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

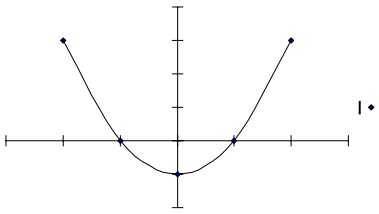
4. Line. x-int.: (-1.5, 0), y-int.: (0, -3)
12. Horizontal parabola. x-int.:(-4, 0), y-int.:(0, $\pm\sqrt{2}$)
32. It is the upper half of the circle $x^2 + y^2 = 4$ with center (0, 0) and r = 2
34. It is the left half of the circle $x^2 + y^2 = 25$ with center (0,0) and r=5
36. $(x+4)^2 + (y-1)^2 = 9$
46. $(x+1)^2 + (y-4)^2 = 20$
50. C(5, 0), r = $\sqrt{7}$
70. 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.
22. a. y = 2
    b. x = -4
24. 2x - 3y = -14
32. 2x - 3y = -7
36. $y = \frac{6}{5}x + \frac{17}{5}$
38. 3x - 4y = -21
58. a. P = -125t + 8250
    b. t = 26 months
    c. The endpoints of the graph are (0, 8250) and (66, 0)
62. a. $T = \frac{1.7}{99}t + 11.8$
    b. During the year 1910
66. a. F = -40 b. C = 160 and F = 320

Section 3.4

4. $f(-2) = \frac{2}{5}$, $f(0) = 0$, $f(3)$ is undefined
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. $\sqrt{2a-5}$
20. a. $[-5, 7]$ b. $[-1, 2]$
    c. $f(1) = -1$ 1 d. $x = -3, -1, 3, 5$
    e. $(-3, -1) \cup (3, 5)$
28. $\left[\frac{3}{4}, 2\right) \cup (2, \infty)$
40. a.



    b. D = (-∞, ∞), R = [-1, ∞)
    c. Decreasing on (-∞, 0]
       Increasing on [0, ∞)
54. $f(x) = -\frac{3}{2}x + 4$
68. a. $y(x) = \frac{4}{x}$ b. $S(x) = 3x + 4 + \frac{12}{x}$
76. a. $L(x) = \sqrt{2500 + (x-2)^2}$
    b. approx. 57.9 feet ($25\sqrt{5} + 2$ ft.)

Section 3.5

4. Even 6. Odd 10. Neither

14. 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

16. 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

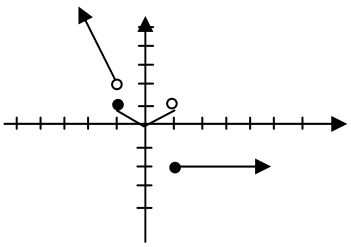
32. (-1, -8)

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

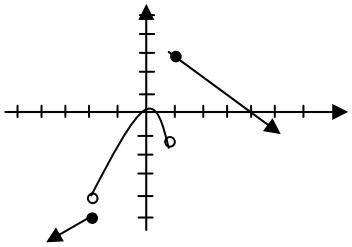
42. Given f(x) as drawn:
    a. shift f right 2 units
    b. shift f left 2 units
    c. shift f down 2 units
    d. shift f up 2 units
    e. reflect f through the x-axis and vertically stretch it by a factor of 2.
    f. reflect f through the x-axis and vertically compress it by a factor of 2.
    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.

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

50.



52.



64. 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]

66. $T(x) = \begin{cases} .01x & \text{if } x \le 500{,}000 \\ .0125x - 1250 & \text{if} x > 500{,}000 \end{cases}$

68. $C(x) = \begin{cases} 0.0577x & \text{if } 0 \le x \le 1000 \\ 4.50 + 0.0532x & \text{if } 1000 < x \le 5000 \\ 15.00 + 0.0511x & \text{if } x > 5000 \end{cases}$

Section 3.6

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

14. (a) x=-6, 0
    (b) 9 is a maximum
    (c) graph is a parabola that opens down with vertex at (-3, 9)

16. a. $x = -\frac{8}{3}, \frac{3}{2}$
    b. -26.04 is a minimum
    c. Graph is a parabola with vertex $\left(-\frac{7}{12}, -\frac{625}{24}\right)$, opens up and has the x-intercepts obtained from part a.

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

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

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

46. 125 yd. by 250 yd.

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
