Answers for Lesson 5-1 Exercises

1. linear; none, x, 4

2. quadratic; $2x^2$, $-3x$, 5

3. quadratic; $3x^2$, $-6x$, none

4. quadratic; x^2, none, -7

5. quadratic; x^2, $3x$, -10

6. linear; none, $-7x$, 28

7. quadratic; $6x^2$, none, 6

8. linear; none, x, -1

9. quadratic; $-2x^2$, $-8x$, none

10. $(0, -4)$, $x = 0$

11. $(-1, 0)$, $x = -1$

12. $(-1, -4)$, $x = -1$

13. $P'(6, 9)$, $Q'(2, 1)$

14. $P'(1, 5)$, $Q'(-2, 8)$

15. $P'(-1, -1)$, $Q'(-4, -4)$

16. $y = -x^2 + 3x - 4$

17. $y = x^2 - 5x + 2$

18. $y = 2x^2 - x + 3$

19. $y = x^2 + 2x$

20. $y = -3x^2 + 20$

21. **a.** $y = -16x^2 + 33x + 46$, where x is the number of seconds after release and y is height in feet.

b. 28.5 ft

22. **a.** $y = 0.0236x^2 + 0.907x - 2.09$

b. 58.5%

23. $y = 4x^2$

24. $y = -2x^2 + 3x + 5$

25. no

26. $y = \frac{5}{8}x^2 - \frac{7}{4}x + 1$

27. $\left(-\frac{1}{2}, -\frac{1}{2}\right)$, $x = -\frac{1}{2}$

28. $(-1, 4)$, $x = -1$

29. $\left(\frac{1}{2}, 0\right)$, $x = \frac{1}{2}$

30. **a.** x: 4, 5; y: 6, 10

b. $y = \frac{1}{2}x^2 - \frac{1}{2}x$

c. 45 segments

31. **a.** $y = -0.0112x^2 + 1.24x + 9.97$

b. Answers may vary. Sample: domain, whole numbers from 0 to 50; range, positive whole numbers to 200.

c. 1992

d. Never; the quadratic model reaches a maximum of about 45 cents, so it is useful for only a limited number of years.

32. 3 **33.** 8 **34.** 6

35. $-\frac{11}{8}$ **36.** $\frac{25}{4}$ **37.** -10

38. **a.** $y = 3.157x - 52.34$

b. $y = 0.04243x^2 - 0.04080x + 0.8890$

c. Answers may vary. Sample: Quadratic; the quadratic model comes closer to most data points than the linear model because the data follows a curve.

39. Answers may vary. Sample: $y = -\frac{1}{25}x^2$, $y = \frac{1}{25}x^2 - \frac{2}{5}x$, $y = \frac{1}{5}x^2 - \frac{6}{5}x$

40. Answers may vary. Sample: You need at least 3 points; you are going to substitute x- and y-values into $y = ax^2 + bx + c$ to set up and solve a linear system for finding values of a, b, and c.

41. Answers may vary. Sample: They are similar in that both are symmetric with respect in the y-axis, have only non-negative y-values, lie in Quadrants I and II, and have minimums at $(0, 0)$; they are different in that the graph of $y = x^2$ rises more steeply, while $y = |x|$ rises at a steady rate as $|x|$ increases.

42. $(3, 5)$

43. a. You can find how high the arrow was when it was released.

b. The negative intercept tells you how much earlier you would have to shoot the arrow from a height of zero for its height to be described by the same function. The positive intercept tells you how many seconds after the release the arrow will take to hit the ground.