

Practice by Example

Example 1
(page 262)

Is each equation a direct variation? If it is, find the constant of variation.

1. $2y = 5x + 1$

2. $8x + 9y = 10$

3. $-12x = 6y$

4. $y + 8 = -x$

5. $5x - 6y = 0$

6. $-4 + 7x + 4 = 3y$

7. $-x = 10y$

8. $0.7x - 1.4y = 0$

9. $\frac{1}{2}x + \frac{1}{3}y = 0$

Example 2
(page 262)

Write an equation of the direct variation that includes the given point.

10. $(1, 5)$

11. $(5, 1)$

12. $(-8, 10)$

13. $(-5, -9)$

14. $(-2, 3)$

15. $(-6, 1)$

16. $(3, -4)$

17. $(6, -8)$

18. $(-6, 8)$

19. $(-5, -10)$

20. $(12, -8)$

21. $(35, 7)$

Example 3
(page 263)

Define the variables. Then write a direct variation to model each relationship.



22. **Geometry** The perimeter of a regular octagon varies directly with the length of one side of the octagon.

23. **Earnings** When you have a job that pays an hourly wage, the amount you earn varies directly with the number of hours you work. Suppose you earn \$7.10/hour working at the library.

Example 4
(page 263)

For the data in each table, tell whether y varies directly with x . If it does, write an equation for the direct variation.

24.

x	y
3	5.4
7	12.6
12	21.6

25.

x	y
-2	1
3	6
8	11

26.

x	y
-6	9
1	-1.5
8	-12

Example 5
(page 264)

27. **Physics** The maximum weight you can lift with a lever varies directly with the amount of force you apply. Suppose you can lift a 50-lb weight by applying 20 lb of force to a certain lever.

- What is the ratio of weight to force for the lever?
- Write a proportion and find the force you need to lift a friend weighing 130 lb.

28. **Bicycling** A bicyclist traveled at a constant speed during a timed practice period. Write a proportion to find the distance the cyclist traveled in 30 min.

A Bicyclist's Practices

Elapsed Time	Distance
10 min	3 mi
25 min	7.5 mi

Write an equation of the direct variation that includes the given point.

29. $(3, \frac{1}{2})$ 30. $(\frac{1}{4}, -5)$ 31. $(-\frac{5}{6}, \frac{6}{5})$ 32. $(1.2, 7.2)$
 33. $(0.5, 4.5)$ 34. $(-2, \frac{1}{16})$ 35. $(5.2, -1.5)$ 36. $(-\frac{8}{3}, -\frac{9}{8})$

37. a. **Writing** How can you tell whether two sets of data vary directly?
 b. How can you tell if a line is the graph of a direct variation?

Critical Thinking Is each statement true or false? Explain.

38. The graph of a direct variation may pass through $(-2, 4)$.
 39. The graph of a direct variation may pass through $(0, 3)$.
 40. If you triple an x -value of a direct variation, the y -value also triples.

Graph the direct variation that includes the given point.
 Write an equation of the line.

41. $(2, 5)$ 42. $(-2, 5)$ 43. $(2, -5)$ 44. $(-2, -5)$

45. **Biology** The amount of blood in a person's body varies directly with body weight. A person who weighs 160 lb has about 5 qt of blood.
 a. Find the constant of variation.
 b. Write an equation relating quarts of blood to weight.
 c. **Open-Ended** Estimate the number of quarts of blood in your body.

B Apply Your Skills



Real-World Connection

You must be at least 17 years old and weigh at least 110 pounds to give blood.

46. **Electricity** Ohm's Law $V = I \times R$ relates the voltage, current, and resistance in a circuit. V is the voltage measured in volts. I is the current measured in amperes. R is the resistance measured in ohms.
- Find the voltage of a circuit that has a current of 24 amperes and resistance of 2 ohms.
 - Find the resistance of a circuit that has a current of 24 amperes and a voltage of 18 volts.

C Challenge

The ordered pairs in each exercise are for the same direct variation. Find each missing value.

47. $(3, 4)$ and $(9, y)$

48. $(-1, 2)$ and $(4, y)$

49. $(-5, 3)$ and $(x, -4)$

50. $(1, y)$ and $(\frac{3}{2}, -9)$

51. $(2, 5)$ and $(x, 12.5)$

52. $(-2, 5)$ and $(x, -5)$

Problem Solving Hint

For Exercise 53, start with the relationship between miles and gallons: $m = 24g$.

53. **Gas Mileage** A car gets 24 miles per gallon. The number of gallons g of gas used varies directly with the number of miles m traveled.
- Suppose the price of gas is \$1.83 per gallon. Write a function relating the cost c for g gallons of gas. Is this a direct variation?
 - Write a direct variation relating the cost of gas to the miles traveled.

