Lesson 2.1.3

2-31. See below:

a. (–9, 0), opens up, none

b. (0, 7), opens up, none

c. (0, 0), opens up, stretch

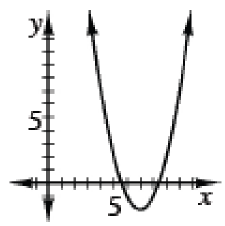
d. (1, 0), opens up, compression

e. (7, 6), opens down, none

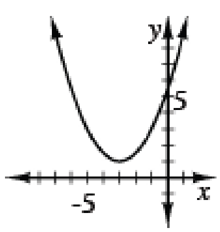
f. (–3, –8), opens up, stretch. See Suggested Lesson Activity section for strategies for making accurate graphs.

2-32. Students should answer that they need the vertex and stretch factor (or a-value).

a. vertex at (7, –2), opens up



b. vertex at (–3, 1), opens up and compressed by one half.



2-33. See below:

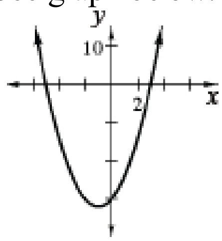
a. upward, $a > 0$, change 2 to –2

b. 2, it is the coefficient of x^2.

c. The vertex is (–1, –32).
i. (–5, 0) and (3, 0)

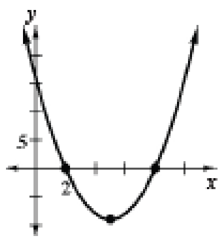
ii. The vertex is directly between the x-intercepts. Its x coordinate is -1.
iii. -32

d. See graph below. $y = 2(x + 1)^2 - 32$

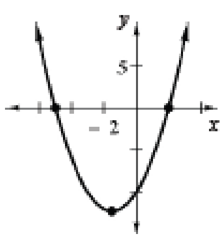


2-34. See below:

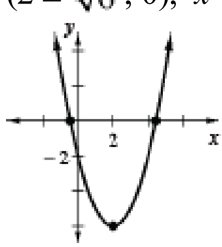
a. (8, 0), (2, 0), x-avg. = 5, $f(5) = -9$, vertex(5, –9), $p(x) = (x - 5)^2 - 9$



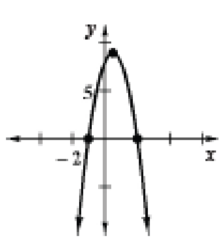
b. (–5, 0), (2, 0), x-avg. $= -\frac{3}{2}$, $f(\frac{3}{2}) = -\frac{49}{4}$, vertex(–1.5, –12.25), $f(x) = (x + \frac{3}{2})^2 - \frac{49}{4}$



c. $(2 \pm \sqrt{6}, 0)$, x-avg. = 2, $g(2) = -6$, $g(x) = (x - 2)^2 - 6$



d. (2, 0), (–1, 0), x-avg. $= \frac{1}{2}$, $h(\frac{1}{2}) = 9$, vertex($\frac{1}{2}$, 9), $h(x) = -4(x - \frac{1}{2})^2 + 9$



2-35. See below:

a. $y = 0$ or 6

b. $n = 0$ or –5

c. $t = 0$ or 7

d. $x = 0$ or –9

e. There is no constant term when each equation is set equal to zero, so the variable is a common factor after like terms are collected.

2-36. See below:

a. (7, –16), $y = (x - 7)^2 - 16$

b. (2, –16) $y = (x - 2)^2 - 16$

c. (7, –9), $y = (x - 7)^2 - 9$

d. (2, –1)

2-37. See below:

a. (2, –1)

b. When $x = 2$, $(x - 2)^2$ will equal zero and $y = -1$, the smallest possible value for y in the equation. So the y-value of the vertex is the minimum value in the range of the function.

2-38. See below:

a. 9.015 gigatons

b. $C(x) = 8(1.01)^{(x+2)}$ if x represents years since 2000 or $8.16(1.01)^x$.

2-39. Let students figure out what form is more useful.

a. 2

b. 1

c. 1

d. 2

e. 2

f. 1

g. Students check their predictions with a calculator

h. If the factored version includes a perfect-square binomial factor, the parabola will touch at one point only.

2-40. See below:

a. 4

b. $\frac{1}{16x^4y^{10}}$

c. $6xy^2$

2-41. See below:

a. $\frac{8}{27}$

b. $\frac{12}{27}$

c. $\frac{6}{27}$

d. $\frac{1}{27}$