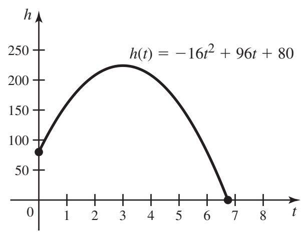
Answers

CHAPTER 1

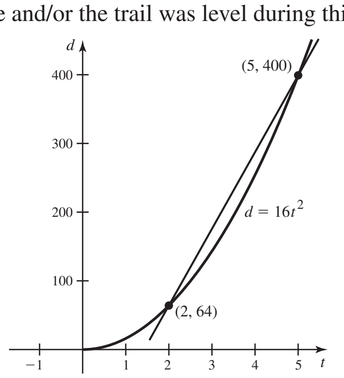
Section 1.1 Exercises, pp. 9–13

1. A function is a rule that assigns to each value of the independent variable in the domain a unique value of the dependent variable in the range. **3.** B **5.** The first statement **7.** $D = \mathbb{R}$, $R = [-10, \infty)$
9. The independent variable is h; the dependent variable is V; $D = [0, 50]$. **11.** -3; $1/8$; $1/(2x)$ **13.** The domain of $f \circ g$ consists of all x in the domain of g such that $g(x)$ is in the domain of f.
15. a. 4 **b.** 1 **c.** 3 **d.** 3 **e.** 8 **f.** 1 **17.** 15.4 ft/s; radiosonde rises at an average rate of 15.4 ft/s during the first 5 seconds of its flight. **19.** 2; 2; 2; -2 **21.** A is even, B is odd, and C is even.
23. $D = \{x: x \neq 2\}$; $R = \{y: y \neq -1\}$ **25.** $D = [-\sqrt{7}, \sqrt{7}]$; $R = [0, \sqrt{7}]$ **27.** $D = \mathbb{R}$ **29.** $D = [-3, 3]$
31. a. $[0, 3 + \sqrt{14}]$
b.



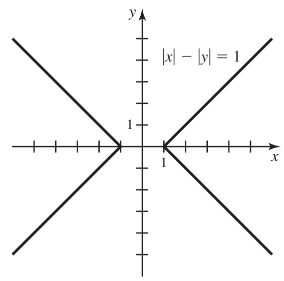
At time $t = 3$, the maximum height is 224 ft.

33. $1/z^3$ **35.** $1/(y^3 - 3)$ **37.** $(u^2 - 4)^3$ **39.** $\dfrac{x - 3}{10 - 3x}$ **41.** x
43. $g(x) = x^3 - 5$, $f(x) = x^{10}$ **45.** $g(x) = x^4 + 2$, $f(x) = \sqrt{x}$
47. $|x^2 - 4|$; $D = \mathbb{R}$ **49.** $\dfrac{1}{|x - 2|}$; $D = \{x: x \neq 2\}$
51. $\dfrac{1}{x^2 - 6}$; $D = \{x: x \neq \sqrt{6}, -\sqrt{6}\}$
53. $x^4 - 8x^2 + 12$; $D = \mathbb{R}$ **55.** $f(x) = x - 3$
57. $f(x) = x^2$ **59.** $f(x) = x^2$ **61. a.** True **b.** False **c.** True **d.** False **e.** False **f.** True **g.** True **h.** False **i.** True
63. 3 **65.** $2x + h$ **67.** $-\dfrac{2}{x(x + h)}$ **69.** $x + a + 1$
71. $x^2 + ax + a^2 - 2$ **73.** $\dfrac{4(x + a)}{a^2x^2}$ **75. a.** 864 ft/hr; the hiker's elevation increases at an average rate of 864 ft/hr.
b. -487 ft/hr; the hiker's elevation decreases at an average rate of 487 ft/hr. **c.** The hiker might have stopped to rest during this interval of time and/or the trail was level during this portion of the hike.
77. a.



b. $m_{\text{sec}} = 112$ ft/s; the object falls at an average rate of 112 ft/s.

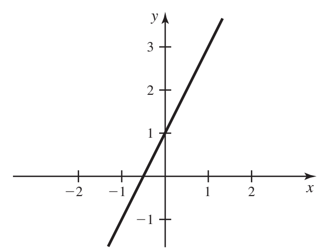
79. y-axis **81.** No symmetry **83.** x-axis, y-axis, origin
85. Origin **87. a.** 4 **b.** 1 **c.** 3 **d.** -2 **e.** -1 **f.** 7
89.



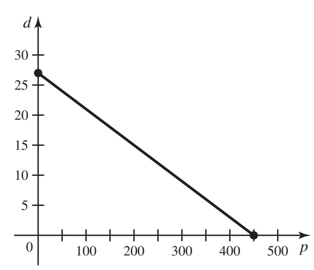
91. The equation $y = 2 - \sqrt{-x^2 + 6x + 16}$ can be rewritten as $(x - 3)^2 + (y - 2)^2 = 5^2$. Because $y \leq 2$, the function is the lower half of a circle of radius 5 centered at $(3, 2)$. $D = [-2, 8]$; $R = [-3, 2]$ **93.** $f(x) = 3x - 2$ or $f(x) = -3x + 4$
95. $f(x) = x^2 - 6$ **97.** $\dfrac{1}{\sqrt{x + h} + \sqrt{x}}$; $\dfrac{1}{\sqrt{x} + \sqrt{a}}$
99. $\dfrac{3}{\sqrt{x}(x + h) + x\sqrt{x + h}}$; $\dfrac{3}{x\sqrt{a} + a\sqrt{x}}$ **101.** None **103.** y-axis

Section 1.2 Exercises, pp. 22–27

1. A formula, a graph, a table, words **3.** $y = -\frac{2}{3}x - 1$ **5.** The set of all real numbers for which the denominator does not equal 0
7. $y = \begin{cases} x + 3 & \text{if } x < 0 \\ -\frac{1}{2}x + 3 & \text{if } x \geq 0 \end{cases}$ **9.** Shift the graph to the left 2 units.
11. Compress the graph horizontally by a factor of $\frac{1}{3}$.
13. $f(x) = |x - 2| + 3$; $g(x) = -|x + 2| - 1$
15. $f(x) = 2x + 1$

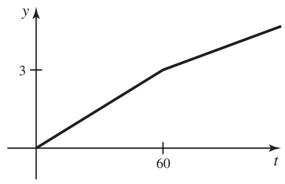


17. $f(x) = 3x - 7$ **19.** $C_s = 5.71$; 856.5 million
21. $d = -3p/50 + 27$; $D = [0, 450]$

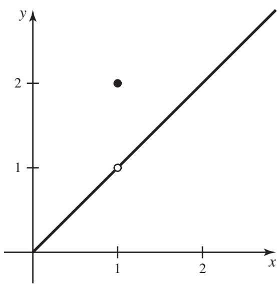


23. a. $p(t) = 328.3t + 1875$ **b.** 4830
25. $f(x) = \begin{cases} 3 & \text{if } x \leq 3 \\ 2x - 3 & \text{if } x > 3 \end{cases}$

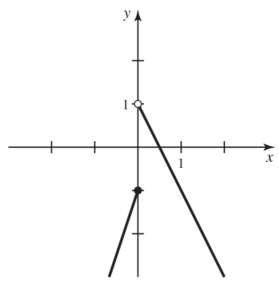
27. $c(t) = \begin{cases} 0.05t & \text{if } 0 \le t \le 60 \\ 1.2 + 0.03t & \text{if } 60 < t \le 120 \end{cases}$



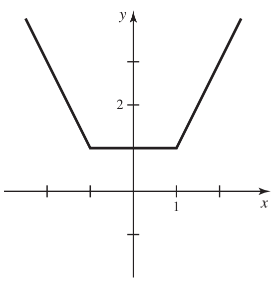
29.



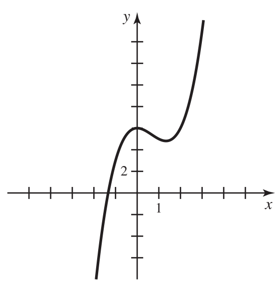
31.



33.

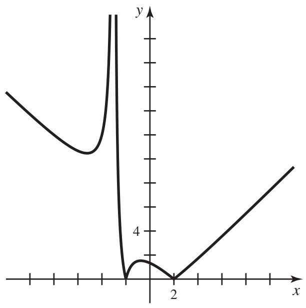


35. a.



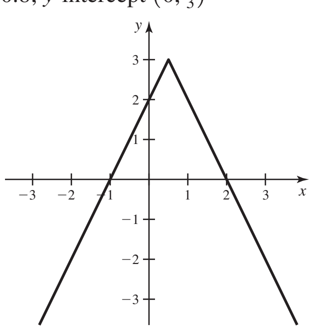
b. $D = \mathbb{R}$ **c.** One peak near $x = 0$; one valley near $x = 4/3$; x-intercept approx. $(-1.3, 0)$, y-intercept $(0, 6)$

37. a.



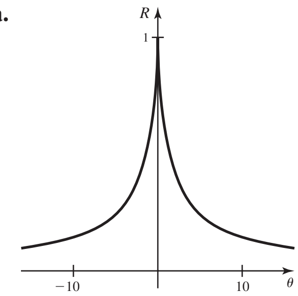
b. $D = \{x: x \neq -3\}$ **c.** Undefined at $x = -3$; a valley near $x = -5.2$; x-intercepts (and valleys) at $(-2, 0)$ and $(2, 0)$; a peak near $x = -0.8$; y-intercept $(0, \frac{4}{3})$

39. a.



b. $D = \mathbb{R}$ **c.** One peak at $x = \frac{1}{2}$; x-intercepts $(-1, 0)$ and $(2, 0)$; y-intercept $(0, 2)$ **41. a.** A, D, F, I **b.** E **c.** B, H **d.** I **e.** A

43. a.



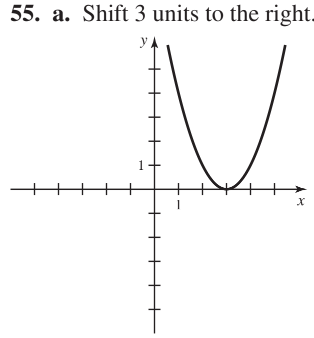
b. $\theta = 0$; vision is sharpest when we look straight ahead.
c. $|\theta| \le 0.19°$ (less than $\frac{1}{5}$ of a degree) **45.** $S(x) = 2$

47. $S(x) = \begin{cases} 1 & \text{if } x < 0 \\ -\frac{1}{2} & \text{if } x > 0 \end{cases}$

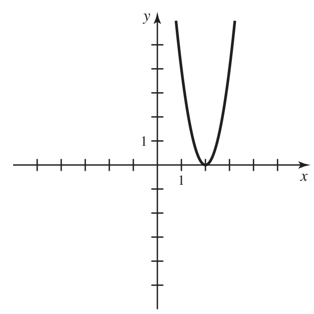
49. a. 12 **b.** 36 **c.** $A(x) = 6x$ **51. a.** 12 **b.** 21
c. $A(x) = \begin{cases} 8x - x^2 & \text{if } 0 \le x \le 3 \\ 2x + 9 & \text{if } x > 3 \end{cases}$

53. a. True **b.** False **c.** True **d.** False

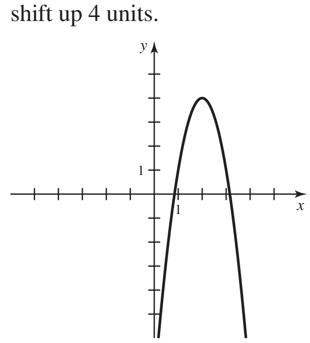
55. a. Shift 3 units to the right.



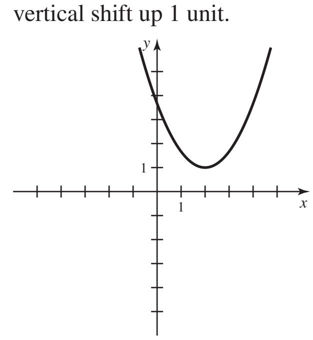
b. Horizontal compression by a factor of $\frac{1}{2}$, then shift 2 units to the right.



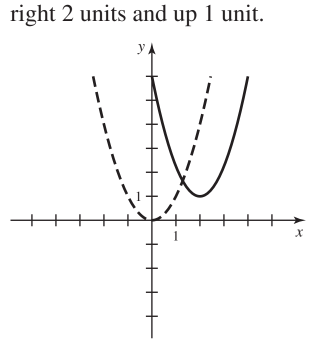
c. Shift to the right 2 units, vertically stretch by a factor of 3, reflect across the x-axis, and shift up 4 units.



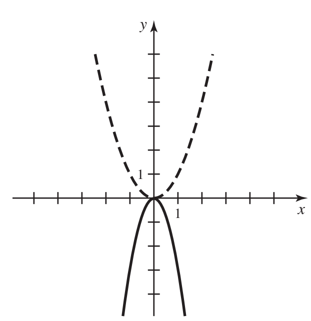
d. Horizontal stretch by a factor of 3, horizontal shift right 2 units, vertical stretch by a factor of 6, and vertical shift up 1 unit.



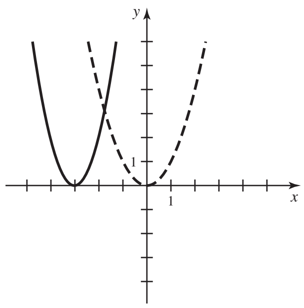
57. Shift the graph of $y = x^2$ right 2 units and up 1 unit.



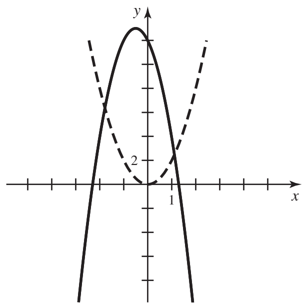
59. Stretch the graph of $y = x^2$ vertically by a factor of 3 and reflect across the x-axis.



61. Shift the graph of $y = x^2$ left 3 units and stretch vertically by a factor of 2.

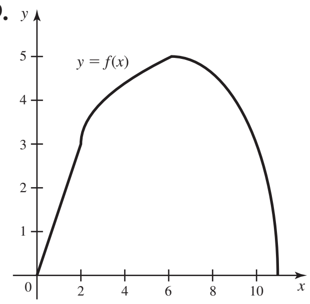


63. Shift the graph of $y = x^2$ to the left $\frac{1}{2}$ unit, stretch vertically by a factor of 4, reflect across the x-axis, and then shift up 13 units.

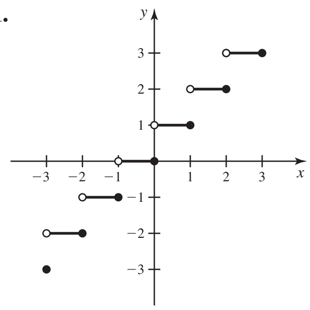


65. $(0, 0)$; $(2, 8)$ **67.** $(0, 0)$; $(4, 16)$

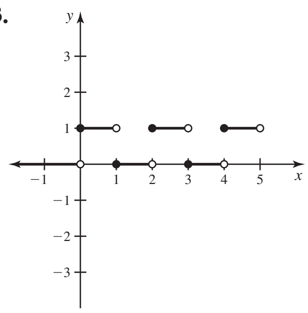
69.



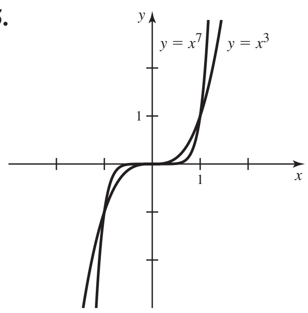
71.



73.

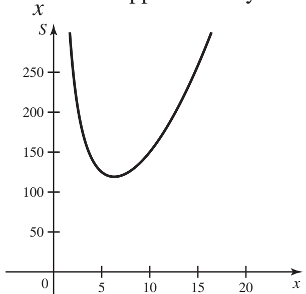


75.



77. a. 0.9; 90% chance that server will win from deuce given that such servers win 75% of their service points **b.** 0.1; 10% chance that server will win from deuce given that such servers win 25% of their service points **79. a.** $f(m) = 350m + 1200$ **b.** Buy

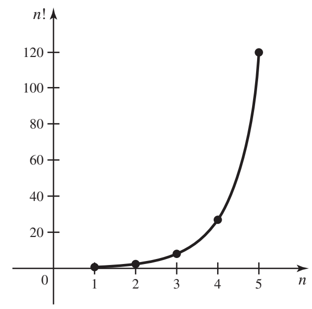
81. a. $S(x) = x^2 + \dfrac{500}{x}$ **b.** Approximately 6.3 ft



85. a.

n	1	2	3	4	5
$n!$	1	2	6	24	120

b.

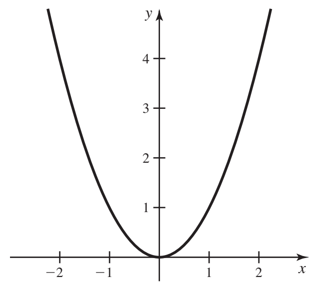


c. 10

Section 1.3 Exercises, pp. 35–39

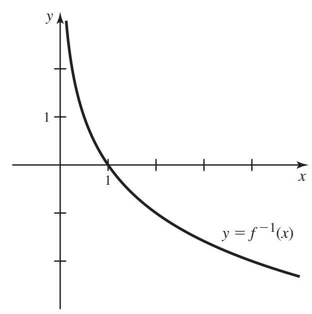
1. $D = \mathbb{R}$; $R = (0, \infty)$

3.



5. $(-\infty, -1]$, $[-1, 1]$, $[1, \infty)$ **7.** If a function f is not one-to-one, then there are domain values, x_1 and x_2, such that $x_1 \neq x_2$ but $f(x_1) = f(x_2)$. If f^{-1} exists, then by definition, $f^{-1}(f(x_1)) = x_1$ and $f^{-1}(f(x_2)) = x_2$, so f^{-1} assigns two different range values to the single domain value of $f(x_1)$.

9. $f^{-1}(x) = \dfrac{1}{2}x$ **11.**



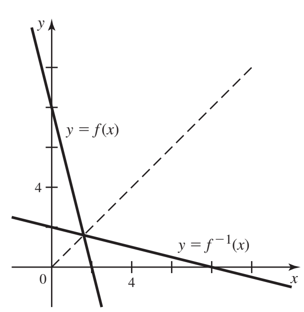
13. $g_1(x) = x^2 + 1$; $D = [0, \infty)$; $R = [1, \infty)$; $g_1^{-1}(x) = \sqrt{x - 1}$; $D = [1, \infty)$; $R = [0, \infty)$

15. The expression $\log_b x$ represents the power to which b must be raised to obtain x. **17.** $D = (0, \infty)$; $R = \mathbb{R}$

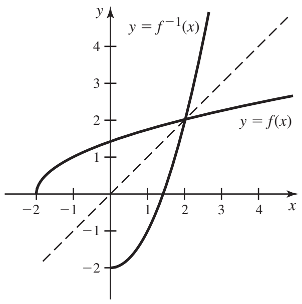
19. a. 3 **b.** 4 **c.** -2 **d.** 3 **e.** $1/2$ **21.** $(-\infty, \infty)$

23. $(-\infty, 5) \cup (5, \infty)$ **25.** $(-\infty, 0)$, $(0, \infty)$

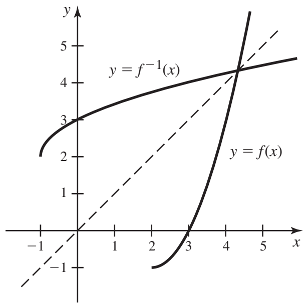
27. $f^{-1}(x) = -\dfrac{1}{4}x + 2$



29. $f^{-1}(x) = x^2 - 2$



31. $f^{-1}(x) = 2 + \sqrt{x+1}$



33. $f^{-1}(x) = \sqrt{\frac{2}{x} - 1}$ **35.** $f^{-1}(x) = \frac{1}{2}\ln x - 3$

37. $f^{-1}(x) = \frac{e^x - 1}{3}$ **39.** $f^{-1}(x) = -\frac{1}{2}\log_{10}x$

41. $f^{-1}(x) = \ln\left(\frac{2x}{1-x}\right)$

43. a. $f_1(x) = \sqrt{1-x^2};\ 0 \le x \le 1$

$f_2(x) = \sqrt{1-x^2};\ -1 \le x \le 0$

$f_3(x) = -\sqrt{1-x^2};\ -1 \le x \le 0$

$f_4(x) = -\sqrt{1-x^2};\ 0 \le x \le 1$

b. $f_1^{-1}(x) = \sqrt{1-x^2};\ 0 \le x \le 1$

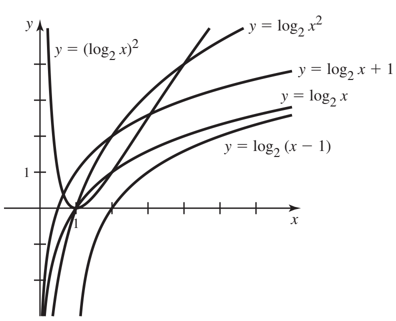
$f_2^{-1}(x) = -\sqrt{1-x^2};\ 0 \le x \le 1$

$f_3^{-1}(x) = -\sqrt{1-x^2};\ -1 \le x \le 0$

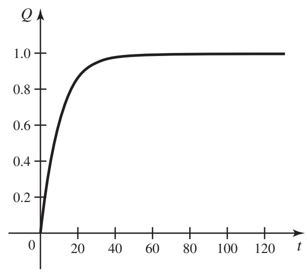
$f_4^{-1}(x) = \sqrt{1-x^2};\ -1 \le x \le 0$

45. -0.2 **47.** 1.19 **49.** $-0.09\overline{6}$ **51.** 1000 **53.** 2 **55.** $1/e$
57. $\ln 21/\ln 7$ **59.** $\ln 5/(3\ln 3) + 5/3$ **61.** 451 years
63. 9.53 years **65. a.** No **b.** $f^{-1}(h) = 2 - \frac{1}{4}\sqrt{64-h}$
c. $f^{-1}(h) = 2 + \frac{1}{4}\sqrt{64-h}$ **d.** 0.542 s **e.** 3.837 s
67. $\frac{\ln 15}{\ln 2} \approx 3.9069$ **69.** $\frac{\ln 40}{\ln 4} \approx 2.6610$ **71.** $e^{x\ln 2}$
73. $\log_5|x|/\log_5 e$ **75.** e **77. a.** False **b.** False **c.** False **d.** True **e.** False **f.** False **g.** True **79.** A is $y = \log_2 x$; B is $y = \log_4 x$; C is $y = \log_{10} x$.

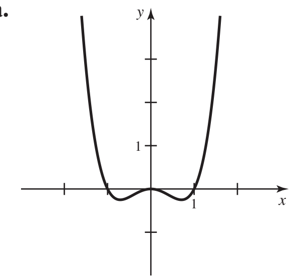
81.



83. a.



b. Vertical scaling; steady state equals a. **c.** Horizontal scaling; steady state remains constant. **d.** a
85. $f^{-1}(x) = \sqrt{x-5} + 1, x \ge 5$ **87.** $f^{-1}(x) = \sqrt[3]{x} - 1, D = \mathbb{R}$
89. $f_1^{-1}(x) = \sqrt{2/x - 2}, D_1 = (0, 1]$; $f_2^{-1}(x) = -\sqrt{2/x - 2}$, $D_2 = (0, 1]$
95. a.



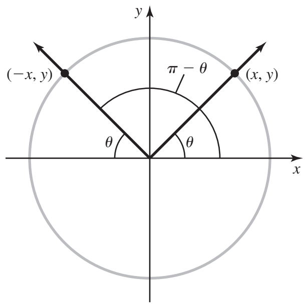
f is one-to-one on the intervals $(-\infty, -1/\sqrt{2}]$, $[-1/\sqrt{2}, 0]$, $[0, 1/\sqrt{2}]$, and $[1/\sqrt{2}, \infty)$.

b. $x = \sqrt{\frac{1 \pm \sqrt{4y+1}}{2}}, -\sqrt{\frac{1 \pm \sqrt{4y+1}}{2}}$

Section 1.4 Exercises, pp. 48–51

1. $\sin\theta = \text{opp}/\text{hyp}$; $\cos\theta = \text{adj}/\text{hyp}$; $\tan\theta = \text{opp}/\text{adj}$; $\cot\theta = \text{adj}/\text{opp}$; $\sec\theta = \text{hyp}/\text{adj}$; $\csc\theta = \text{hyp}/\text{opp}$ **3.** 3 s
5. The radian measure of an angle θ is the length s of an arc on the unit circle associated with θ. **7.** $\sin^2\theta + \cos^2\theta = 1$, $1 + \cot^2\theta = \csc^2\theta$, $\tan^2\theta + 1 = \sec^2\theta$ **9.** $\theta = 3\pi/2$
11. $\{x: x \text{ is an odd multiple of } \pi/2\}$
13. Sine is not one-to-one on its domain. **15.** $3\pi/4$
17. Horizontal asymptotes at $y = \pi/2$ and $y = -\pi/2$
19. $-1/2$ **21.** 1 **23.** $-1/\sqrt{3}$ **25.** $1/\sqrt{3}$ **27.** 1 **29.** -1
31. Undefined **33.** $\frac{\sqrt{2+\sqrt{3}}}{2}$ or $\frac{\sqrt{6}+\sqrt{2}}{4}$
35. $\pi/4 + n\pi, n = 0, \pm 1, \pm 2, \ldots$
37. $\pi/6, 5\pi/6, 7\pi/6, 11\pi/6$
39. $\pi/4 + 2n\pi, 3\pi/4 + 2n\pi, n = 0, \pm 1, \pm 2, \ldots$
41. $0, \pi/2, \pi, 3\pi/2$
43. $\pi/12, 5\pi/12, 3\pi/4, 13\pi/12, 17\pi/12, 7\pi/4$
45. 0.1007; 1.4701 **47.** 17.3°; 72.7° **49.** $\pi/2$ **51.** $-\pi/6$
53. $\pi/3$ **55.** $2\pi/3$ **57.** -1 **59.** $\sin\theta = \frac{12}{13}$; $\tan\theta = \frac{12}{5}$
61. $\sqrt{1-x^2}$ **63.** $\frac{\sqrt{4-x^2}}{2}$ **65.** $2x\sqrt{1-x^2}$
67. $\sec\theta = \frac{r}{x} = \frac{1}{x/r} = \frac{1}{\cos\theta}$
69. Dividing both sides of $\cos^2\theta + \sin^2\theta = 1$ by $\cos^2\theta$ gives $1 + \tan^2\theta = \sec^2\theta$. **71.** Because $\cos(\pi/2 - \theta) = \sin\theta$, for all θ, $1/\cos(\pi/2 - \theta) = 1/\sin\theta$, excluding integer multiples of π, and $\sec(\pi/2 - \theta) = \csc\theta$.

73. $\cos^{-1} x + \cos^{-1}(-x) = \theta + (\pi - \theta) = \pi$



75. $\pi/3$ **77.** $\pi/3$ **79.** $\pi/4$ **81.** $\pi/2 - 2$

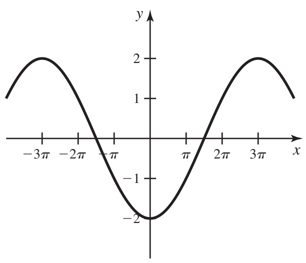
83. $\dfrac{1}{\sqrt{x^2+1}}$ **85.** $1/x$ **87.** $x/\sqrt{x^2+16}$

89. $\theta = \sin^{-1}\dfrac{x}{6} = \tan^{-1}\left(\dfrac{x}{\sqrt{36-x^2}}\right) = \sec^{-1}\left(\dfrac{6}{\sqrt{36-x^2}}\right)$

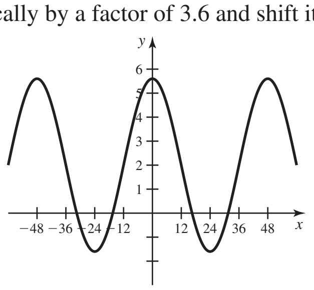
91. a. False **b.** False **c.** False **d.** False **e.** True **f.** False **g.** True **h.** False **93.** $\sin\theta = \frac{12}{13}$; $\tan\theta = \frac{12}{5}$; $\sec\theta = \frac{13}{5}$; $\csc\theta = \frac{13}{12}$; $\cot\theta = \frac{5}{12}$ **95.** $\sin\theta = \frac{12}{13}$; $\cos\theta = \frac{5}{13}$; $\tan\theta = \frac{12}{5}$; $\sec\theta = \frac{13}{5}$; $\cot\theta = \frac{5}{12}$ **97.** Amp $= 3$; period $= 6\pi$

99. Amp $= 3.6$; period $= 48$ **103.** Area of circle is πr^2; $\theta/(2\pi)$ represents the proportion of area swept out by a central angle θ. Therefore, the area of such a sector is $(\theta/2\pi)\pi r^2 = r^2\theta/2$.

105. Stretch the graph of $y = \cos x$ horizontally by a factor of 3, stretch vertically by a factor of 2, and reflect across the x-axis.



107. Stretch the graph of $y = \cos x$ horizontally by a factor of $24/\pi$; then stretch it vertically by a factor of 3.6 and shift it up 2 units.



109. $y = 3\sin(\pi x/12 - 3\pi/4) + 13$ **111.** About 6 ft

113. $d(t) = 10\cos(4\pi t/3)$ **115.** h

Chapter 1 Review Exercises, pp. 51–55

1. a. True **b.** False **c.** False **d.** True **e.** False **f.** False **g.** True **3.** f is one-to-one but not g.

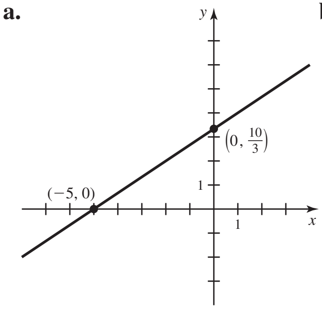
5. $D = \{w: w \neq 2\}$; $R = \{y: y \neq 5\}$

7. $D = (-\infty, -1] \cup [3, \infty)$; $R = [0, \infty)$ **9.** Yes; no **11.** 8

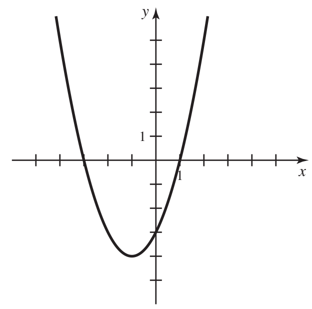
13. 7 **15.** 8 **17.** -2 **19. a.** 1 **b.** $\sqrt{x^3}$ **c.** $\sin^3\sqrt{x}$ **d.** $\mathbb{R}$ **e.** $[-1, 1]$ **21.** $2x + h - 2$; $x + a - 2$

23. $3x^2 + 3xh + h^2$; $x^2 + ax + a^2$ **25. a.** $y = \dfrac{5}{2}x - 8$ **b.** $y = \dfrac{3}{4}x + 3$ **c.** $y = \dfrac{1}{2}x - 2$ **27.** $B = -\dfrac{1}{500}a + 212$

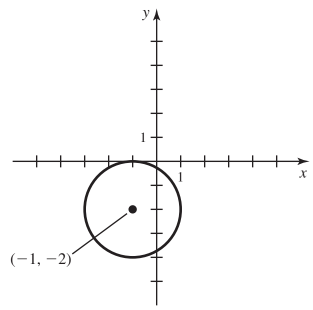
29. a.



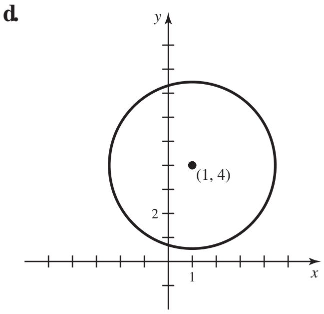
b.



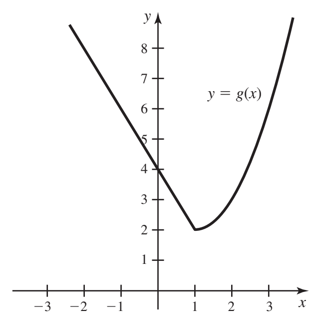
c.



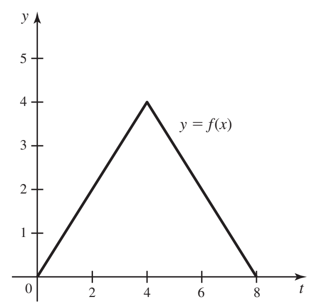
d.



31.

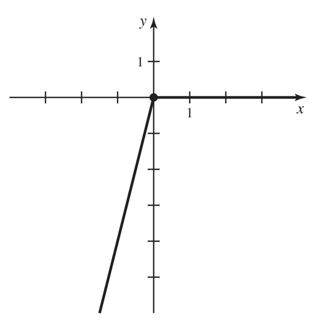


33. a.



b. 2; 14 **c.** $A(x) = \begin{cases} x^2/2 & \text{if } 0 \leq x \leq 4 \\ -x^2/2 + 8x - 16 & \text{if } 4 < x \leq 8 \end{cases}$

35. $f(x) = \begin{cases} 4x & \text{if } x < 0 \\ 0 & \text{if } x \geq 0 \end{cases}$



37. $D_f = \mathbb{R}$, $R_f = \mathbb{R}$; $D_g = [0, \infty)$, $R_g = [0, \infty)$

39. Shift $y = x^2$ left 3 units and down 12 units.

41. a. y-axis **b.** y-axis **c.** x-axis, y-axis, origin **43.** $x = 2$

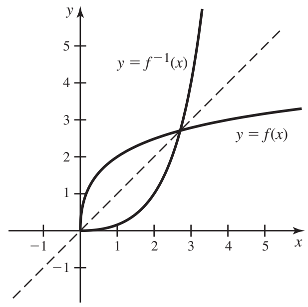
45. $t = \frac{e^4 - 4}{5}$ **47.** $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$ **49.** $\theta = \pm\frac{\pi}{12}, \pm\frac{5\pi}{12}$

51. Approx. 35 years **53.** $(-\infty, 0]$, $[0, 2]$, and $[2, \infty)$

55. $f^{-1}(x) = -\frac{1}{4}x + \frac{3}{2}$ **57.** $f^{-1}(x) = 2 + \sqrt{x - 1}$

59. $f^{-1}(x) = -\sqrt{\frac{x-1}{3}}$ **61.** $f^{-1}(x) = \sqrt{\ln x - 1}$

63. $f^{-1}(x) = \frac{4x^2}{(6 - x)^2}$, for $0 \le x < 6$



65. **a.** $f(t) = -2\cos\frac{\pi t}{3}$ **b.** $f(t) = 5\sin\frac{\pi t}{12} + 15$

67. **a.** F **b.** E **c.** D **d.** B **e.** C **f.** A

69. $(7\pi/6, -1/2)$; $(11\pi/6, -1/2)$ **71.** $-\frac{\sqrt{2 + \sqrt{2}}}{2}$

73. $\pi/6$ **75.** $-\pi/2$ **77.** x, provided $-1 \le x \le 1$

79. $\cos\theta = \frac{5}{13}$; $\tan\theta = \frac{12}{5}$; $\cot\theta = \frac{5}{12}$; $\sec\theta = \frac{13}{5}$; $\csc\theta = \frac{13}{12}$

81. $\frac{\sqrt{16 - x^2}}{4}$ **83.** $\pi/2 - \theta$ **85.** 0

87. $$\tan 2\theta = \frac{\sin 2\theta}{\cos 2\theta} = \frac{2\sin\theta\cos\theta}{\cos^2\theta - \sin^2\theta} = \frac{2\sin\theta\cos\theta/\cos^2\theta}{(\cos^2\theta - \sin^2\theta)/\cos^2\theta} = \frac{2\tan\theta}{1 - \tan^2\theta}$$

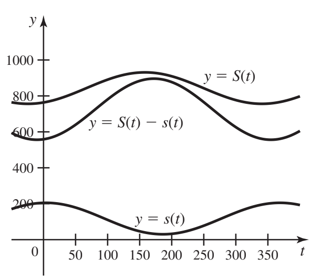
89. **a.**

n	1	2	3	4	5	6	7	8	9	10
$T(n)$	1	5	14	30	55	91	140	204	285	385

b. $D = \{n: n \text{ is a positive integer}\}$ **c.** 14

91. $s(t) = 117.5 - 87.5\sin\left(\frac{\pi}{182.5}(t - 95)\right)$

$S(t) = 844.5 + 87.5\sin\left(\frac{\pi}{182.5}(t - 67)\right)$



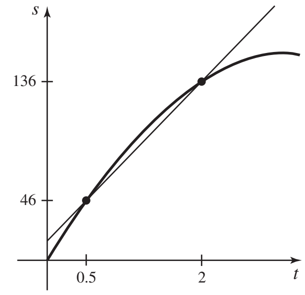
CHAPTER 2

Section 2.1 Exercises, pp. 61–62

1. $\frac{s(b) - s(a)}{b - a}$ **3.** 20 **5.** **a.** 36 **b.** 44 **c.** 52 **d.** 60

7. 47.84, 47.984, 47.9984; instantaneous velocity appears to be 48

9. $\frac{f(b) - f(a)}{b - a}$ **11.** The instantaneous velocity at $t = a$ is the slope of the line tangent to the position curve at $t = a$. **13.** **a.** 48 **b.** 64 **c.** 80 **d.** $16(6 - h)$ **15.** $m_{sec} = 60$; the slope is the average velocity of the object over the interval $[0.5, 2]$.



17.

Time interval	Average velocity
[1, 2]	80
[1, 1.5]	88
[1, 1.1]	94.4
[1, 1.01]	95.84
[1, 1.001]	95.984
$v_{inst} = 96$	

19.

Time interval	Average velocity
[2, 3]	20
[2.9, 3]	5.60
[2.99, 3]	4.16
[2.999, 3]	4.016
[2.9999, 3]	4.002
$v_{inst} = 4$	

21.

Time interval	Average velocity
[3, 3.5]	−24
[3, 3.1]	−17.6
[3, 3.01]	−16.16
[3, 3.001]	−16.016
[3, 3.0001]	−16.002
$v_{inst} = -16$	

23.

Time interval	Average velocity
[0, 1]	36.372
[0, 0.5]	67.318
[0, 0.1]	79.468
[0, 0.01]	79.995
[0, 0.001]	80.000
$v_{inst} = 80$	

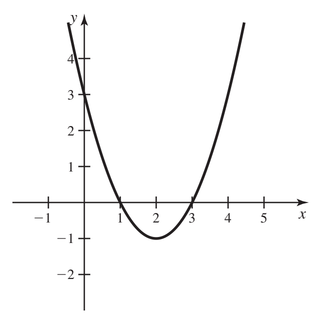
25.

Interval	Slope of secant line
[1, 2]	6
[1.5, 2]	7
[1.9, 2]	7.8
[1.99, 2]	7.98
[1.999, 2]	7.998
$m_{tan} = 8$	

27.

Interval	Slope of secant line
[0, 1]	1.718
[0, 0.5]	1.297
[0, 0.1]	1.052
[0, 0.01]	1.005
[0, 0.001]	1.001
$m_{tan} = 1$	

29. **a.**



b. $(2, -1)$

c.

Interval	Slope of secant line
[2, 2.5]	0.5
[2, 2.1]	0.1
[2, 2.01]	0.01
[2, 2.001]	0.001
[2, 2.0001]	0.0001
$m_{tan} = 0$	