Name _____ Class _____ Date _____

3-2 Reteaching

Direct Variation

A **direct variation** is a relationship that can be represented by a function in the form $y = kx$ where $k \neq 0$. The constant of variation for a direct variation k is the coefficient of x. The equation $y = kx$ can also be written as $\frac{y}{x} = 5$.

Problem

Does the equation $6x + 3y = 9$ represent a direct variation? If so, find the constant of variation.

If the equation represents a direct variation, the equation can be rewritten in the form $y = kx$. So, solve the equation for y to determine whether the equation can be written in this form.

$6x + 3y = 9$

$3y = 9 - 6x$ Subtract $6x$ from each side.

$y = 3 - 2x$ Divide each side by 3.

You cannot write the equation in the form $y = kx$. So $6x + 3y = 9$ does not represent a direct variation.

Problem

Does the equation $5y = 3x$ represent a direct variation? If so, find the constant of variation.

Again, if the equation represents a direct variation, the equation can be rewritten in the form $y = kx$. So, solve the equation for y to determine whether the equation can be written in this form.

$5y = 3x$

$y = \frac{3}{5}x$ Divide each side by 5.

The equation has the form $y = kx$, so the equation represents a direct variation. The coefficient of x is $\frac{3}{5}$, so the constant of variation is $\frac{3}{5}$.

Exercises

Determine whether each equation represents a direct variation. If it does, find the constant of variation.

1. $2y = x$

2. $3x + 2y = 1$

3. $-4y = 8x$

4. $2x = y - 5$

5. $4x - 3y = 0$

6. $5x = 2y$

Name _____ Class _____ Date _____

3-2 Reteaching (continued)

Direct Variation

To write an equation for direct variation, find the constant of variation k using an ordered pair. Then use the value of k to write an equation.

Problem

Suppose y varies directly with x, and $y = 24$ when $x = 8$. What direct variation equation relates x and y? What is the value of y when $x = 10$?

You are given that x and y vary directly. This means that the relationship between x and y can be written in the form $y = kx$, where k is a constant.

$y = kx$	Start with the direct variation equation.
$24 = k(8)$	Substitute the given values: 8 for x and 24 for y.
$3 = k$	Divide each side by 8 to solve for k.
$y = 3x$	Write the direct variation equation that relates x and y by substituting 3 for k in $y = kx$.

The equation $y = 3x$ relates x and y. When $x = 10$, $y = 3(10)$ or 30.

Exercises

Suppose y varies directly with x. Write a direct variation equation that relates x and y. Then find the value of y when $x = 6$.

7. $y = 14$ when $x = 2$.

8. $y = 3$ when $x = 9$.

9. $y = 12$ when $x = -24$.

10. $y = -81$ when $x = 9$.

11. $y = -16$ when $x = -4$.

12. $y = 5$ when $x = 20$.

13. Consider the direct variation $y = 3x$.

a. List three ordered pairs that satisfy the equation.

b. Plot your three ordered pairs from part (a) on a coordinate grid.

c. Complete the graph of $y = 3x$ on the grid.