Answers for 2.5

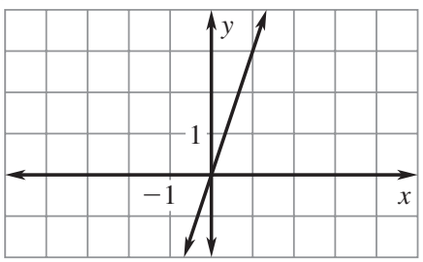
For use with pages 109–111

2.5 Skill Practice

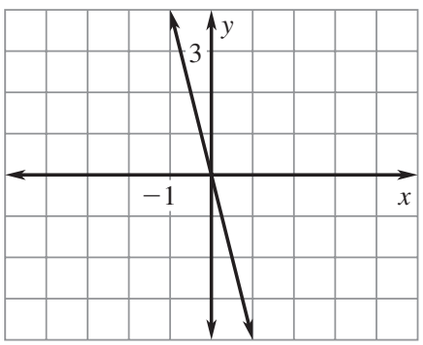
1. *Sample answer:* If $y = ax$, then a is the constant of variation. a is a constant ratio of y to x for all ordered pairs (x, y).

2. Find the ratio of y to x for each ordered pair. If the ratios are approximately equal, then it is a direct variation.

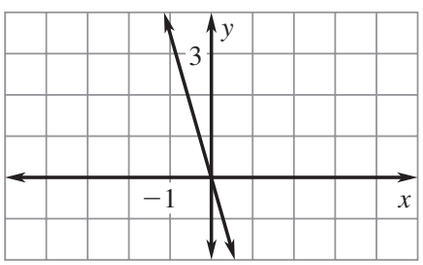
3. $y = 3x$



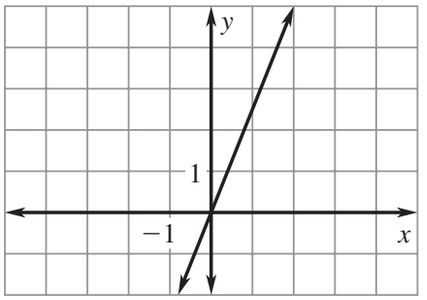
4. $y = -4x$



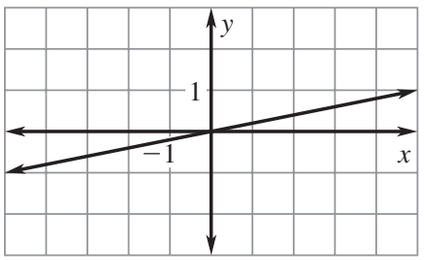
5. $y = -3.5x$



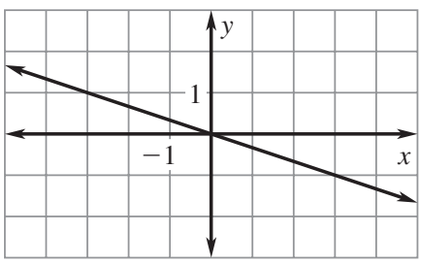
6. $y = 2.5x$



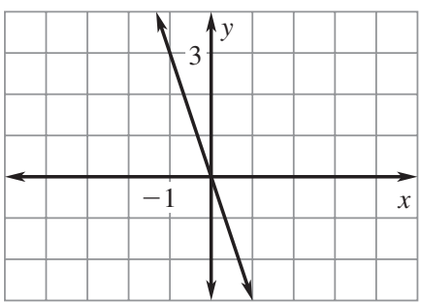
7. $y = 0.2x$



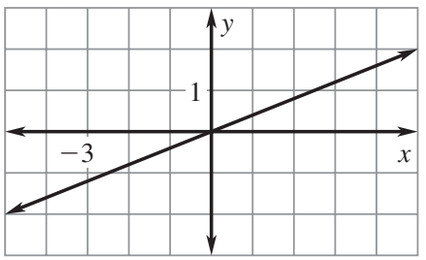
8. $y = -\frac{1}{3}x$



9. $y = -3x$



10. $y = 0.4x$



11. $y = 2x$; 24 **12.** $y = \frac{5}{3}x$; 20

13. $y = -0.2x$; -2.4

14. $y = -\frac{2}{9}x$; $-2\frac{2}{3}$

15. $y = \frac{1}{3}x$; 4

16. $y = -15x$; -180

17. C

18. direct variation; -8

19. not direct variation

20. not direct variation

21. direct variation; 2.5

22. direct variation; $-\frac{4}{5}$

23. direct variation; $\frac{1}{6}$

24. $y = -3x$; $\frac{4}{3}$

25. $y = -\frac{4}{3}x$; 3

26. $y = \frac{1}{9}x$; -36

27. $y = -7x$; $\frac{4}{7}$

28. $y = \frac{9}{32}x$; $-14\frac{2}{9}$

29. $y = -7.2x$; $\frac{5}{9}$

30. *Sample answer:* If you earn an hourly wage, the amount of money you earn varies directly with the number of hours you work. If your work 4 hours and make \$28, the equation relating the number of hours h worked and the amount of money m you earn is $m = 7h$. If you are traveling at a constant speed, the distance d you travel varies directly with the time t you travel. If you drive for 4 hours and travel 248 kilometers, the direct variation equation is $d = 62h$.

31. direct variation; $y = -\frac{1}{3}x$

32. not direct variation

33. direct variation; $y = -4x$

34. direct variation; $y = -x$

35. The quotients need to be compared to each other, not the products; $\frac{24}{1} = 24$, $\frac{12}{2} = 6$, $\frac{8}{3} \approx 2.7$, $\frac{6}{4} = 1.5$, because the ratios are not equal, the data do not show direct variation.

36. $y = \frac{y_1}{x_1}x$; $y = -\frac{x_1}{y_1}x$

37. *Sample answer:* Since the points are a direct variation, $\frac{y_1}{x_1} = \frac{y_2}{x_2}$. An equivalent proportion to this is $\frac{x_2}{x_1} = \frac{y_2}{y_1}$.

2.5 Problem Solving

38. $t = \frac{1}{60}d$; $1\frac{2}{3}$ min

39. $w = 3600d$; 6300 lb

40. D

41. direct variation; $t = 5.1s$

42. 4, 8, 12, 16; 1, 4, 9, 16

43. a. direct variation; $P = 4s$

b. Not a direct variation; the ratios of A to s are not equal.

c. Not a direct variation; the ratios of A to P are not equal.

44. a. $d_1 = 75t$

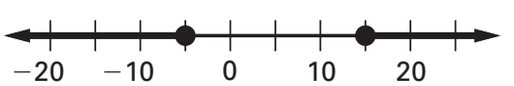
b. $d_2 = 6000 - 75t$

c. *Sample answer:* Part (a) represents direct variation because the graph goes through the origin. Part (b) does not represent direct variation because the graph does not go through the origin.

45. *Sample answer:* Let p be the price of a necklace, ℓ be the length, w be the weight, and a and b be constants of variation. $p = a\ell$ and $w = b\ell$, solve for ℓ in terms of w, $\ell = \frac{w}{b}$, and substitute into the other equation for ℓ, $p = a\left(\frac{w}{b}\right) = \frac{a}{b}w$. Since a and b are constants of variation, $\frac{a}{b}$ is also a constant of variation relating p, the price, to w, the weight.

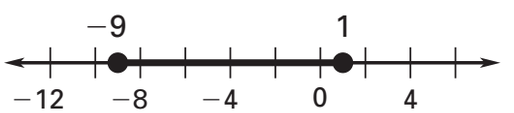
2.5 Mixed Review

46. $x \le -5$ or $x \ge 15$

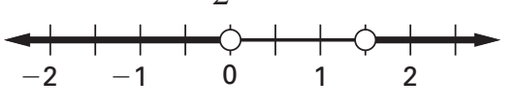


47. $-1\frac{2}{3} < x < 7$

48. $-9 \le x \le 1$



49. $x < 0$ or $x > 1\frac{1}{2}$

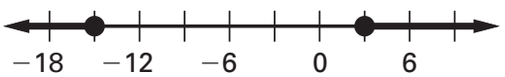


Answers for 2.5 *continued*

For use with pages 109–111

50. $-2 < x < 10$

51. $x \leq -15$ or $x \geq 3$

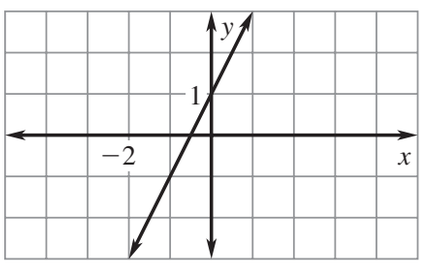


52. -3 **53.** $-\frac{3}{2}$ **54.** 3

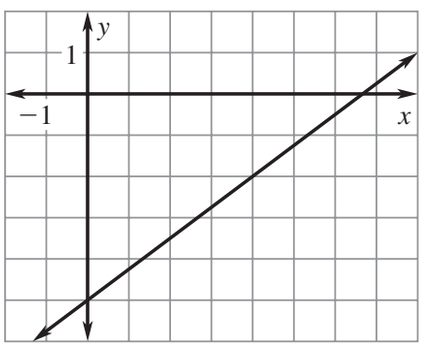
55. undefined

56. $-\frac{9}{5}$ **57.** $\frac{4}{3}$

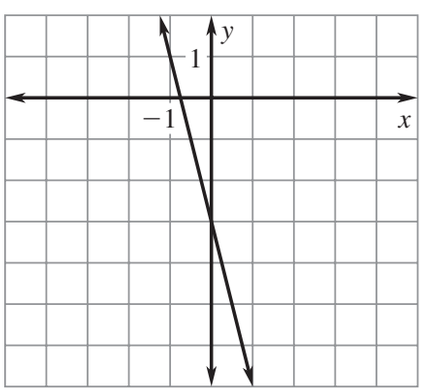
58.



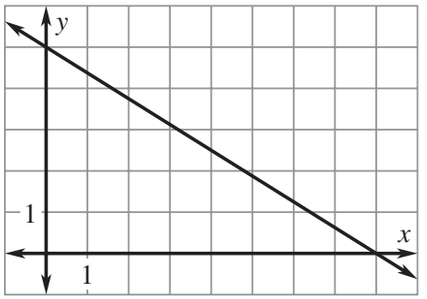
59.



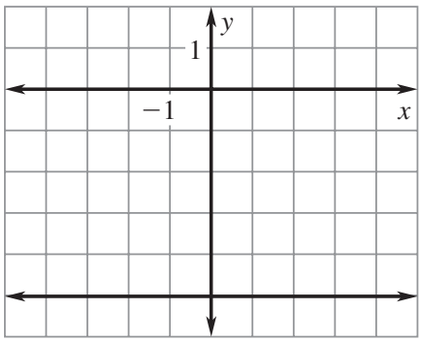
60.



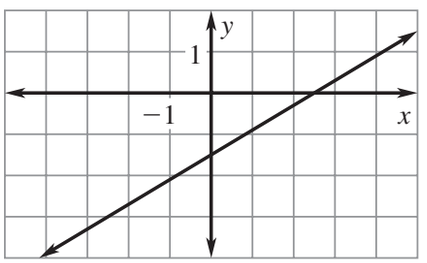
61.



62.



63.



64. $c = \frac{1}{10}k + 6$

Answers for 2.6

For use with pages 117–120

2.6 Skill Practice

1. best-fitting line

2. *Sample answer:* If the data points show a positive correlation, the points lie close to a line with positive slope. If the data points show a negative correlation, the points lie close to a line with negative slope. If the data points have approximately no correlation, the points do not lie close to any line.

3. negative correlation

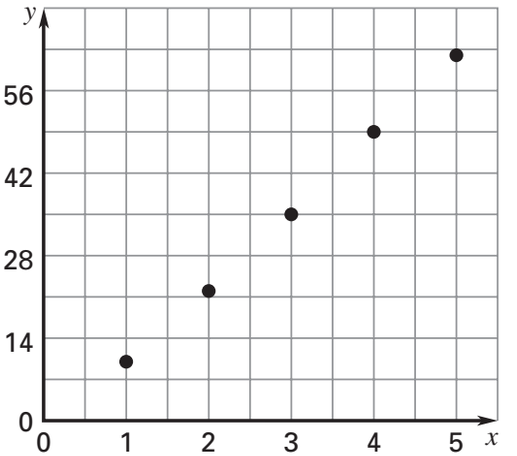
4. positive correlation

5. approximately no correlation

6. *Sample answer:* If the y values increase as the x values increase, then there is a positive correlation. If the y values decrease as the x values increase, there is a negative correlation. If the y values are randomly increasing and decreasing, then there is approximately no correlation.

7. 0 **8.** 0.5 **9.** -1

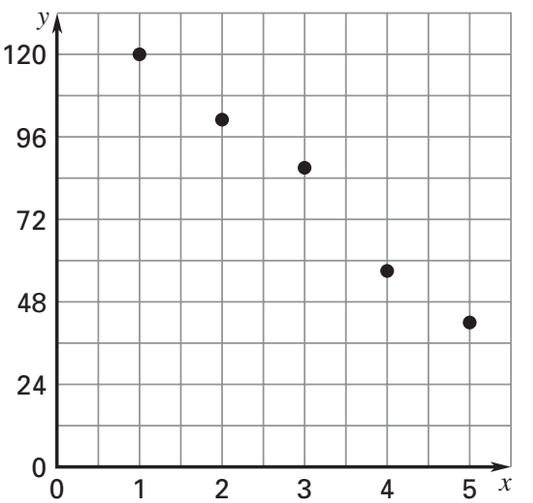
10. a.



b. *Sample answer:* $y = 13x - 4$

c. about 256

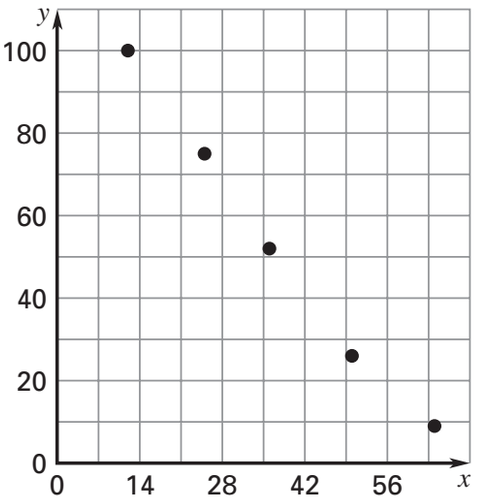
11. a.



b. *Sample answer:* $y = -20x + 141$

c. about -259

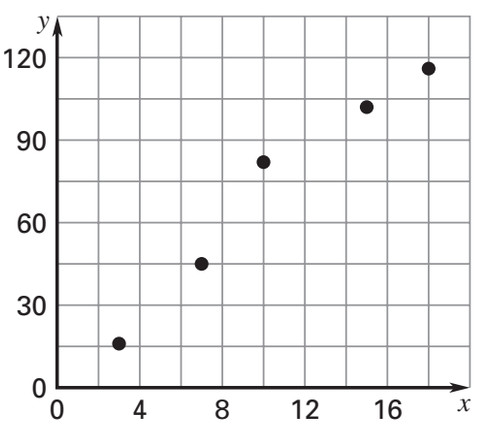
12. a.



b. *Sample answer:*
$y = -1.8x + 119$

c. about 83

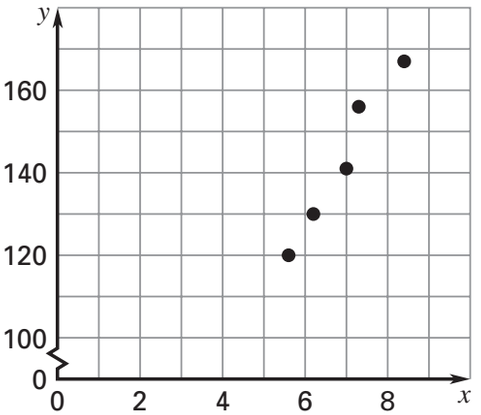
13. a.



b. *Sample answer:* $y = 6.7x + 1$

c. about 135

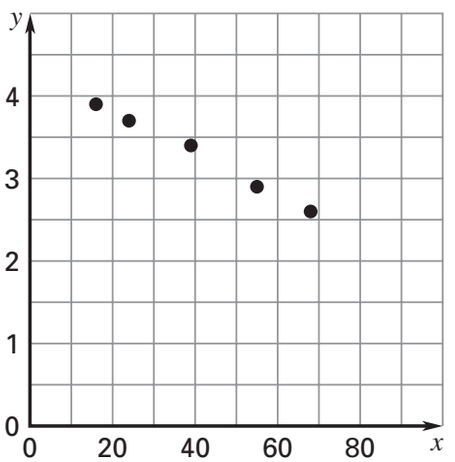
14. a.



b. *Sample answer:*
$y = 17.4x + 22.8$

c. about 371

15. a.

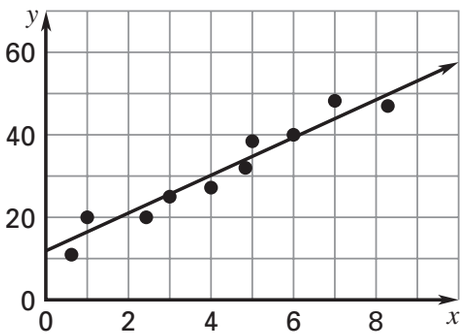


b. *Sample answer:*
$y = -0.025x + 4.35$

c. about 3.82

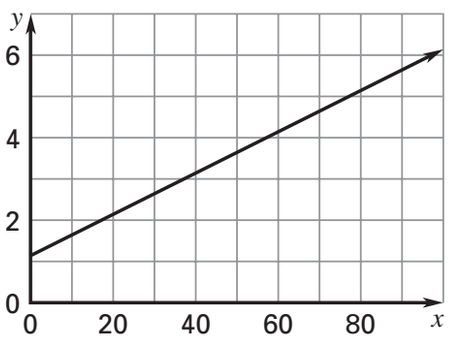
16. B

17. The line should go through the middle of the data points. *Sample:*

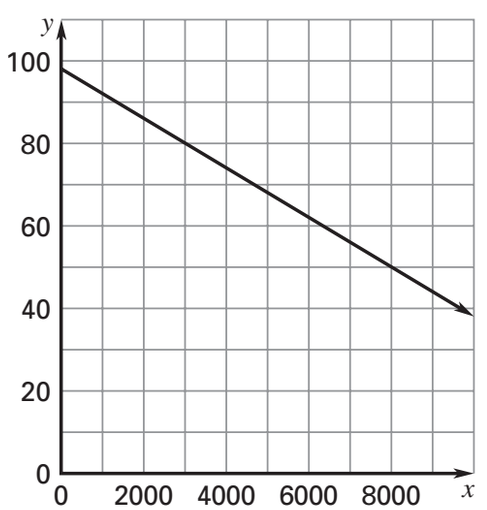


18. A

19. $y = 0.05x + 1.14$



20. $y = -0.006x + 98.1$



21. a. *Sample answer:* measuring the depth of water at different times while filling a swimming pool; the number of gallons of milk you buy and the total cost

b. *Sample answer:* the age of a car and its current value; the number of miles you have driven since you last put gas in the tank and the amount of gas left in the tank.

c. *Sample answer:* the height of a person and the month they were born; the age of a person and the number of vehicles they own

22. No; the correlation is close to zero, so it represents a very weak relationship between the two variables.

23. Negative correlation. *Sample answer:* If x and y have a positive correlation, then they are both increasing. If y and z have a negative correlation, then z must be decreasing. So, if x is increasing and z is decreasing, then x and z have a negative correlation.

2.6 Problem Solving

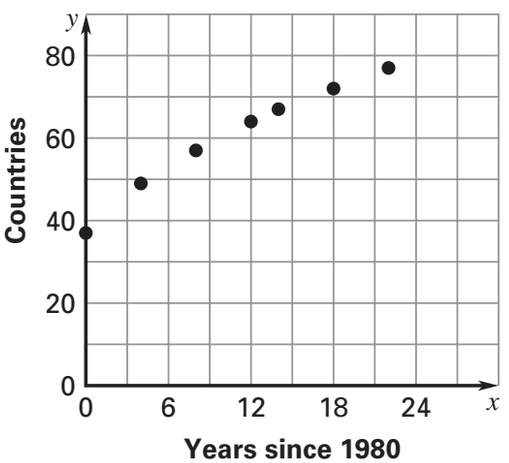
24. *Sample answer:*
$y = 0.389x + 19.8$

25. *Sample answer:*
$y = 101.3x + 2236.6$

26. *Sample answer:*
$y = -0.001861x + 212.2$;
about 186°F

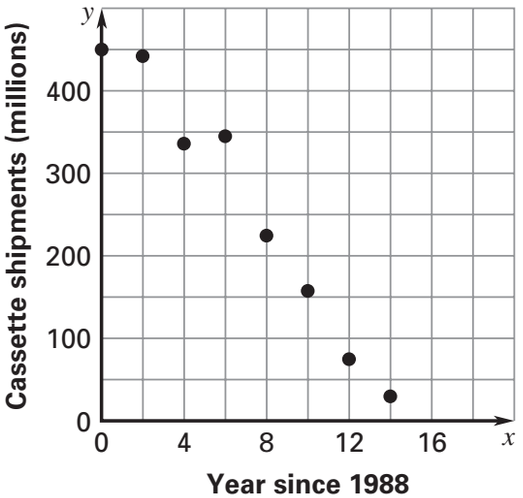
27. a. (0, 37), (4, 49), (8, 57), (12, 64), (14, 67), (18, 72), (22, 77)

b.



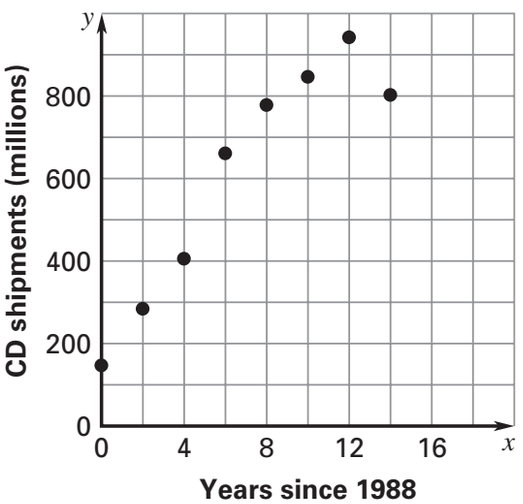
c. *Sample answer:*
$y = 1.8x + 40.7$;
102 countries

28. a.



negative correlation

b.



positive correlation

c. Negative correlation.
Sample answer: More people began buying CDs rather than cassettes.

29. a. *Sample answer:* The greater the availability of personal computers, the greater the availability of all technology including health care technology. Also, the more accessible the technology becomes, the more affordable it becomes. So the positive correlation is a sign of a country's ability to provide good affordable health care and prolong its citizens' life expectancy.

b. No. *Sample answer:* Correlation does not show cause-effect relationships.

2.6 Mixed Review

30. $y = 2x - 10$; 6

31. $y = -\frac{1}{6}x - \frac{5}{6}$; -1

32. $y = \frac{1}{4}x - \frac{3}{4}$; $-1\frac{1}{2}$

33. $y = \frac{3}{4}x - \frac{5}{4}$; $-2\frac{3}{4}$

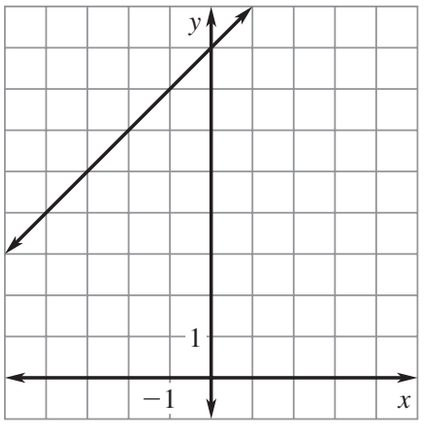
34. $y = 0.5x - 4$; -2

35. $y = \frac{4x + 9}{x}$; $5\frac{1}{2}$

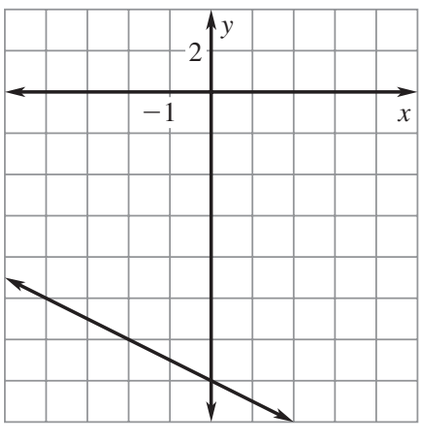
36. -2 **37.** 9 **38.** 12

39. 0 **40.** 10 **41.** 1

42.



43.



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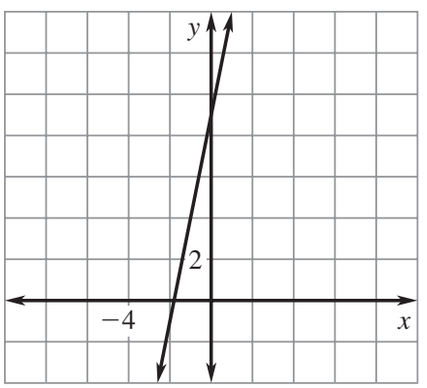

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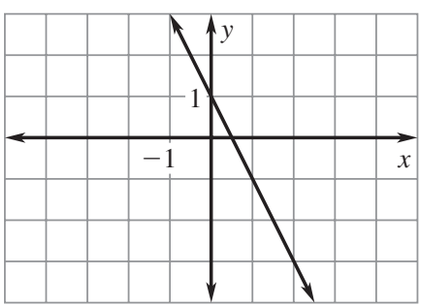
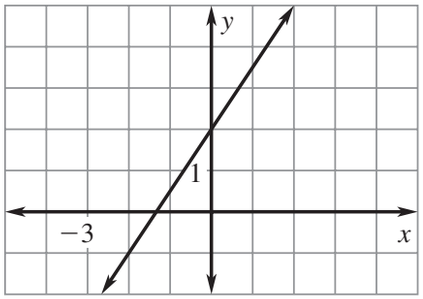


Answers for 2.6 *continued*

For use with pages 117–120

46.



47.