

A2H Functions Review

1. Let $f(x) = \begin{cases} -3x^2 - 2x + 1, & x > 4 \\ 3[x] + 9, & x < 4 \end{cases}$

a) $f(-3)$

b) $f(4)$

c) $f(-2.8)$

d) $5f(0) - f(6)$

2. $y = \begin{cases} -2x + 3, & x \leq -1 \\ 4x + 9, & 0 < x \leq 1 \\ 5, & x > 1 \end{cases}$

a) Sketch the graph.

b) State the domain and range in set notation.

3. Describe the transformation, sketch the graph, then state the domain and range in set notation. (Omit range of greatest integer function).

a) $y = -2|x - 3| + 5$

b) $y = (3 - 2x)^2 - 1$

c) $y = \frac{1}{3} \left[\frac{x}{4} \right]$

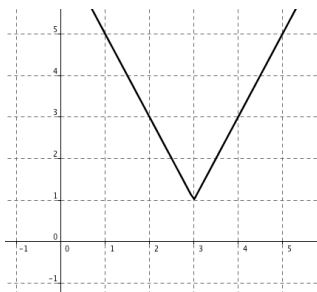
d) $y = \frac{6}{5 - x}$

e) $y = \sqrt[3]{\frac{x}{2}} - 4$

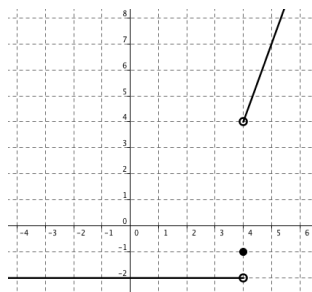
f) $y = \sqrt{9 - (x + 2)^2} - 5$

4. Write the equation.

a)



b)



5. Rewrite as a piecewise function: $y = 3|x - 1| + 4$

6. Write an equation of the function with the following characteristics:

a)

- Parent: greatest integer
- Reflection over the x-axis
- Vertical stretch by a factor of 4
- Right 2
- Up 10

b)

- Parent: cube root
- Reflection over the y-axis
- Horizontal shrink by a factor of 1/3
- Left 1
- Down 2

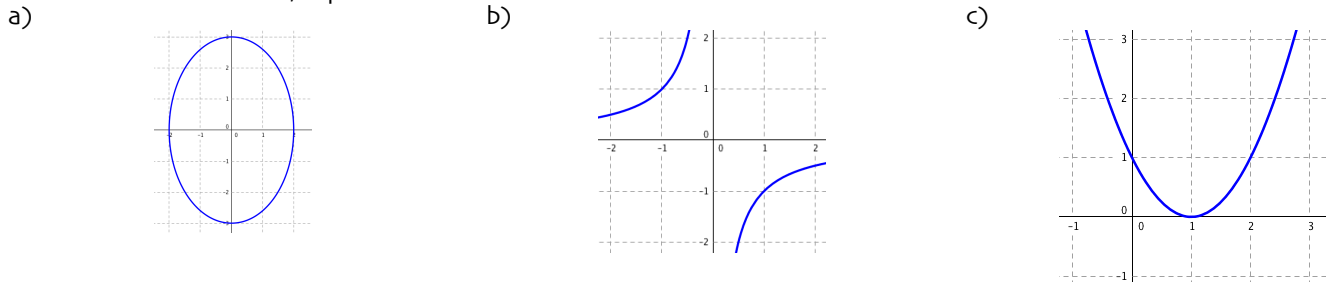
7. Determine if each function is even, odd, or neither.

a) $f(x) = \frac{x - x^3}{5x^5 + x}$

b) $g(x) = \frac{x^2 + 1}{x^3}$

c) $h(x) = \frac{x^2 - 1}{x - 1}$

8. Determine if each graph is symmetric over the x-axis, y-axis, origin or $y=x$. Then state if each graph represents is even or odd function, if possible.



9. Test each equation *algebraically* for x-axis, y-axis, origin or $y=x$ symmetry.

a) $xy = 17$

b) $3x^4 + 5x^2y^6 - 7y^8 = -9$

10. Determine if the data is representative of a linear, quadratic, exponential or logarithmic function.

a)

x	0	1	2	3
y	4	9	18	31

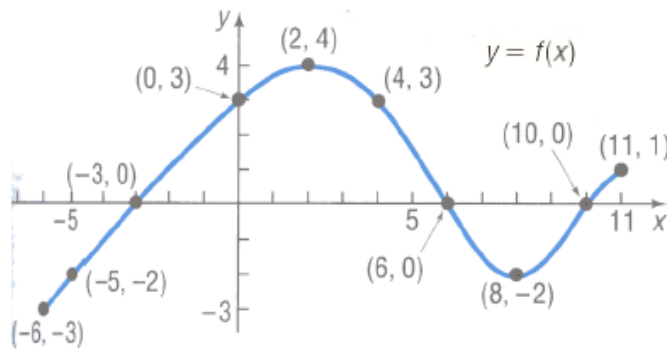
b)

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

c)

x	1/25	1/5	1	5
y	0	1	2	3

11. Determine the open intervals on which $f(x)$ is increasing, decreasing, positive and negative.



12. Find the average rate of change over the indicated interval.

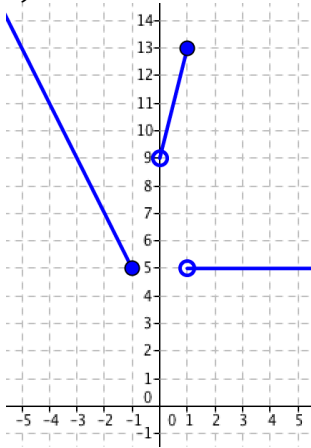
a) $f(x) = \frac{x-6}{x^2-1}, [2, 7]$

b) $g(x) = \frac{2x+3}{x^2-4}, \left[\frac{1}{3}, \frac{1}{2}\right]$

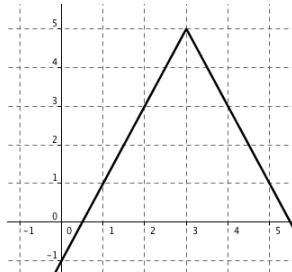
ANSWERS

1.
 a) 0 b) undefined c) 0 d) 164

2.
 a) b) $D: \{x|x \leq -1 \text{ or } x > 0\}$, $R: \{y|y \geq 5\}$

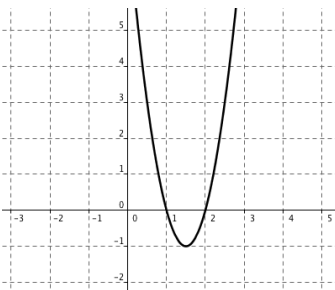


3.
 a) reflect over the x-axis, vertical stretch by a factor of 2, right 3, up 5



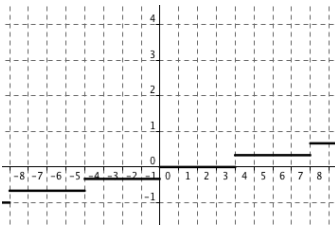
$D: \{x|x \in R\}$
 $R: \{y|y \leq 5\}$

- b) reflect over the y-axis, horizontal shrink by a factor of 1/2, right 3/2, down 1



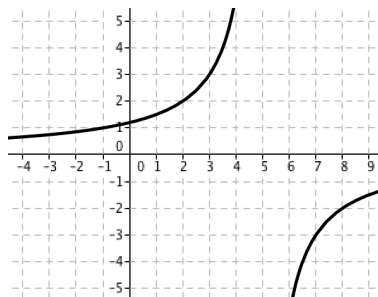
$D: \{x|x \in R\}$
 $R: \{y|y \geq -1\}$

- c) vertical shrink by a factor of 3, horizontal stretch by a factor of 4



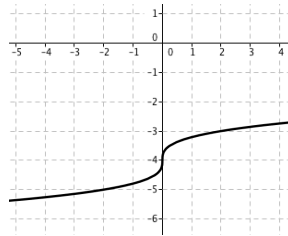
$D: \{x|x \in R\}$

- d) Vertical stretch by a factor of 6, right 5, reflection over the y-axis



$D: \{x|x \neq 5\}$
 $R: \{y|y \neq 0\}$

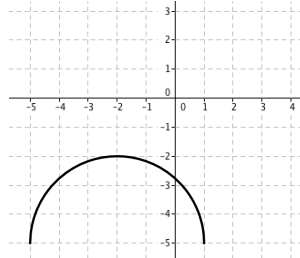
e) Horizontal stretch by a factor of 2, down 4



$$D: \{x | x \in \mathbb{R}\}$$

$$R: \{y | y \in \mathbb{R}\}$$

f) Radius of 3, left 2, down 5



$$D: \{x | -5 \leq x \leq 1\}$$

$$R: \{y | -5 \leq y \leq -2\}$$

4.

a) $y = 2|x - 3| + 1$ or

$$y = |2x - 6| + 1$$

$$b) y = \begin{cases} -2, & x < 4 \\ -1, & x = 4 \\ 3x - 8, & x > 4 \end{cases}$$

$$5. y = \begin{cases} 3x + 1, & x \geq 1 \\ -3x + 7, & x < 1 \end{cases}$$

6.

a) $y = -4[x - 2] + 10$

b) $y = \sqrt[3]{-3x - 3} - 2$

7.

a) even

b) odd

c) neither

8.

a) x-axis, y-axis, origin; neither even nor odd

b) origin, $y = x$; odd

c) no symmetry; neither even nor odd

9.

a) origin, $y = x$

b) x-axis, y-axis, origin

10.

a) quadratic

b) exponential

c) logarithmic

11.

increasing: $(-6, 2) \cup (8, 11)$ decreasing: $(2, 8)$

positive: $(-3, 6) \cup (10, 11)$ negative: $(-6, -3) \cup (6, 10)$

12.

a) $13/48$

b) $26/35$