$$

2.



$$\begin{aligned} 3y + 18 &= 90 \\ 3y &= 72 \\ y &= 24 \end{aligned}$$

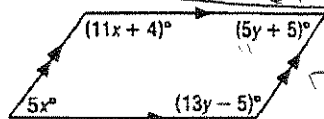
$$15x + 30 + 10x = 180$$

$$25x = 150$$

$$6y = 114$$

$$x = 6$$

3.

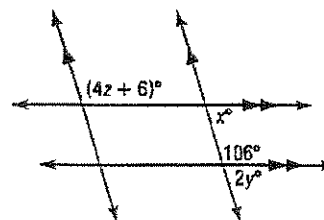


$$5x + 11x + 4 = 180$$

$$16x = 176$$

Find  $x$ ,  $y$ , and  $z$  in each figure.

5.



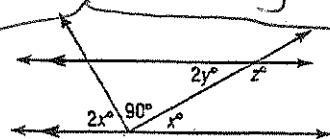
$$x = 74$$

$$2y = 74$$

$$y = 37$$

$$42 + 6 = 106 \quad |z = 25|$$

6.



$$3x = 5x - 20$$

$$2x = 20$$

$$2y + 4y = 150$$

$$6y = 150$$

$$x = 30$$

$$2y = 30$$

$$y = 15$$

$$z = 150$$

# 3-2 Study Guide and Intervention

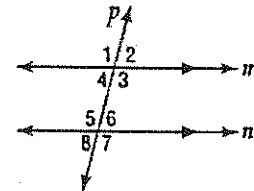
## Angles and Parallel Lines

**Parallel Lines and Angle Pairs** When two parallel lines are cut by a transversal, the following pairs of angles are congruent.

- corresponding angles
- alternate interior angles
- alternate exterior angles

Also, consecutive interior angles are supplementary.

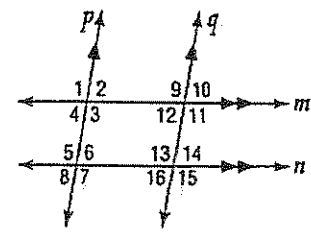
**Example** In the figure,  $m\angle 2 = 75$ . Find the measures of the remaining angles.



- $m\angle 1 = 105$   $\angle 1$  and  $\angle 2$  form a linear pair.
- $m\angle 3 = 105$   $\angle 3$  and  $\angle 2$  form a linear pair.
- $m\angle 4 = 75$   $\angle 4$  and  $\angle 2$  are vertical angles.
- $m\angle 5 = 105$   $\angle 5$  and  $\angle 3$  are alternate interior angles.
- $m\angle 6 = 75$   $\angle 6$  and  $\angle 2$  are corresponding angles.
- $m\angle 7 = 105$   $\angle 7$  and  $\angle 3$  are corresponding angles.
- $m\angle 8 = 75$   $\angle 8$  and  $\angle 6$  are vertical angles.

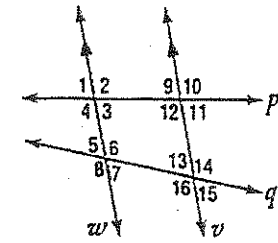
**Exercises**

In the figure,  $m\angle 3 = 102$ . Find the measure of each angle.



- 1.  $\angle 5$   $102^\circ$
- 2.  $\angle 6$   $78^\circ$
- 3.  $\angle 11$   $102^\circ$
- 4.  $\angle 7$   $102^\circ$
- 5.  $\angle 15$   $102^\circ$
- 6.  $\angle 14$   $78^\circ$

In the figure,  $m\angle 9 = 80$  and  $m\angle 5 = 68$ . Find the measure of each angle.



- 7.  $\angle 12$   $100^\circ$
- 8.  $\angle 1$   $80^\circ$
- 9.  $\angle 4$   $100^\circ$
- 10.  $\angle 3$   $80^\circ$
- 11.  $\angle 7$   $68^\circ$
- 12.  $\angle 16$   $112^\circ$

Lesson 3-2