Answers for Lesson 5-2, pp. 259–261 Exercises

1. no
2. no
3. yes
4. no
5. yes
6. no
7. no
8. yes

9.

x	$x + 7$	$f(x)$
1	$1 + 7$	8
2	$2 + 7$	9
3	$3 + 7$	10
4	$4 + 7$	11

10.

x	$11x - 1$	y
1	$11(1) - 1$	10
2	$11(2) - 1$	21
3	$11(3) - 1$	32
4	$11(4) - 1$	43

11.

x	x^2	$f(x)$
1	1^2	1
2	2^2	4
3	3^2	9
4	4^2	16

12.

x	$-4x$	$f(x)$
1	$-4(1)$	-4
2	$-4(2)$	-8
3	$-4(3)$	-12
4	$-4(4)$	-16

13.

x	$15 - x$	$f(x)$
1	$15 - 1$	14
2	$15 - 2$	13
3	$15 - 3$	12
4	$15 - 4$	11

14.

x	$3x + 2$	y
1	$3(1) + 2$	5
2	$3(2) + 2$	8
3	$3(3) + 2$	11
4	$3(4) + 2$	14

15.

x	$\frac{1}{4}x$	y
1	$\frac{1}{4}(1)$	$\frac{1}{4}$
2	$\frac{1}{4}(2)$	$\frac{1}{2}$
3	$\frac{1}{4}(3)$	$\frac{3}{4}$
4	$\frac{1}{4}(4)$	1

16.

x	$-x + 2$	$f(x)$
1	$-1 + 2$	1
2	$-2 + 2$	0
3	$-3 + 2$	-1
4	$-4 + 2$	-2

17. $\{0.5, 53\}$
18. $\{-8, -2, 18\}$
19. $\{-27, -7, -2, 8, 48\}$
20. $\{-4\frac{1}{2}, -\frac{3}{4}, 0\}$
21. no
22. no

23. yes; $\{-4, -1, 0, 3\}$; $\{-4\}$

24. Answers may vary. Sample: A relation is not a function if two range values have the same domain value.

25. No; two 4-year-old iguanas may have different lengths.

26. Answers may vary. Sample:

x	y
14	60
13	58
16	60
14	63

Data represent the ages (x) and heights (y) of 4 students.

27. $\{-3, 3, 15.8\}$

28. $\{-13.8, -1, 5\}$

29. $\{-0.5, 0, 2.7\}$

30. $\{-0.75, 0, 12.69\}$

31. **a.** $\{-300, -210, 0, 72\}$

b. Domain is the number of cameras sold, and range is the profit.

32. yes

33. no

34. no

35. yes

36. **a.** 3,720,000 mi

b. 11,160,000 mi

37. yes

38. no

39. no

40. yes

41. a. Answers may vary. Sample: The cost appears to be far too little.

b. Answers may vary. Sample: The student failed to convert hours to minutes.

c. $10.80

d. whole numbers; positive numbers

42. a.

g	$180-25g$	d
2	$180-25(2)$	130
4	$180-25(4)$	80
6	$180-25(6)$	30
8	$180-25(8)$	-20

b. about 7 gallons

c. Domain: More than 0 gallons up to 15 gallons; Since the car would be stuck if there was no gas in it.
Range: 0 to 180 miles; Since you are 180 miles away and start heading home, 180 is the upper limit. Your distance will be 0 when you arrive at home.

43. 23

44. 18

45. 6

46. 20

47. Yes, it passes the vertical line test; no, it doesn't pass the vertical line test.

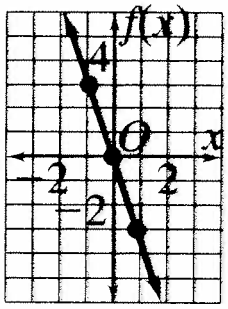
48. a. $0, -1, -2, -6$

b. all integers

1–9. Tables may vary. Samples are given.

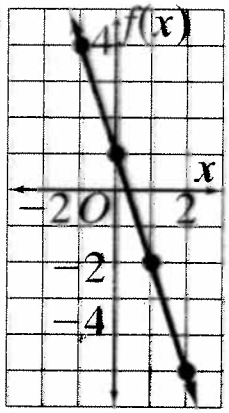
1.

x	$f(x)$
−1	3
0	0
1	−3



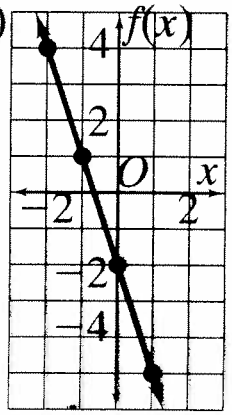
2.

x	$f(x)$
−1	4
0	1
1	−2
2	−5



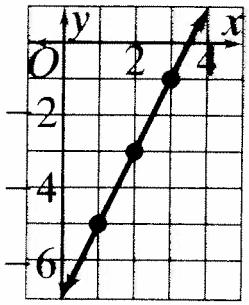
3.

x	$f(x)$
−2	4
−1	1
0	−2
1	−5



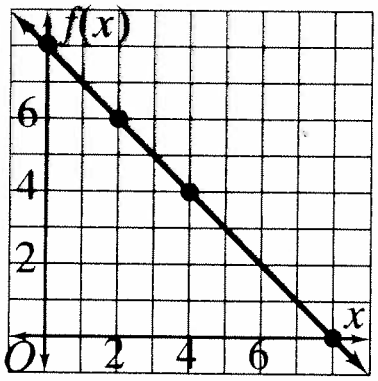
4.

x	y
1	−5
2	−3
3	−1



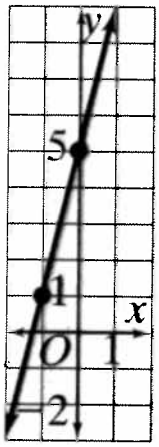
5.

x	$f(x)$
0	8
2	6
4	4
8	0



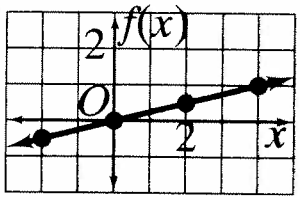
6.

x	y
−1	1
0	5
1	9



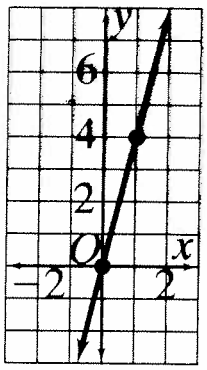
7.

x	$f(x)$
−2	$-\frac{1}{2}$
0	0
2	$\frac{1}{2}$
4	1



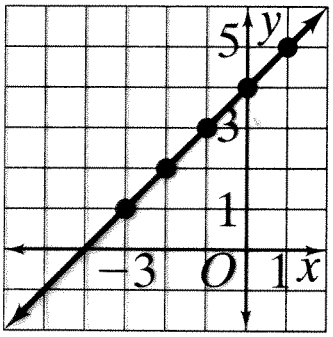
8.

x	y
−1	−4
0	0
1	4



9.

x	y
−3	1
−2	2
−1	3
0	4
1	5



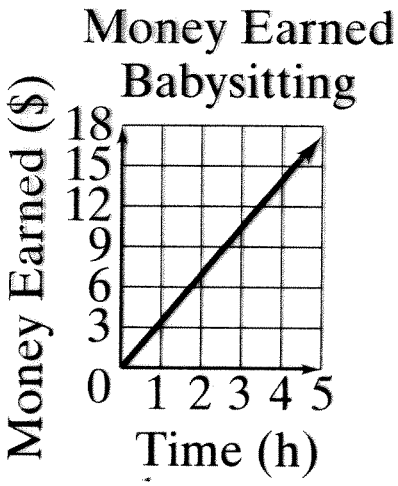
10. a. $M = 3.5\,h$

b–d. Answers may vary. Samples are given.

b.

h	M
0	\$0.00
$\frac{1}{2}$	\$1.75
1	\$3.50
2	\$7.00
3	\$10.50

c.

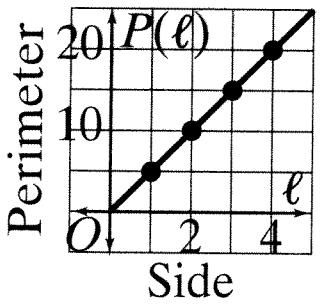


d. about 8.5 h

11. a.

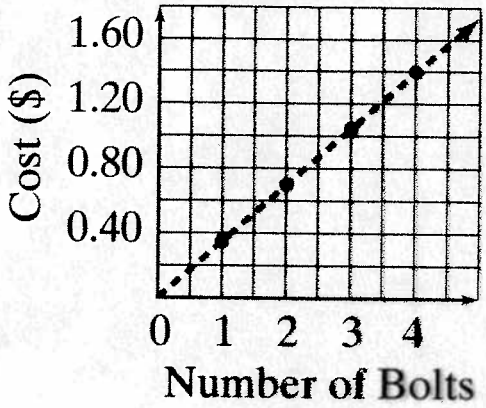
ℓ	$P(\ell)$
1	5
2	10
3	15
4	20

b.



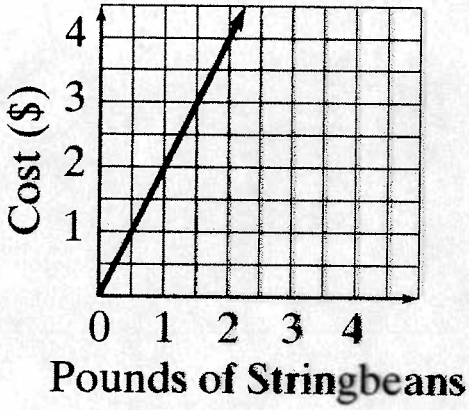
12. discrete;

p	$0.35p$	$C(p)$
1	0.35(1)	0.35
2	0.35(2)	0.70
3	0.35(3)	1.05
4	0.35(4)	1.40



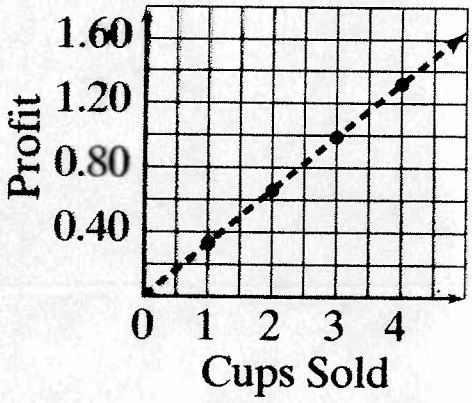
13. continuous;

n	$2n$	$A(n)$
1	2(1)	2
2	2(2)	4
3	2(3)	6
4	2(4)	8

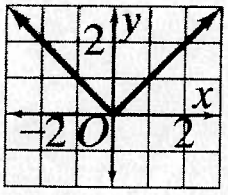


14. discrete;

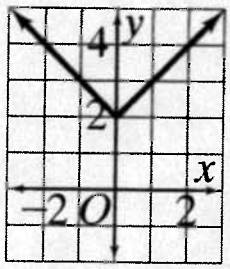
c	$0.75c - 0.42cn$	$P(c)$
1	0.75 − 0.42(1)	0.33
2	0.75 − 0.42(2)	0.66
3	0.75 − 0.42(3)	0.99
4	0.75 − 0.42(4)	1.32



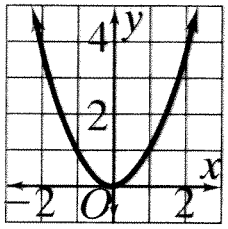
15.



16.



17.



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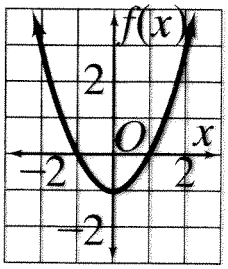
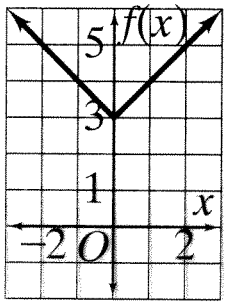
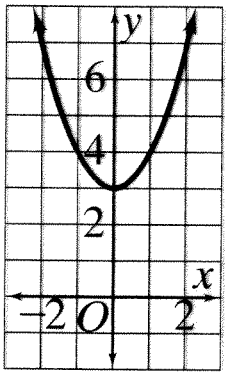


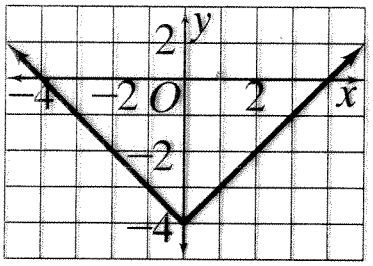
19.



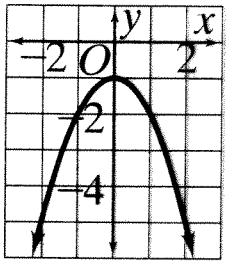
20.



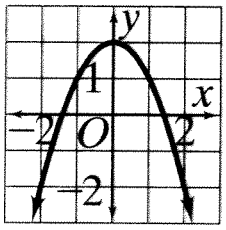
21.



22.

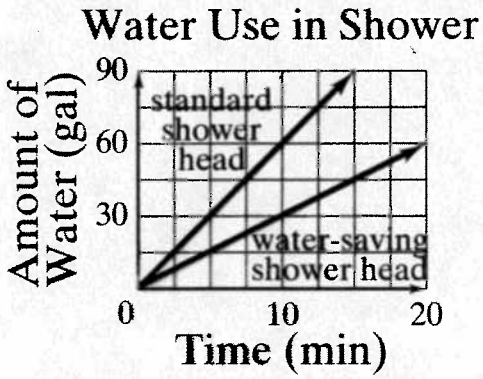


23.



24. a. 55.2 gal

b.



c. Check students' work.

d. Check students' work.

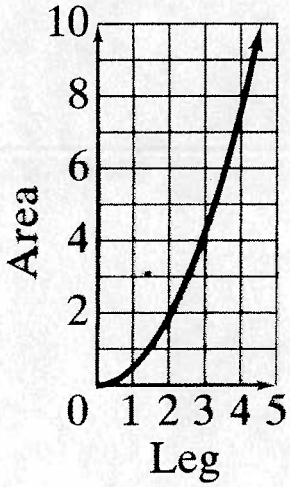
25. Check students' work.

26. a.

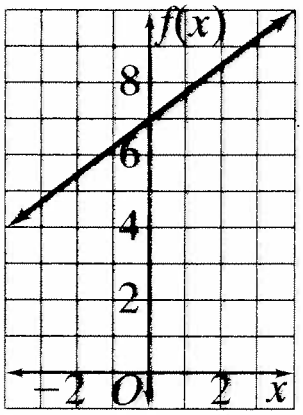
ℓ	$A(\ell)$
1	0.5
2	2
3	4.5
4	8

b. continuous; length is a continuous measure

c.



27.



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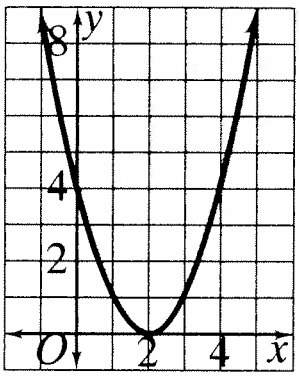
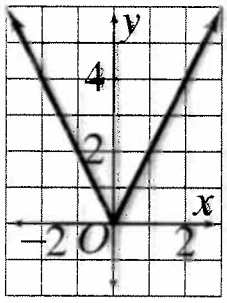
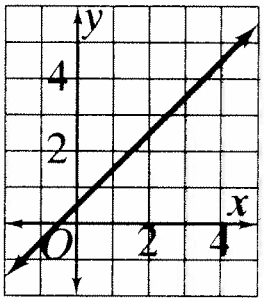


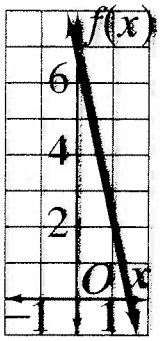
29.



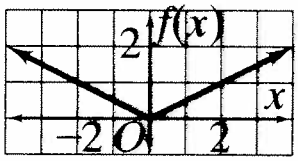
30.



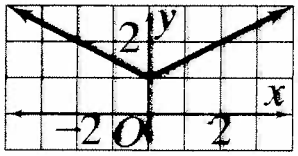
31.



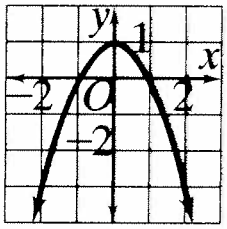
32.



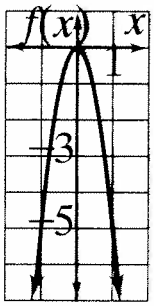
33.



34.

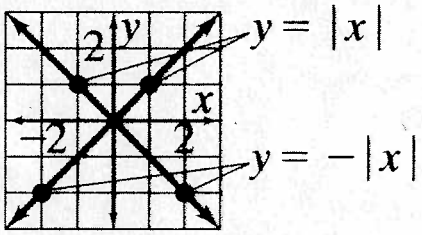


35.



36. D

37. a.



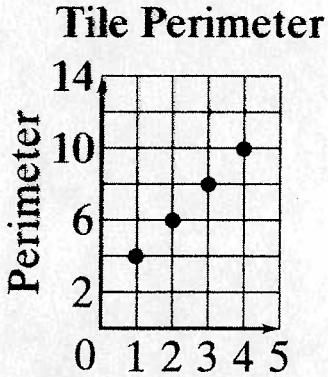
b. x-axis

c. $y = -|x| - 1$

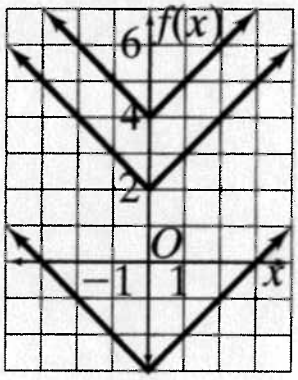
38 a.

Tiles	Perimeter
1	4
2	6
3	8
4	10

b. $P(t) = 2t + 2$,

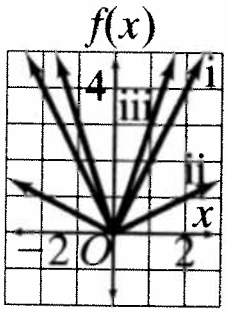


39. a.



b. It changes the y-intercept.

40. a.



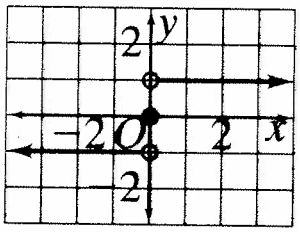
b. It makes the graph wider or narrower.

41. a. 1, 1, −1, −1

b. {−1, 0, 1}

c. Tables may vary. Sample:

x	y
−4	−1
−2	−1
0	0
2	1
4	1



d. No; $s(3 + 5) = s(8) = 1$ and $s(3) + s(5) = 1 + 1 = 2$; $1 \neq 2$.

Answers for Lesson 5-4, pp. 272–274 Exercises

1. B
2. A
3. C
4. $f(x) = 3x$
5. $f(x) = x - 0.5$
6. $f(x) = 0.5x$
7. $f(x) = -3x$
8. $y = 4x$
9. $y = x^2$
10. $t(c) = 0.79c$
11. $d(n) = 45n$
12. $f(h) = \frac{1}{12}h$
13. $e(n) = 6.37n$
14. $A(n) = n^2$
15. $V(n) = n^3$
16. $A(r) = \pi r^2$
17. a. $f(x) = 0.19x$
    b. \$1.52
18. a. $f(x) = 0.34 + 0.21(x - 1)$
    b. \$.97
19. $f(x) = 1000x$
20. $f(x) = 2.54x$
21. a. $C(a) = 10a + 1$
    b. \$31
    c. 61; the total cost of 12 books
    d. discrete; You cannot buy parts of a book.
22. a. $C(b) = 6b$
    b. 72; the total cost of 12 books
    c. about \$5.08
    d. Club; \$61 is less than \$72.
23. Answers may vary. Sample: The input values you need may not be in the table.
24. a. gal of water, number of loads
    b. $w(n) = 34n$
    c. 238 gal
    d. 13 loads

25. Answers may vary. Sample: $f(x) = 60x$; $f(3) = 180$, 180 mi in 3 h, the distance you can travel at a constant speed of 60 mi/h

26. C

27.

x	y
−1	3
0	2
1	1
2	0
3	−1

$y = -x + 2$

28.

x	y
−2	−3
−1	$-\frac{3}{2}$
0	0
2	3

$y = \frac{3}{2}x$

29.

x	y
−4	−1
−2	1
0	3

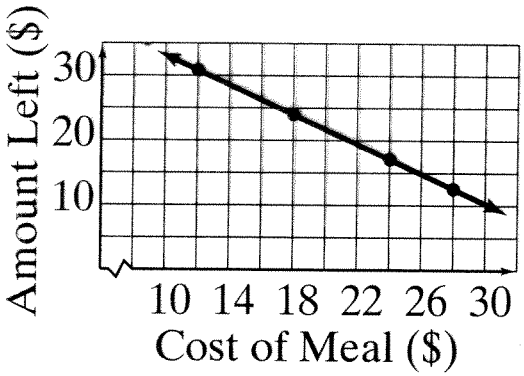
$y = x + 3$

30. a.

c	Process	$A(c)$
\$12	45 − [12 + 0.15(12)]	\$31.20
\$18	45 − [18 + 0.15(18)]	\$24.30
\$24	45 − [24 + 0.15(24)]	\$17.40
\$28	45 − [28 + 0.15(28)]	\$12.80

b. $A(c) = 45 - (c + 0.15c)$

c.



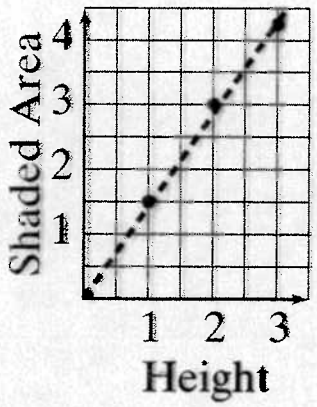
31. a.

h	Process	$A(h)$
1	$1 \cdot 3 \cdot \frac{1}{2}$	$\frac{3}{2} = 1\frac{1}{2}$
2	$2 \cdot 3 \cdot \frac{1}{2}$	3
3	$3 \cdot 3 \cdot \frac{1}{2}$	$\frac{9}{2} = 4\frac{1}{2}$

b. $A(h) = \frac{3}{2}h$

c. continuous; height may be any measure.

d.



32. $f(x) = x^3$ **33.** $f(x) = -x^3$ **34.** $f(x) = -x^3 - 1$

35. a. $c(m) = 44 + 0.38m$

b. \$70.60, \$89.60

c. 38 mi

d. \$202

36. a. $B(v) = 6.93v$

b. $B(w) = \frac{7}{10}w$

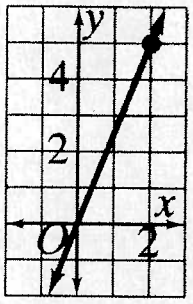
Answers for Lesson 5-5, pp. 280–282 Exercises

1. no
2. no
3. yes; -2
4. no
5. yes; $\frac{5}{6}$
6. yes; $\frac{7}{3}$
7. yes; $-\frac{1}{10}$
8. yes; 0.5
9. yes; $-\frac{3}{2}$
10. $y = 5x$
11. $y = \frac{1}{5}x$
12. $y = -\frac{5}{4}x$
13. $y = \frac{9}{5}x$
14. $y = -\frac{3}{2}x$
15. $y = -\frac{1}{6}x$
16. $y = -\frac{4}{3}x$
17. $y = -\frac{4}{3}x$
18. $y = -\frac{4}{3}x$
19. $y = 2x$
20. $y = -\frac{2}{3}x$
21. $y = \frac{1}{5}x$

22–23. Choices of variables may vary.

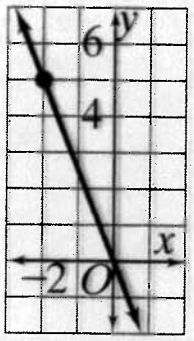
22. $P(\ell) = 8\ell$
23. $E(h) = 7.10h$
24. yes; $y = 1.8x$
25. no
26. yes; $y = -1.5x$
27. **a.** $\frac{20}{50}$ or 0.4
    b. $f = 0.4w$, 52 lb
28. $d = 0.3t$, 9 mi
29. $y = \frac{1}{6}x$
30. $y = -20x$
31. $y = -\frac{36}{25}x$
32. $y = 6x$
33. $y = 9x$
34. $y = -\frac{1}{32}x$
35. $y = -\frac{15}{52}x$
36. $y = \frac{27}{64}x$
37. **a.** The ratio $\frac{y}{x}$ is the same for each pair of values.
    b. A line through the origin that is neither vertical nor horizontal is the graph of a direct variation.
38. True; a line that is neither horizontal nor vertical can pass through $(0, 0)$ and $(-2, 4)$.
39. False; the line through $(0, 3)$ and $(0, 0)$ is vertical, so it is not a function and is therefore not a direct variation.
40. True; for the equation $y = kx$, if one side is multiplied by 3, then the other side must be multiplied by 3.

41.



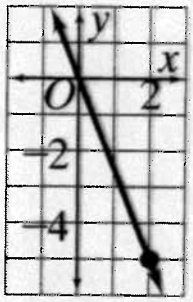
$y = \frac{5}{2}x$

42.



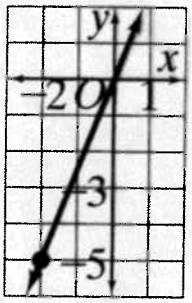
$y = -\frac{5}{2}x$

43.



$y = -\frac{5}{2}x$

44.



$y = \frac{5}{2}x$

45. **a.** $\frac{1}{32}$

b. $b = \frac{1}{32}w$

c. Check students' work.

46. **a.** 48 volts

b. 0.75 ohms

47. Check students' graphs.

a. The graphs get steeper for increasing, positive values of the constant of variation.

b. It would appear less steep than $y = x$.

48. 12

49. -8

50. 8

51. -6

52. 5

53. 2

54. **a.** $c = 1.83g$; yes

b. $c = \frac{1.83}{24}m$ or $c = 0.07625m$

Answers for Lesson 5-6, pp. 288–290 Exercises

1. $xy = 18$
2. $xy = 2$
3. $xy = 56$
4. $xy = 1.5$
5. $xy = 24$
6. $xy = 7.7$
7. $xy = 2$
8. $xy = 0.5$
9. $xy = 0.06$
10. 8
11. 15
12. 6
13. 7
14. 3
15. 130
16. 12
17. 96
18. 3125
19. 2
20. $\frac{1}{6}$
21. 20
22. 3 h
23. $13.\overline{3}$ mi/h
24. direct variation; $y = 0.5x$
25. inverse variation; $xy = 60$
26. inverse variation; $xy = 72$
27. Direct variation; the ratio $\frac{\text{cost}}{\text{pound}}$ is constant at \$1.79.
28. Inverse variation; the total number of slices is constant at 8.
29. Inverse variation; the product of the length and width remains constant with an area of 24 square units.
30. 32; $xy = 32$
31. 1.1; $rt = 1.1$
32. 2.5; $xy = 2.5$
33. 1; $ab = 1$
34. 15.6; $pq = 15.6$
35. 375; $xy = 375$
36. Direct variation; the ratio of the perimeter to the side length is constant at 3.
37. Inverse variation; the product of the rate and the time is always 150.
38. Direct variation; the ratio of the circumference to the radius is constant at 2π.
39. 121 ft
40. 2.4 days

41. direct variation; $y = 0.4x$; 8

42. direct variation; $y = 70x$; 0.9

43. inverse variation; $xy = 48$; 0.5

44. **a.** greater

b. greater

c. less

45. **a.** 16 h; 10 h; 8 h; 4 h

b. hours worked, rate of pay

c. $rt = 80$

46. Check students' work.

47. A

48. p: $y = 0.5x$; q: $xy = 8$

49. **a.** y is doubled.

b. y is halved.

50. 4; $s\left(\frac{1}{2}d\right)^2 = \frac{1}{4}sd^2 = k$, so $s = 4\frac{k}{d^2}$.

51. **a.** $x^4y = k$

b. $\frac{x^4y}{z} = k$

Answers for Lesson 5-7, pp. 294–296 Exercises

1. "Add 2 to the previous term"; 12, 14.
2. "Multiply the previous term by $1\frac{1}{2}$"; $20\frac{1}{4}$, $30\frac{3}{8}$.
3. "Add 2 to the first term, 3 to the second term and continue, adding 1 more each time"; 18, 24.
4. "Add 0.04 to the previous term"; 3.16, 3.20.
5. "Multiply the previous term by 1.1"; 4.3923, 4.83153.
6. "Add −2 to the previous term"; −5, −7.
7. "Add 1.1 to the previous term"; 5.5, 6.6.
8. "Multiply the previous term by 10"; 10, 100.
9. "Multiply the previous term by 4"; 512, 2048.
10. "Square the reciprocals of consecutive integers"; $\frac{1}{25}$, $\frac{1}{36}$.
11. "Add −14 to the previous term"; −47, −61.
12. "Multiply the previous term by 5"; 937.5, 4687.5.

13. 3
14. −4
15. −11
16. 13
17. $-\frac{1}{6}$
18. 0.8
19. −2
20. 12
21. 5
22. 5, 14, 26
23. −3, 15, 39
24. −3, 9, 25
25. 17, 44, 80
26. 3.5, 12.5, 24.5
27. 2, 23, 51
28. 3, −15, −39
29. −7.1, −22.1, −42.1
30. 58, 37, 9
31. 17, 5, −11
32. −8, −17, −29
33. −0.8, −3.8, −7.8
34. −4, −10

35. $3\frac{1}{4}, 3\frac{1}{2}$

36. 26, 37

37. $\frac{4}{27}, \frac{4}{81}$

38. 35, 48

39. 31, 40

40. 2.5, 1.25

41. $8, 8\frac{1}{4}$

42. $\frac{4}{27}, -\frac{4}{81}$

43. **a.** Answers may vary. Sample: Inductive reasoning is making conclusions based on patterns, while deductive reasoning is making conclusions based on given facts.

b. Answers may vary. Check students' work.

44. 5 min

45. Answers may vary. Sample: $A(n) = 2 - 4n$

46. 7 lb 4 oz, 7 lb 9 oz, 7 lb 14 oz, 8 lb 3 oz, 8 lb 8 oz; the baby's weight at the end of the 4th week

47. \$4500, \$4350, \$4200, \$4050, \$3900; the balance after 4 payments

48. **a.** $\underbrace{1 \quad 2}_{1} \quad \underbrace{\quad 4}_{2}; 7$

b. $\frac{2}{1} = 2; \frac{4}{2} = 2; 8$

c. When there are more than three terms you can test the pattern to make sure it is reasonable.

49. No; there is no common difference.

50. Yes; the common difference is -4.

51. No; there is no common difference.

52. No; there is no common difference.

53. Yes; the common difference is -15.

54. Yes; the common difference is -0.8.

55. **a.** 1, 5, 10, 10, 5, 1

b. 1, 2, 4, 8, 16; 32

56. $11\frac{1}{3}$, 12, $13\frac{1}{3}$

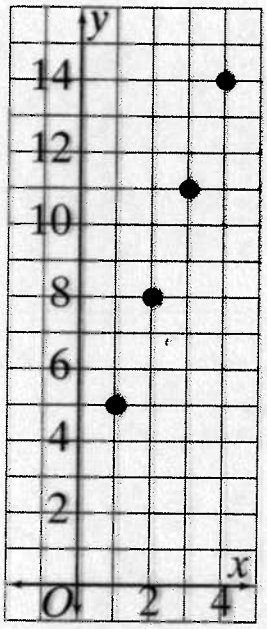
57. 4.5, −4.5, −22.5

58. −2, −5.2, −11.6

59. 1, $2\frac{3}{5}$, $5\frac{4}{5}$

60. a. 11, 14

b.



c. The points lie on a line.

61. a. Yes; for each input there is only one output value.

b. For every increase of 7 in the key position, the frequency doubles.

62. a. 21

b. 89

c. Answers may vary. Sample: 3, 3, 6, 9, 15, 24, 39

63. value of new term = value of previous term + 6

64. value of new term = value of previous term · 1.5

65. value of new term = value of previous term − 2.5

66. value of new term = value of previous term + 4

67. value of new term = value of previous term ÷ 7

68. value of new term = value of previous term · (−2.5)

69. x; $4x + 4$

70. $3a + 2b$; $10a + 7b + c$

71. **a.** 10

b. −6

c. $A(n) = 10 + (n - 1)(-6)$

72. **a.**

b. Blue; the colors rotate red, blue, and purple. Every third figure is purple. Since 21 is divisible by 3, the 21st figure is purple. The figure just before a purple figure is blue.

c. 12 sides; the figures show this pattern for number of sides.

Figure		Number of Sides
1–3	→	3
4–6	→	4
7–9	→	5
10–12	→	6
13–15	→	7
16–18	→	8
19–21	→	9
22–24	→	10
25–27	→	11
28	→	12

73. **a.** −5

b. 6

c. $A(n) = -5 + (n - 1)(6)$