Lesson 4.1.1

4-1. See below:

a. There are infinite coordinate pairs that make the equation true. The parabola is a "picture" of all these possible coordinate pairs.

b. $x = 0$ or $x = -6$; Possible responses: look for points $(x, 4)$, look along the line $y = 4$, trace the graph to points where $y = 4$.

4-3. See below:

a. Rewriting, because he rewrote the equation to get rid of the fractions.

b. Undoing, because the opposite of addition is subtraction.

c. Looking inside, because he reasoned about the value of the expression in the parentheses.

d. There are infinite coordinate pairs that are solutions to the equation. To check the one solution, look on the line where the x-coordinate is 7 and check if the y-coordinate is approximately $\frac{9}{10}$.

e. Verify that the point $x = 7$, $y = \frac{9}{10} = 0.9$ is on the table.

f. Possible solution: Rewrite as $\frac{x-5}{4} = \frac{1}{2}$. Then rewrite as $x - 5 = 2$ and undo for $x = 7$.

4-4. Possible responses listed below.

a. $x = 0$ or $x = \frac{1}{2}$

b. $x = 3$

c. no solution

d. $y = \frac{3}{2}$ or $y = -4$

e. $x = \pm 2$

f. no solution

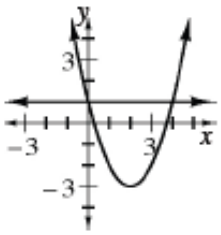
g. $w = \frac{1}{3}$

h. $x = -7$ or $x = -1$

4-5. Parts (a), (b), (c), (f), and (h) can easily be checked by graphing the similar $y =$ function. For example, for part (a), by graphing $y = 4\text{abs}(8x - 2)$ students can see if the coordinates (0, 8) and ($\frac{1}{2}$, 8) are on the graph and in the table.

Review & Preview

4-7. See graph below. $x = 0$ and $x = 4$



4-8. See below:

a. $x = 5$ or $x = -3$

b. $m = 35$

c. no solution

d. $x = 7$

4-9. $y = 2$

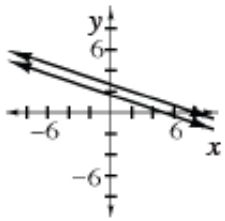
a. $y = 0$

b. $x = 0$

4-10. See below:

a. Combining the equations leads to an impossible result, so there is no solution.

b. See graph below.



c. There can be no intersection because the lines are parallel. When assuming there is an intersection,

students will find that their work results in a false statement.

4-11. This is a scalene triangle, because the sides have lengths $\sqrt{29}$, $\sqrt{17}$, and $\sqrt{20}$.

4-12. See below:

a. 63

b. 0

c. $n^3 - 1$

d. Neither; both the differences and ratios between the terms vary.

4-13. See below:

a. $\frac{(x-2)(x+6)}{(x+4)(2x+3)}$

b. $\frac{2x+1}{x-5}$

c. $\frac{9m+27}{m+3} = 9$

d. $\frac{n+3}{n-1}$

4-14. See below:

a. 0-2 times

b. 0-4 times

c. 0-4 times

d. 1-3 times if you consider parabolas that open up or down
1-4 times if you consider rotated parabolas