Section 1.1

2. a) negative b) negative
   c) positive d) positive
8. a) $b > 0$ b) $s \le 0$
   c) $w \ge -4$ d) $\frac{1}{5} < c < \frac{1}{3}$
   e) $p \le -2$ f) $-m \ge -2$
   g) $\frac{r}{s} \ge \frac{1}{5}$ h) $\frac{1}{f} \ne 14$
   i) $|x| < 4$
12. a) 4 b) $\frac{5}{2}$ c) 10

Section 1.2

4. $\frac{1}{2}$ 6. $\frac{5}{1}$ 12. $-12x^2$
20. $\frac{-2x^6z^5}{y}$ 24. $-4x^{12}y^7$
8. $\frac{243}{1}$ 36. $4r^{\frac{5}{6}}$
54. a) $4 + x\sqrt{x}$ b) $(4 + x)\sqrt{4 + x}$
58. -5
64. $\frac{4a^4}{b}$
78. $5x^2y^5\sqrt{2}$
86. $\sqrt{a^2+1} \ne a+1$

Section 1.3

6. $6x^2 + 19x - 36$
12. $7x^4 - 11x^3 + 4x^2 + 42x - 24$
18. $2a^2b - 3a + b^2$
22. $25x^2 - 16y^2$
38. $x^3 + 9x^2y + 27xy^2 + 27y^3$
46. $4u^2 - 2uv = 2u(2u - v)$
54. $(7x-4)(x+2)$
62. $(3x + 4)^2$
68. $(9r + 4t)(9r - 4t)$
72 $x(x + 5)(x - 5)$
76. $4(4x + 3y)(4x - 3y)$
92. $(x^4 +4)(x^2 + 2)(x^2 - 2)$
100. $x(2x + 1)^2$

Section 1.4

4. $\frac{23}{216}$
10. $\frac{5 - r}{r^3}$
22. $\frac{5t - 6}{t - 3}$
26. $\frac{5x + 4}{2x + 3}$
34. $\frac{x(3x + 5)}{(x - 2)(x + 2)^2}$
46. $\frac{-1}{x(x + h)}$
50. $\frac{t - 8\sqrt{t} + 16}{t - 16}$

Section 2.1

6. $y = -\frac{11}{3}$
12. $x = \frac{51}{5}$
22. $x = \frac{3}{17}$
30. All Reals, $x \ne -\frac{2}{5}$
40. All Reals, $x \ne \pm\frac{5}{2}$
44. No Solutions, $(x \ne -4)$
66. $r = \frac{A - P}{Pt}$
70. $h = \frac{S - 2lw}{2(w + l)}$

Section 2.2

4. \$57.42
6. 13 hr.
8. Sell \$10 million in bonds and borrow \$40 million.
10. engineer = 8.5 hours; assistant = 3.5 hours
12. Use $\frac{40}{3}$ ml of 1% solution and $\frac{5}{3}$ ml of 10% solution
14. Use 40 ml of elixir and 60 ml of syrup.
18. After 1:21 PM
24. h = 13 ft.
30. about 3 hours

Section 2.3

2. $x = -2, \frac{7}{4}$
14. $x = -\frac{1}{3}, (x \ne -2)$
16. a) No
    b) Yes
20. $x = \pm\frac{7}{4}$
26. a) $d = \frac{169}{4}$ b) $d = 9$
    c) $d = \pm 10$ d) $d = \pm 9$
28. $x = 4 \pm \sqrt{5}$
36. $x = -\frac{5}{6} \pm \frac{1}{6}\sqrt{13}$
48. $d = \sqrt{\frac{gmM}{F}}$, since $d > 0$
50. $t = \frac{-v_o + \sqrt{v_o^2 + 2gs}}{g}$
54. 8 in. by 16 in.
56. a. 206.25 ft. b. v = 40 mi/hr
60. 1.5 in. for sides and top; 3 in. for bottom
62. 32 feet of fencing
66. in range until 9:24 a.m.

Sections 2.4

4. $-5 + 5i$

18. -1

22. $-\frac{3}{2} - \frac{5}{2}i$

42. $-4 \pm i$

Section 2.5

4. $x = \frac{1}{5}$, or $x = -1$

24. $x = 9$ ($x = 2$ is extraneous)

38. $y = \pm\frac{1}{6}\sqrt{30 \pm 6\sqrt{13}}$

52. a) $x = -243$ b) $x = \pm 125$
    c) No real solutions d) $x = 9$
    e) No real solutions

56. $t = \frac{TA^2}{k^2}$

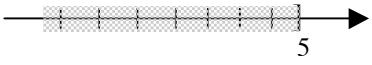
62. Change in diameter $\approx$ 1.37 ft.

64. $r = \sqrt{3}$ in.

Section 2.6

2. a) $11 > 2$ b) $9 > 0$
   c) $\frac{2}{3} > -\frac{5}{6}$ d) $-\frac{2}{3} < \frac{5}{6}$

4. $(-\infty, 5]$



14. $0 \le x < 4$

22. $(-\infty, 1]$

54. $(-\infty, 2.6) \cup (3.4, \infty)$

78. $\frac{20}{9} \le x \le 4$

Section 2.7

2. $\left(-2, \frac{7}{4}\right)$ 10. $\left(-1, \frac{4}{3}\right)$

44. $8 < t < 12$

Section 3.1

2. It forms a star

6. A(0, 4), B(-4, 0), C(0, -4),
   D(4, 0), E(2, 2), F(-2, -2)

10. a) $\sqrt{157}$ b) $\left(-1, \frac{1}{2}\right)$

14. a) $\sqrt{241}$ b) $\left(-2, -\frac{1}{2}\right)$

22. Show that $d(A, C) = d(B, C) = 5\sqrt{5}$

Section 3.2

4. x-int.: (-1.5, 0), y-int.: (0, -3)

12. x-int.:(-4, 0), y-int.:$(0, \pm\sqrt{2})$

32. It is the upper half of the
    circle $x^2 + y^2 = 4$ with center (0, 0) and r = 2

36. $(x + 4)^2 + (y - 1)^2 = 9$

46. $(x + 1)^2 + (y - 4)^2 = 20$

50. C(5, 0), $r = \sqrt{7}$

66. Find the distance between the two stations using the Pythagorean theorem and compare that to the sum of their signal strengths.

Section 3.3

2. $m = \frac{1}{5}$

14. All four lines travel through the origin. Those lines with positive slopes go up to the right and those lines with negative slopes to up to the left.

20. a. $y = 2$
    b. $x = -4$

22. $2x - 3y = -14$

30. $2x - 3y = -7$

34. $y = \frac{6}{5}x + \frac{17}{5}$

36. $3x - 4y = -21$

56. a. $P = -125t + 8250$
    b. $t = 26$ months
    c. The endpoints of the graph are
    (0, 8250) and (66, 0)

60. The year 1910

64. a. $F = -40$ b. $C = 160$ and $F = 320$

Section 3.4

6. a. $-4a + 3$ b. $4a + 3$
   c. $4a - 3$ d. $-4a - 4h + 3$
   e. $-4a - 4h + 6$ f. -4

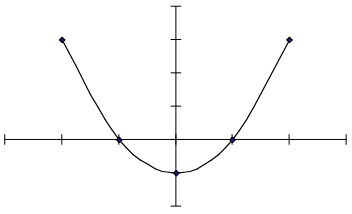
10. a. $2a^2 + 3a - 7$ b. $2a^2 - 3a - 7$
    c. $-2a^2 - 3a + 7$
    d. $2a^2 + 4ah + 2h^2 + 3a + 3h - 7$
    e. $2a^2 + 2h^2 + 3a + 3h - 14$
    f. $4a + 2h + 3$

12. a. $\frac{-5a + 2}{a}$ b. $\frac{1}{2a - 5}$
    c. $2\sqrt{a} - 5$ d. $\sqrt{2a - 5}$

16. a. $[-5, 7]$ b. $[-1, 2]$
    c. $f(1) = -1$ 1 d. $x = -3, -1, 3, 5$
    e. $(-3, -1) \cup (3, 5)$

24. $\left(-3, -\frac{3}{4}\right) \cup (2, \infty)$

34. a.



    b.
    c. Decreasing on $(-\infty, 0]$
    Increasing on $[0, \infty)$

46. $f(x) = -\frac{3}{2}x + 4$

60. a. $y = \frac{4}{x}$ b. $S = 3x + 4 + \frac{12}{x}$

68. a. $L(x) = \sqrt{2500 + (x - 2)^2}$
    b. approx. 57.9 feet

Section 3.5

2. Even 4. Odd 8. Neither

12. Given: g(x) = | x | and f(x) = | x - c |
    To find f(x):
    For c = -3, shift g(x) left 3 units
    For c = 1, shift g(x) right 1 unit
    For c = 3, shift g(x) right 3 units

14. Given: g(x) = $2x^2$ and f(x) = $2x^2$ - c
    to find f(x):
    For c = -4, shift g(x) up 4 units
    For c = 2, shift g(x) down 2 units
    For c = 4, shift g(x) down 4 units

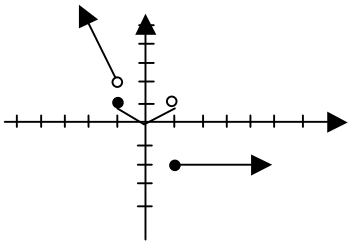
30. (-1, -8)

36. graph of f horizontally stretched by 2 and shifted down 3

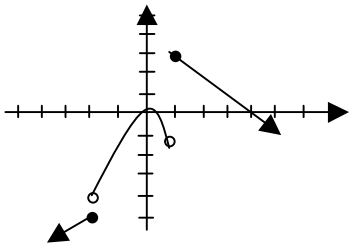
40. Given f(x) as drawn:
    a. shift f right 2 units
    b. shift f left 2 units
    c. shift f down 2 units
    d. shift f up 2 units
    e. reflect f through the x-axis and vertically stretch it by a factor of 2.
    f. reflect f through the x-axis and vertically compress it by a factor of 2.
    g. reflect f through the y-axis and horizontally compress it by a factor of 2.
    h. horizontally stretch f by a factor of 2.
    i. reflect f about the x-axis, shift it left 4 units and down 2 units.
    j. shift f right 4 units and up 2.

44. a. $y = f(x - 2) + 2$
    b. $y = -f(x)$
    c. $y = -f(x + 4) + 2$

48.



50.



62. a. D = [-6, -2], R = [-5, -2]
    b. D = [-3, -1], R = [-10, -4]
    c. D = [-4, 0], R = [-5, 1]
    d. D = [-10, -6], R = [-11, -5]
    e. D = [2, 6], R = [-10, -4]
    f. D = [-6, -2], R = [4, 10]

64. $C(x) = \begin{cases} 0.25 & \text{if } x \le 1 \\ 0.10 + 0.15x & \text{if } x > 1 \end{cases}$

Section 3.6

10. f(x) = $-4(x - 2)^2 + 3$

16. a. x = $-\frac{8}{3}, \frac{3}{2}$
    b. -26.04 is a minimum

24. y = $-(x - 2)^2 + 4$

26. y = $\frac{5}{9}(x + 1)^2 - 2$

30. y = $\frac{7}{64}(x - 4)^2 - 7$

Section 3.7

2. a. -4 b. -14
    c. -45 d. $-\frac{9}{5}$

10. a. $3x^2 - 6x + 3$ b. $3x^2 - 1$
    c. $27x^4$ d. x - 2

18. a. $27x^3 + 18x^2$ b. $3x^3 + 6x^2$
    c. -144 d. 135

Section 3.8

6. f is not one-to-one

22. $f^{-1}(x) = \frac{-3x + 1}{x}$

40. a. The graphs intersect on the line y = x
    b. D = [1, 10], R = [0, 9]
    c. D_1= [0, 9], R_1 = [1, 10]

Section 3.9

8. k = $\frac{2500}{3}$

12. k = $\frac{8}{5}$

16. a. I = $\frac{k}{d^2}$ b. k = 2.5 x 10^9
    c. 89.7 candlepower

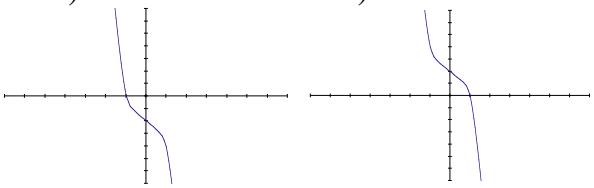
24. a. $V = k\frac{nT}{P} = \frac{knT}{P}$ b. V is doubled.

80. a. V = 6000t + 89000 b. t = $\frac{7}{3}$

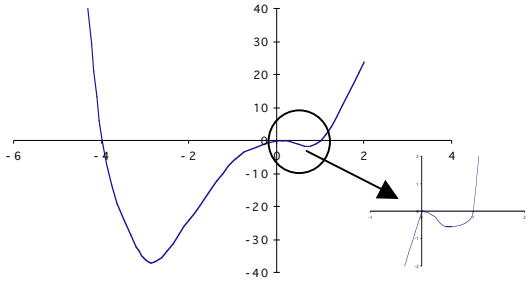
92. 375 calls

Section 4.1

2. a) b)



18. f(x) > 0 if x < -4 or x > 1
    f(x) < 0 if -4 < x < 0 or 0 < x < 1



Section 9.1

2. (-2, 5), (1,2)
4. No real solutions, $y = -1 \pm i\sqrt{2}$
18. No real solutions, $x = -\frac{6}{5} \pm \frac{2}{5}i$
20. $\left(\frac{1}{3}, 6\right), (-2, -1)$

Section 9.2

2. (-3, 5)
10. $\left(\frac{55}{31}, -\frac{95}{31}\right)$
14. No solution, 0 = 31
16. All (x,y) such that x-5y=2
24. He can row 55 ft./min.
    The current is 5 ft./min.
32. 320 $0.50 notebooks and 180 $0.75 ones
34. $V_0 = 80$ ft/sec, $S_0 = 20$ ft.

Section 5.1

2. x = 2
38. $4535.15
42. $597.81

Section 5.2

2. a. f is increasing, y-int = 1, and does not cross the x-axis
   b. f is increasing and y-int = 2, does not cross the x-axis
8. $10,257.92

Section 5.3

4. a. 81 b. $\frac{1}{256}$
   c. w
   d. 2x - 1 e. p f. 343
16. a. 7 b. -6 c. 5
    d. -3 e. 8 f. $\frac{2}{3}$
    g. 5e
18. $-\frac{3}{2}$
26. $\frac{1}{8}$
44. $f(x) = \log_2(1 - x)$
62. approx. 14.27 years

Section 5.4

4. $5\log_a y + 2\log_a w - 4\log_a x - 3\log_a z$
6. $\frac{1}{2}\log y - 4\log x - \frac{1}{3}\log z$
10. a. $\log_4(3xz)$ b. $\log_4\left(\frac{x}{7y}\right)$
    c. $\log_4 \sqrt[3]{w}$
14. $\log y^4$
18. $x = \frac{13}{3}$
22. $x = \frac{2}{15}$
46. f is decreasing, x-int =1 and does not cross the y-axis

Section 5.5

2. x ≈ 0.79
12. x ≈ -6.34
18. x ≈ 1.54
50. $t = \frac{\ln\left(\frac{A}{P}\right)}{n \ln\left(1 + \frac{r}{n}\right)}$
54. a. 7.21 hr. b. 3.11 hr.