Lesson 2.2.5

2-153. See below:

a. Overall $x \geq 0$, $y = 40.00, 45.45, 40.90, 41.35...$
First piece: $0 \leq x \leq 450$, $y = 40$
Second piece: $450 < x \leq 451$, $y = 40.45$
Third piece: $451 < x \leq 452$, $= 40.90$

b. See solution to part (a).

2-154. Answers vary.

2-155. See below:
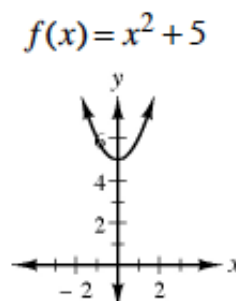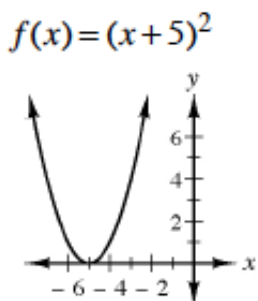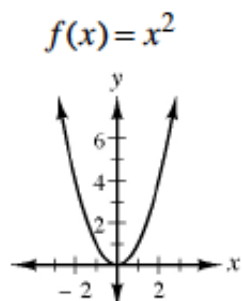
a. Solutions listed in bold in the table below.

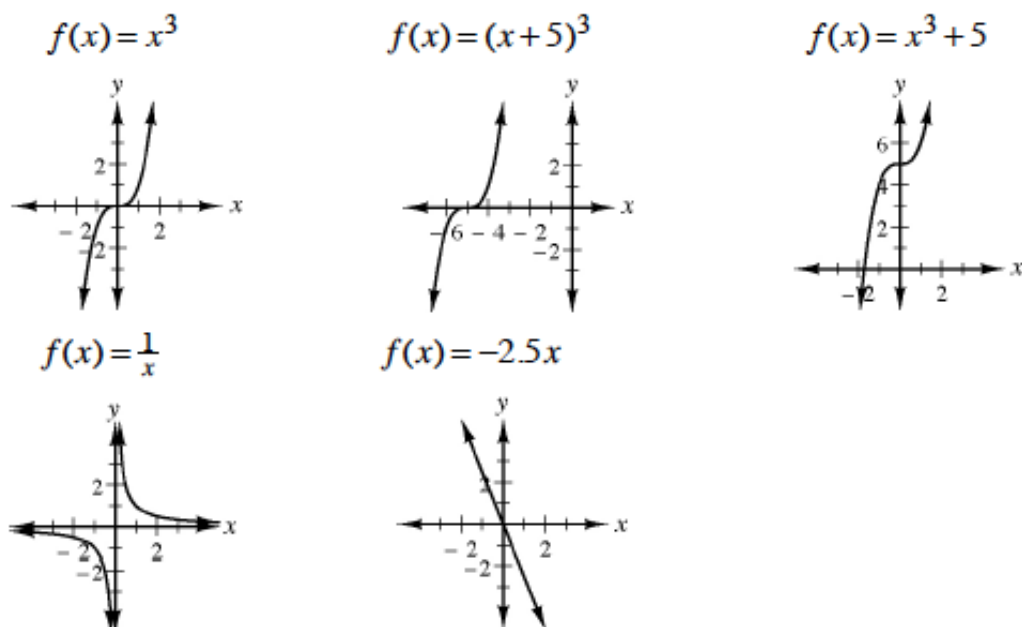| x	-4	-3	-2	-1	0	1	2	3	4	5	6	7
$F(x)$	-2	-2	-2	-3	-4	-5	-4	-1	4	4	4	4

b. $-5 \leq x < -2$, $y = -2$; $-2 \leq x < 1$, $y = -4 - x$; $1 \leq x < 4$, $y = (x-1)^2 - 5$; $4 \leq x \leq 7$, $y = 4$

2-156. The Lesson 2.2.5B Resource Page contains solutions.

2-157. See below.

a. See graphs below.

$f(x) = x^2$

$f(x) = (x+5)^2$

$f(x) = x^2 + 5$

$$f(x)=x^3 \qquad\qquad f(x)=(x+5)^3 \qquad\qquad f(x)=x^3+5$$

$$f(x)=\tfrac{1}{x} \qquad\qquad\qquad f(x)=-2.5x$$

b. One efficient method is to examine the tables for $f(-x)$ and $-f(x)$ for each function, and determine which are equivalent to the table for $f(x)$. Even: $f(x)=x^2$, $f(x)=(x+5)^2$; Odd: $f(x)=x^3$, $f(x)=\tfrac{1}{x}$, $f(x)=-2.5x$; Neither: $f(x)=x^2+5$, $f(x)=(x+5)^3$, $f(x)=x^3+5$.

c. Even functions have reflective symmetry across the y-axis, and odd functions have 180-degree rotational symmetry about the origin.

d. Odd, because it has 180-degree rotational symmetry about the origin.

2-160. Answers vary. a will stretch or compress the graph vertically, and if a is negative the graph will be flipped vertically. h will move the graph horizontally. k will move the graph vertically. If x is negated, the graph will reflect across the y-axis.

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2-162. $x < 2$, $y = -(x-2)^2$; $2 \le x$, $y = |x+2|$

2-164. $y = -2|x+3| + 4$

2-165. See below:

a. $(x+2)^2 + (y-3)^2 = 4$

b. $(x-12)^2 + (y+15)^2 = 81$

2-166. $y = (x-2.5)^2 + 0.75$, vertex $(2.5, 0.75)$

2-167. He is incorrect. Justifications vary.

2-168. $f(x) = x^2 + 1$

2-169. ± 11, ± 9, ± 19