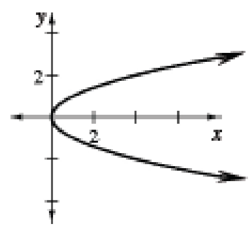
Lesson 2.2.4

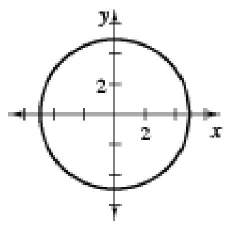
2-132. See below:

a. See tables and graphs below.

x	y
0	0
1	1
4	2
9	3
16	4



x	y
–5	0
–2	$\sqrt{21}$
0	5, –5
2	$\sqrt{21}$
5	0



b. –2

c. Students must describe the graphs.

d. They are not functions. Students may say that some x-values have more than one y-value, or that the y value is squared.

2-133. Graph two separate functions for each relationship since they must be in the form "y =" and most calculators do not have a ± button; $y_1 = \sqrt{x}$, $y_2 = -\sqrt{x}$ and $y_1 = \sqrt{25 - x^2}$, $y_2 = -\sqrt{25 - x^2}$; within the limitations of the window settings they should resemble the graphs in problem 2-132.

2-134. Students are most likely to find general equations of the form $y = \pm\sqrt{25 - (x - h)^2} + k$, at this point.

2-135. $25 = (x - h)^2 + (y - k)^2$; the center of the circle is (h, k).

2-136. See below:

a. The radius is 5; it is the square root of 25.

b. $(x - 5)^2 + (y + 7)^2 = 100$, $(x - 5)^2 + (y + 7)^2 = 144$

c. $(x - h)^2 + (y - k)^2 = r^2$

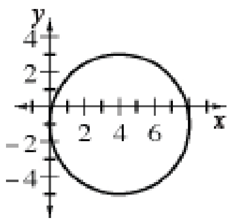
d. Take the square root of 169 to get a radius of 13.

2-137. See below:

a. The graph is a circle with radius of 4. It is in the form $(x-h)^2+(y-k)^2=r^2$.

b. The circle's center is at (4, –1) and the radius is 4.

c. See graph below.



2-138. See below:

a. Answers will vary as students experiment with a, h, and k.

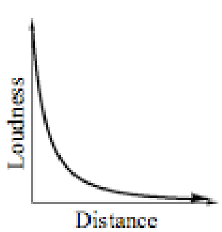
b. $y=\pm a\sqrt{x-h}+k$

c. See the "Suggested Lesson Activity". $x=b(y-k)^2+h$.

2-139. $y=(x+3.5)^2-20.25$

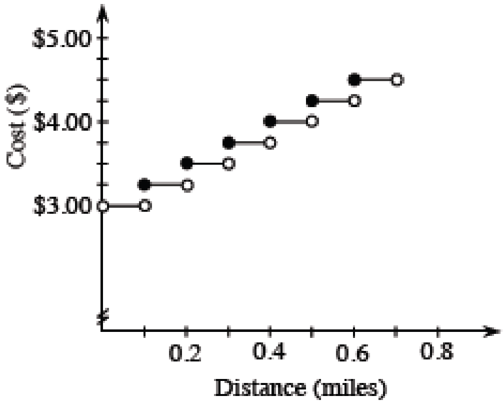
2-140. See below:

a. See graph below. Note that this graph is not very intuitive—a distance verses loudness graph starts high and decreases. Many students will graph a bell shape. If so, this is a good time to do some whole-class graphical interpretation. The bell shape could be argued as appropriate if the student sees his or her position as the origin and the negative side of the x-axis as representing direction. Students should talk about what they are visualizing. Seeing themselves with the distance first decreasing then increasing is different from the way distance is usually graphed on the x-axis, small to large.



b. Loudness depends on distance.

2-141. See graph below. The domain is all positive numbers (or $d > 0$). The range is all real numbers greater than 3 and that are multiples of 0.25.



2-142. Answers will vary.

2-143. The second graph shifts the first 5 units left and 7 units up and stretches it by a factor of 4.

2-144. See below:

a. $x^2 - 1$

b. $2x^3 + 4x^2 + 2x$

c. $x^3 - 2x^2 - x + 2$

d. y: (0, 2) x :(1, 0), (–1, 0), (2, 0)

2-145. See below:

a. $(a, b) = (2, \pm\frac{1}{2})$

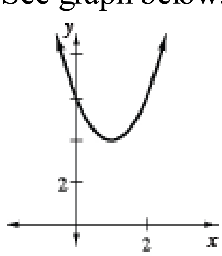
b. $(a, b) = (\frac{1}{2}, \pm 2)$

2-146. See below:

a. $y = -\frac{5}{9}(x - 3)^2 + 5$

b. $x = -\frac{3}{25}(y - 25)^2 + 3$

2-147. See graph below.



a. $y = 2x^2 - 4x + 6$

b. There is no difference, but the explanations vary.

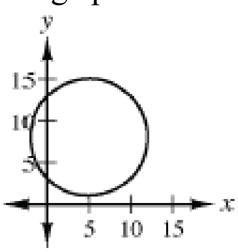
c. $y = x^2$

d. $y = x^2$

2-148. See below:

a. The graph will be a circle with a center at (5, 8) and a radius of 7.

b. See graph below.



2-149. See below:

a. –2

b. –2

c. $\frac{1}{2}$

d. –1

e. The product of the slopes of any two perpendicular lines is –1.

2-150. Answers vary.

2-151. See below:

a. (0, –144), (0, 0) and (24, 0)

b. (0, –144), (0, 0) and (24, 0)

2-152. (3, 2)