Library of Functions - Transformations

Directions:

A. Determine the parent function.
B. Describe the transformation(s) (state the radius for semicircles).
C. Sketch the graph of each function using at least 3 points (sketch at least 3 bars for the greatest integer function).
D. State the domain and range in ***interval*** notation. Use ***set*** notation for the greatest integer functions.

1. $f(x) = (x+2)^2 - 1$
2. $f(x) = -(2x+1)^2 - 4$
3. $f(x) = \sqrt{x-6}$
4. $f(x) = \sqrt[3]{x+5} - 2$
5. $f(x) = \sqrt{9-x^2}$
6. $f(x) = -|4x-12| - 3$
7. $f(x) = (x-1)^3 + 4$
8. $f(x) = [x+4]$
9. $f(x) = -|3x+5| - 2$
10. $f(x) = \sqrt{5-x} - 2$
11. $f(x) = \dfrac{1}{x+2}$
12. $f(x) = \dfrac{1}{(x-3)^2}$
13. $f(x) = -x^3 + 2$
14. $f(x) = -\sqrt[3]{x} - 1$
15. $f(x) = 2[x-1]$
16. $f(x) = \dfrac{1}{x} - 5$
17. $f(x) = -2(x+1)^2 - 5$
18. $f(x) = 2\left[\dfrac{x}{4}\right]$
19. $f(x) = \dfrac{-2}{(x+3)^2} - 1$
20. $f(x) = \sqrt{16-(x+2)^2} + 4$

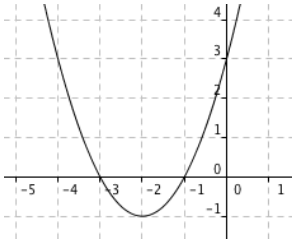
ANSWERS

1.

a. $y = x^2$

b. left 2, down 1

c.



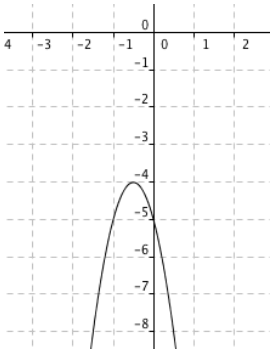
d. D: $(-\infty,\infty)$, R: $[-1,\infty)$

2.

a. $y = x^2$

b. left 1/2, down 4, reflection over the x-axis

c.



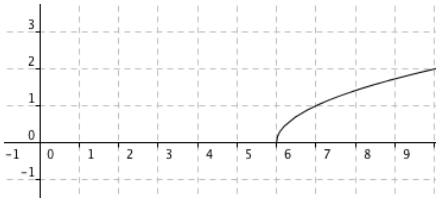
d. D: $(-\infty,\infty)$, R: $(-\infty,-4]$

3.

a. $y = \sqrt{x}$

b. right 6

c.



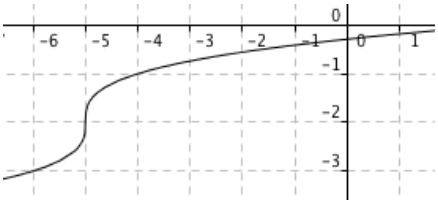
d. D: $[6,\infty)$, R: $[0,\infty)$

4.

a. $y = \sqrt[3]{x}$

b. left 5, down 2

c.



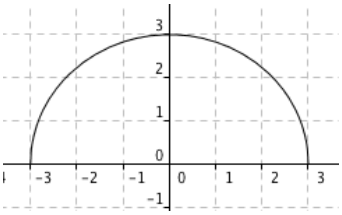
d. D: $(-\infty,\infty)$, R: $(-\infty,\infty)$

5.

a. $y = \sqrt{r^2 - x^2}$

b. radius = 3

c.



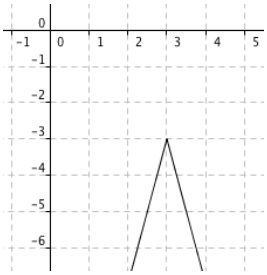
d. D: $[-3,3]$, R: $[0,3]$

6.

a. $y = |x|$

b. right 3, down 3, reflection over the x-axis, horizontal shrink

c.



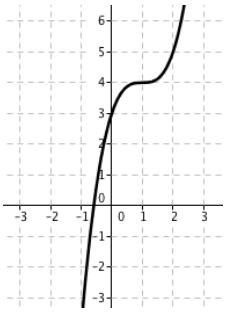
d. D: $(-\infty,\infty)$, R: $(-\infty,-3]$

7.

a. $y = x^3$

b. right 1, up 4

c.



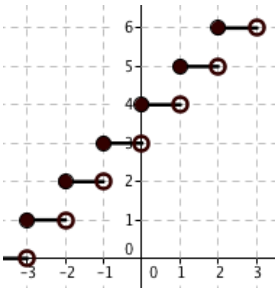
d. D: $(-\infty,\infty)$, R: $(-\infty,\infty)$

8.

a. $y = [x]$

b. left 4

c.



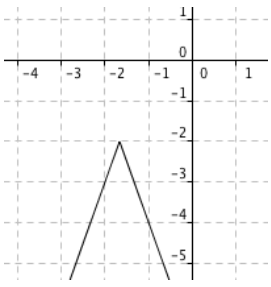
d. D: $\{x|x \in R\}$, R: $\{y|y \in Z\}$

9.

a. $y = |x|$

b. left 5/3, down 2, reflection over the x-axis, horizontal shrink

c.



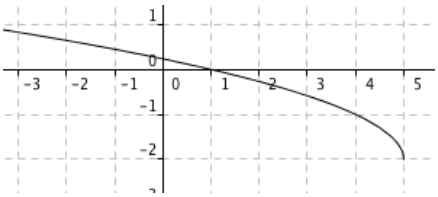
d. D: $(-\infty,\infty)$, R: $(-\infty,-2]$

10.

a. $y = \sqrt{x}$

b. right 5, down 2, reflection over the y-axis

c.



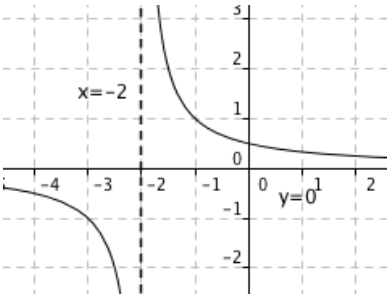
d. D: $(-\infty,5]$, R: $[-2,\infty)$

11.

a. $y = \frac{1}{x}$

b. left 2

c.



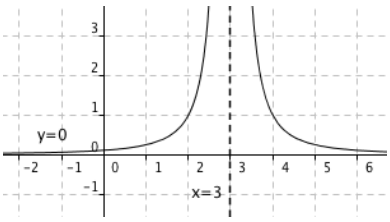
d. D: $(-\infty,-2)\cup(-2,\infty)$, R: $(-\infty,0)\cup(0,\infty)$

12.

a. $y = \frac{1}{x^2}$

b. right 3

c.



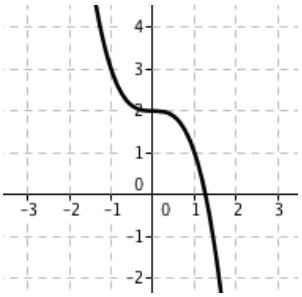
d. D: $(-\infty,3)\cup(3,\infty)$, R: $(0,\infty)$

13.

a. $y = x^3$

b. up 2, reflection over the x-axis

c.



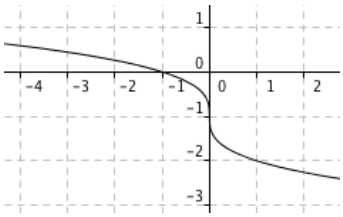
d. D: $(-\infty,\infty)$, R: $(-\infty,\infty)$

14.

a. $y = \sqrt[3]{x}$

b. down 1, reflection over the x-axis

c.



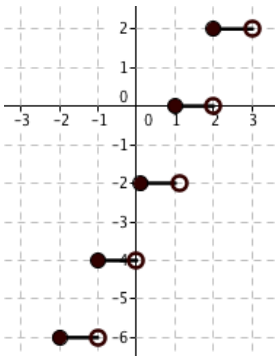
d. D: $(-\infty,\infty)$, R: $(-\infty,\infty)$

15.

a. $y = [x]$

b. right 1, vertical stretch

c.



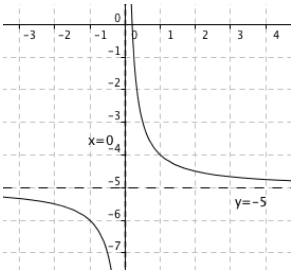
d. D: $\{x|x \in R\}$, R: $\{y|y \in Z\}$

16.

a. $y = \frac{1}{x}$

b. down 5

c.



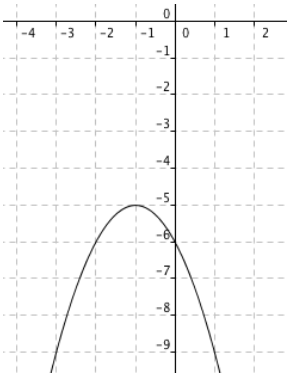
d. D: $(-\infty,0) \cup (0,\infty)$, R: $(-\infty,-5) \cup (-5,\infty)$

17.

a. $y = x^2$

b. left 1, down 5, reflection over the x-axis, vertical stretch

c.



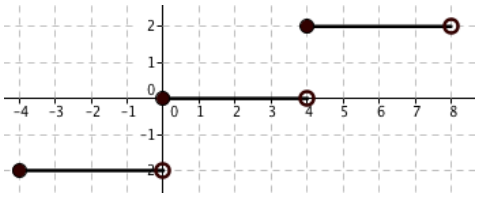
d. D: $(-\infty,\infty)$, R: $(-\infty,-5]$

18.

a. $y = [x]$

b. vertical stretch, horizontal stretch

c.



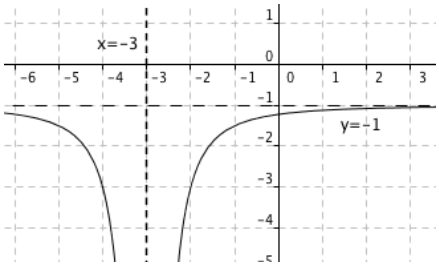
d. D: $\{x|x \in R\}$, R: $\left\{y \middle| y = \frac{n}{4}, n \in Z\right\}$

19.

a. $y = \frac{1}{x^2}$

b. left 3, down 1, vertical stretch, reflection over the x-axis

c.



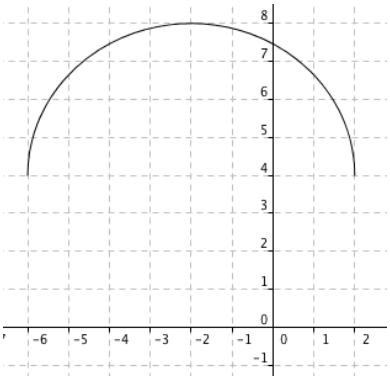
d. D: $(-\infty,-3)\cup(-3,\infty)$, R: $(-\infty,-1)$

20.

a. $y = \sqrt{r^2 - x^2}$

b. radius =4, left 2, up 4

c.



d. D: $[-6,2]$, R: $[4,8]$