Lesson 2.2.3
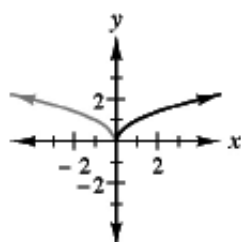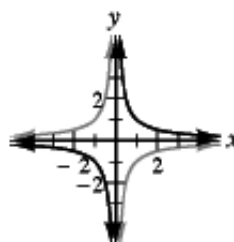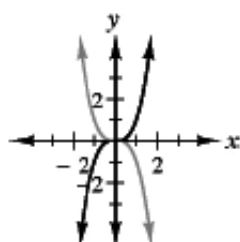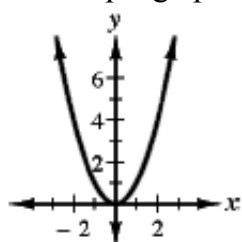
2-121. See below:

a. A vertical translation of a distance k.

b. A reflection across the x-axis.

c. A horizontal translation of a distance h.

d. A vertical dilation with a stretch (or shrink) factor of a. If a is negative, there is also a reflection across the x-axis.

2-122. See below:

a. See sample graphs below.
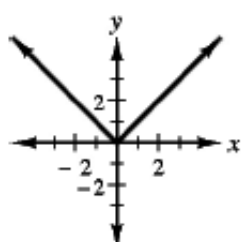
b. $f(-x) = (-x)^2 = x^2, f(-x) = (-x)^3 = -x^3, f(-x) = \frac{1}{-x} = -\frac{1}{x}, f(-x) = \sqrt{-x}$ for $x \le 0$ cannot be simplified, $f(-x) = |-x| = |x|, f(-x) = b^{-x} = \frac{1}{b^x}$

c. A reflection across the y-axis.

2-123. See below:

a. x^2 and $|x|$

b. x^3, $\frac{1}{x}$

c. b^x, $\sqrt{x} \cdot \sqrt{x}$ is niether because $f(x) = \sqrt{x}$ has the domian $x \geq 0$, and for that domain $f(-x)$ is defined only for $x = 0$. Thus$f(-x)$ neither equals $f(x)$ nor $-f(x)$.
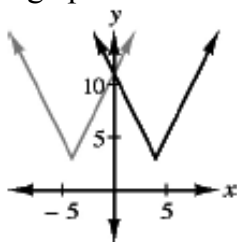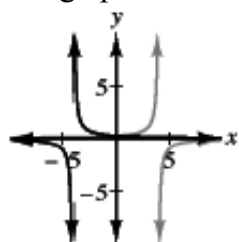
— Review & Preview —

2-125. See below:

a. Neither

b. Neither

c. Even

2-126. See below:

a. See graph below.

b. See graph below.

c. Neither function is odd nor even.

2-127. $y = -\frac{3}{4}(x - 2)^2 + 3$

2-128. See below:

a. x: $(-1, 0)$, y: $(0, 2)$, V: $(-1, 0)$, $y = 2(x + 1)^2$.

b. x: $(0, 0)$, $(2, 0)$, y: $(0, 0)$, V: $(1, 1)$ $y = -(x - 1)^2 + 1$

2-129. See below:

a. $y = x$

b. $\left(\frac{1}{2}, \frac{1}{3}\right)$

c. $\left(\frac{1}{2}, \frac{1}{3}\right)$

d. The solution to the system is the point at which the lines intersect.

2-130. See below:

a. $t(n) = 20\left(\frac{1}{4}\right)^n$ or $10\left(\frac{1}{4}\right)^{n-1}$

b. $t(n) = -6n + 4$

2-131. See below:

a. x: (2, 0), (6, 0) y: (0, 2), vertex: (4, –2), D: all real numbers, R: $y \geq -2$

b. x: (–4, 0), (2, 0), y: (0, 2), vertex (–1, 3), D: all real numbers, R: $y \leq 3$