

## 4-8

NAME \_\_\_\_\_ DATE \_\_\_\_\_

## Direct and Inverse Variation (Pages 239–244)

<b>Direct Variation</b>	A <b>direct variation</b> is described by an equation of the form $y = kx$ , where $k \neq 0$ . In this equation, $k$ is called the constant of variation. In a direct variation, as $x$ increases in value, $y$ increases in value. Direct proportion: $\frac{x_1}{x_2} = \frac{y_1}{y_2}$
<b>Inverse Variation</b>	An <b>inverse variation</b> is described by an equation of the form $xy = k$ , where $k \neq 0$ . In an inverse variation, as $x$ increases in value, $y$ decreases in value. Inverse proportion: $\frac{x_1}{x_2} = \frac{y_2}{y_1}$

## EXAMPLES

- A** Does  $c = \frac{18}{d}$  represent an inverse or a direct variation? What is the constant of variation in this equation?  
*As  $d$  increases, the value of  $c$  will decrease, therefore the equation represents an inverse variation. The constant of variation is 18.*

- B** If  $y = 4$  when  $x = 6$ , and  $y$  varies directly as  $x$ , find  $y$  when  $x = 9$ .  
 $\frac{x_1}{x_2} = \frac{y_1}{y_2}$     *direct proportion*  
 $\frac{6}{9} = \frac{4}{y_2}$      $x_1 = 6, y_1 = 4, \text{ and } x_2 = 9$   
 $6y_2 = 36$     *Find the cross products.*  
 $y_2 = 6$     *Divide each side by 6.*

## PRACTICE

**Determine which equations represent inverse variations and which represent direct variations. Then find the constant of variation.**

1.  $a = \frac{8}{b}$                       2.  $9 = \frac{y}{x}$                       3.  $x = \frac{1}{7y}$                       4.  $d = 65t$

**Solve. Assume that  $y$  varies directly as  $x$ .**

5. If  $y = 8$  when  $x = 5$ ,  
find  $x$  when  $y = 64$ .  
7. If  $y = -15$  when  $x = 27$ ,  
find  $y$  when  $x = 9$ .  
6. If  $y = -14$  when  $x = 84$ ,  
find  $x$  when  $y = -2$ .  
8. If  $y = 3$  when  $x = 4$ ,  
find  $y$  when  $x = -52$ .

**Solve. Assume  $y$  varies inversely as  $x$ .**

9. If  $y = 3$  when  $x = 14$ ,  
find  $x$  when  $y = 7$ .  
11. If  $y = 9$  when  $x = 6$ ,  
find  $y$  when  $x = 2$ .  
10. If  $y = -8$  when  $x = 5$ ,  
find  $x$  when  $y = -10$ .  
12. If  $y = 21$  when  $x = -4$ ,  
find  $y$  when  $x = 28$ .



- 13. Standardized Test Practice** The amount an employee earns varies directly as the number of hours she works. If she gets paid \$58.80 for 8 hours of work, how much will she get paid for 15 hours of work?

- A** \$110.25                      **B** \$112.50                      **C** \$117.60                      **D** \$120.00

Answers: 1. inverse; 2. direct; 3. inverse; 4. direct; 5. 40; 6. 12; 7. -5; 8. -39; 9. 6; 10. 4; 11. 27; 12. -3; 13. A