

## THINK AND DISCUSS

1. Explain why the graph of a direct variation is a line.
2. Describe the type of variation between the length and the width of a rectangular room with an area of  $400 \text{ ft}^2$ .
3. **GET ORGANIZED** Copy and complete the graphic organizer. In each box, write the general variation equation, draw a graph, or give an example.



Type of Variation	Equation	Graph	Example
Direct			
Joint			
Inverse			

## 6-1

## Exercises



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Homework Help

## GUIDED PRACTICE

1. **Vocabulary** A variation function in which  $k$  is positive and one quantity decreases when the other increases is a(n)     ? (*direct variation* or *indirect variation*)

**SEE EXAMPLE 1** Given:  $y$  varies directly as  $x$ . Write and graph each direct variation function.

2.  $y = 6$  when  $x = 3$
3.  $y = 45$  when  $x = -5$
4.  $y = 54$  when  $x = 4.5$

**SEE EXAMPLE 2** 5. **Physics** The wavelength  $\lambda$  of a wave of a certain frequency varies directly as the velocity  $v$  of the wave, and  $\lambda = 60 \text{ ft}$  when  $v = 15 \text{ ft/s}$ . Find  $\lambda$  when  $v = 3 \text{ ft/s}$ .

6. **Work** The dollar amount  $d$  that Julia earns varies directly as the number of hours  $t$  that she works, and  $d = \$116.25$  when  $t = 15 \text{ h}$ . Find  $t$  when  $d = \$178.25$ .

**SEE EXAMPLE 3** 7. **Geometry** The volume  $V$  of a rectangular prism of a particular height varies jointly as the length  $\ell$  and the width  $w$ , and  $V = 224 \text{ ft}^3$  when  $\ell = 8 \text{ ft}$  and  $w = 4 \text{ ft}$ . Find  $\ell$  when  $V = 210 \text{ ft}^3$  and  $w = 5 \text{ ft}$ .

8. **Economics** The total cost  $C$  of electricity for a particular light bulb varies jointly as the time  $t$  that the light bulb is used and the cost  $k$  per kilowatt-hour, and  $C = 12\text{¢}$  when  $t = 50 \text{ h}$  and  $k = 6\text{¢}$  per kilowatt-hour. Find  $C$  to the nearest cent when  $t = 30 \text{ h}$  and  $k = 8\text{¢}$  per kilowatt-hour.

**SEE EXAMPLE 4** Given:  $y$  varies inversely as  $x$ . Write and graph each inverse variation function.

9.  $y = 2$  when  $x = 7$
10.  $y = 8$  when  $x = 4$
11.  $y = \frac{1}{2}$  when  $x = -10$

**SEE EXAMPLE 5** 12. **Travel** The time  $t$  that it takes for a salesman to drive a certain distance  $d$  varies inversely as the average speed  $r$ . It takes the salesman  $4.75 \text{ h}$  to travel between two cities at  $60 \text{ mi/h}$ . How long would the drive take at  $50 \text{ mi/h}$ ?

**SEE EXAMPLE 6** Determine whether each data set represents a direct variation, an inverse variation, or neither.

13. 

$x$	2	5	9
$y$	3	6	4

14. 

$x$	6	4	1
$y$	2	3	12

15. 

$x$	24	4	12
$y$	30	5	15