Lesson 5.1.1

5-1. –11, divide –70 by 10, subtract 4.

5-2. See below:

a. It multiplies the input by two and then adds 1.

x	$f(x)$
3	7
4	9
–3	–5

b. 3, 9 would yield a 4, and –5 would yield a –3. It is giving the input for each original output.

c. It subtracts one and then divides by two.

x	$f(x)$
7	3
9	4
–5	–3

d. Original: $f(x) = 2x + 1$; backwards $f^{-1}(x) = \frac{x-1}{2}$; the backwards function is the same operations in opposite order as the original function.

5-3. See below:

a. 22

b. It must subtract 2 and divide by 5.

c. Subtract 2 and then divide by 5; $h^{-1}(x) = \frac{x-2}{5}$

d. Sample answer: $h(4) = 22$ and $h^{-1}(22) = 4$

5-4. See below:

a. $g(x) = 6(\frac{x+5}{2})^3$, 384

b. • divide by 6 • take cube root • multiply by 2 • subtract 5. $g^{-1}(x) = 2 \cdot \sqrt[3]{\frac{x}{6}} - 5$

c. $g^{-1}(384) = 3$ as expected.

5-5. See below:

   a. $f^{-1}(x) = \frac{x+6}{3}$

   b. $g^{-1}(x) = \sqrt[3]{x+5}$

   c. $p^{-1}(x) = \sqrt[3]{\frac{x}{2}} - 3$

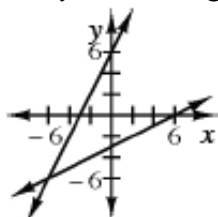   d. $t^{-1}(x) = \frac{3x}{10} + 4$

5-6. Answers will vary, but students should notice that the graphs are the same shape but have different orientation. The tables have x and y values switched. Students may notice a line of symmetry, but they are not likely to name it $y = x$.

Review & Preview

5-8. See below:

   a. $y = 2(x + 3)$

   b. Yes, $y = x$. See graph below.

5-9. See below:

   a. 9

   b. 4

   c. $x \approx 1.89$

5-10. $x = \sin^{-1}(0.75) \approx 48.59°$; to check: $\sin(48.59°) \approx 0.75$

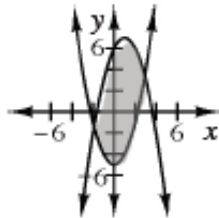**5-11.** x must equal y.

5-12. See below:
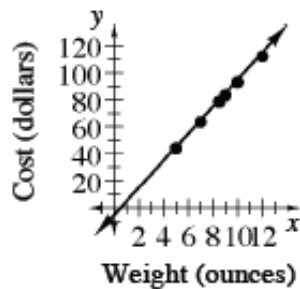
a. $x = \frac{12}{5}$

b. $x = \frac{5}{2}$

c. $x = 8$

d. $x = \frac{80}{3}$

5-13. The area between an upward parabola with vertex $(0, -5)$ and the downward parabola with vertex $(1, 7)$. See graph below.

5-14. See below:

a. See graph below.

b. See graph above.

c. Possible equation: $y = 10x - 5$

d. For this equation, approximately $495

5-15. ≈ 17.74 feet