LESSON 3.6

NAME _____ DATE _____

Reteaching with Practice

For use with pages 165–171

GOAL **Find slopes of lines and use slope to identify parallel lines in a coordinate plane and write equations of parallel lines in a coordinate plane**

VOCABULARY

Postulate 17 ***Slopes of Parallel Lines*** In a coordinate plane, two nonvertical lines are parallel if and only if they have the same slope. Any two vertical lines are parallel.

EXAMPLE 1 Finding the Slope of a Line

Find the slope of the line that passes through the points $(3, -3)$ and $(0, 9)$.

SOLUTION

Let $(x_1, y_1) = (3, -3)$ and $(x_2, y_2) = (0, 9)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{9 - (-3)}{0 - 3}$$

$$= \frac{12}{-3}$$

$$= -4$$

The slope of the line is -4.

Exercises for Example 1

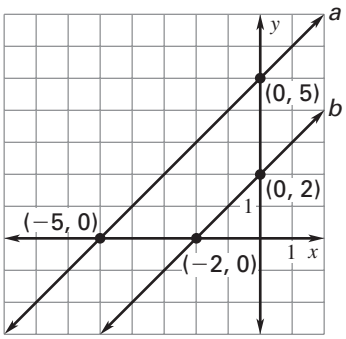
Find the slope of the line that passes through the given points.

1. $(4, 2)$ and $(6, 8)$ **2.** $(-3, -1)$ and $(-5, -11)$ **3.** $(-8, 12)$ and $(0, -12)$

4. $(8, 3)$ and $(14, 5)$ **5.** $(-7, -5)$ and $(5, 4)$ **6.** $(-18, 5)$ and $(4, 5)$

EXAMPLE 2 Identifying Parallel Lines

Find the slope of each line. Is $a \parallel b$?



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SOLUTION

Find the slope of a. Line a passes through $(-5, 0)$ and $(0, 5)$.

$$m_a = \frac{5 - 0}{0 - (-5)} = \frac{5}{5} = 1$$

Find the slope of b. Line b passes through $(-2, 0)$ and $(0, 2)$.

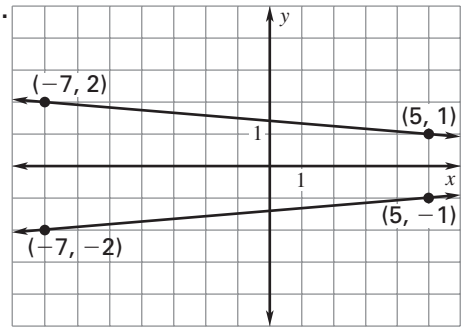
$$m_b = \frac{2 - 0}{0 - (-2)} = \frac{2}{2} = 1$$

Compare the slopes. Because a and b have the same slope, they are parallel.

Exercises for Example 2

Find the slope of each line. Which lines are parallel?

7.



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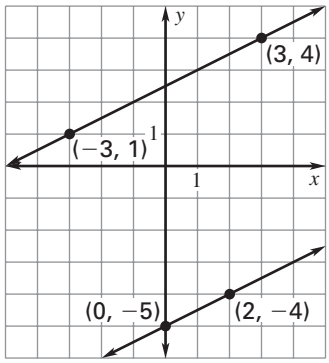

EXAMPLE 3 ***Writing an Equation of a Parallel Line***

Line k has the equation $y = -x - 4$.

Line ℓ is parallel to k and passes through the point $(1, 5)$. Write an equation of ℓ.

SOLUTION

Find the slope. The slope of k is -1. Because parallel lines have the same slope, the slope of ℓ is also -1.

Solve for b. Use $(x, y) = (1, 5)$ and $m = -1$.

$y = mx + b$

$5 = -1(1) + b$

$5 = -1 + b$

$6 = b$

Write an equation. Because $m = -1$ and $b = 6$, an equation of ℓ is $y = -x + 6$.

Exercises for Example 3

Write an equation of the line the passes through the given point *P* and is parallel to the line with the given equation.

9. $P(10, 3), y = x - 12$ **10.** $P(-5, 2), y = -x - 9$ **11.** $P(-1, 2), y = \frac{2}{3}x - 2$