NAME _____ DATE _____ PERIOD _____

5-2 Slope and Direct Variation *(Pages 264–270)*

An equation in the form of $y = kx$, where $k \neq 0$, is called **direct variation**. In direct variation we say that *y varies directly with x* or *y varies directly as x*. In the direct variation equation, $y = kx$, k is the **constant of variation**. The constant of variation in a direct variation equation has the same value as the slope of the graph. For example, $y = 5x$ is a direct variation because it is in the form of $y = kx$. The constant of variation of $y = 5x$ is 5. The slope of the linear graph of $y = 5x$ is 5. All direct variation graphs pass through the origin.

Examples

a. For the equation $y = 2x$, which passes through points (2, 4) and (5, 10), show that the slope and the constant of the variation are equal.

2 is the constant of the variation;

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 4}{5 - 2} = \frac{6}{3} = \frac{2}{1} = 2$$

b. Write and solve an equation if y varies directly with x and $y = 40$ when $x = 5$.

$y = kx$	*Direct variation form*
$40 = k \cdot 5$	*Substitute values.*
$8 = k$	*Divide each side by 5.*

Therefore, $y = 8x$.

Practice

Name the constant of variation for each equation. Then determine the slope of the line that passes through the given pair of points.

1. $y = \frac{1}{3}x$; (6, 2), (−9, −3) **2.** $y = \frac{-5}{2}x$; (−10, 25), (−2, 5) **3.** $y = 13x$; (2, 26), (9, 117)

Write a direct variation equation that relates x and y. Assume that y varies directly with x. Then solve.

4. If $y = -32$ when $x = 4$, find x when $y = 24$. **5.** If $y = 15$ when $x = 6$, find x when $y = -25$.

6. **Standardized Test Practice** Which equation is *not* an example of a direct variation?

A $y = \frac{-7}{3}x + 1$ **B** $y = \frac{5}{16}x$ **C** $y = 14x$ **D** $y = -9x$

Chapter 5

Answers: **1.** $k = \frac{1}{3}$, $m = \frac{1}{3}$ **2.** $k = \frac{-5}{2}$, $m = \frac{-5}{2}$ **3.** $k = 13$, $m = 13$ **4.** $y = -8x$, $x = -3$ **5.** $y = 2.5x$, $x = -10$ **6.** A