Answers to Even-Numbered Exercises

Exercises 0.2

- 4. $f(0) = 0, f(2) = \frac{2}{3},$
- 10. [-1, 1]
- 16. $(-\infty,\infty)$
- 20. $[0,\infty)$

28. It is the graph of a function since it passes the vertical line test.

34. It passes the horizontal line tests and so it is the graph of a one-to-one function.

44. g(x) = (1/x) + 2, $x \neq 0$. Its domain consists of all $x \neq 0$, and its range consists of all $y \neq 2$.

Exercises 0.3

6. It is decreasing on (-2, -1) and (0, 1), and increasing on (-1, 0) and (1, 2).

14. It is increasing on $(-\infty, 0)$, and it is decreasing on $(0, \infty)$.

18. f is neither even nor odd.

22. f is even and its graph is symmetric about the y-axis.

28. y-intercept is 3. There is no x-intercept.

- 36. (i) it matches (b).(ii) it matches (c).
 - (iii) matches (a).

40. Translate the graph of $y = x^2$ to the left by 2 units and downward by 1 unit.

Exercises 0.4

6. slope -3, *y*-intercept 7 20. x = -2 (vertical) 22. $y = -\frac{1}{2}x + 4$ 26. (a) C(x) = 450x + 2100. R(x) = 1050x. P(x) = 600x - 2100(b) x = 3.5(c) P(9) = \$3300 (d) 5 34. supply curve is $q = 160p - 120, p \ge 0.75$

demand curve is q = -150p - 120, $p \ge 0.73$ equilibrium point is $q_e = 7800/31 \approx 251.61$

Exercises 0.5

2. Graph opens upward, vertex is (1,4), axis of symmetry is x = 1. 8. Graph opens upward, vertex is $\left(-\frac{1}{3},\frac{2}{3}\right)$, axis of symmetry is $x = -\frac{1}{3}$. 10. $f(x) = 2x^2 - x - 1 = (2x + 1)(x - 1).$ f(x) will be positive on $(-\infty, -1/2)$ and $(1, \infty)$, and negative on (-1/2, 1). 16. $f(x) = x^2 - \frac{3}{4} = (x + \frac{\sqrt{3}}{2})(x - \frac{\sqrt{3}}{2}).$ f(x) > 0 on $(-\infty, -\frac{\sqrt{3}}{2})$ and $(\frac{\sqrt{3}}{2}, \infty)$; f(x) < 0 on $(-\frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{2})$. 22. (a) p = 60 - q/20, $R(q) = 60q - \frac{q^2}{20}$, $P(x) = -\frac{q^2}{20} + 44q - 3000$. (b) break-even points: $q = 440 \pm 20\sqrt{334} \approx 74.5$ or 805.5. (c) C(p) = 22200 - 320p $R(p) = 1200p - 20p^2$ $P(p) = 22000 + 1520p - 20p^2$ break-even points are $p = 38 \pm \sqrt{334} \approx 19.72$ and 56.28 (d) A profit will be made if the price is between \$19.72 and \$56.28. 26. (a) $t = \frac{3+\sqrt{23}}{2} \approx 3.9$ (b) t = 3/2(c) 92

Exercises 0.6

2. f(x) falls to the left and right

8. $a_n < 0, n$ is even

10. f(x) has vertical asymptote x = 1As x approaches 1, f(x) climbs from the right, and falls from the left. 20. f(x) has vertical asymptotes x = 0 and x = 4As x approaches 0, f(x) climbs from the left, and falls from the right. As x approaches 4, f(x) climbs from the right, and falls from the left.

 $26. \ 0.2$

30. 2

36. f(9) = 27

42. Natural domain is $(0, \infty)$. Decreasing on $(0, \infty)$ (i.e. everywhere). Positive on $(0, \infty)$. Vertical asymptote x = 0, climbs from the right.