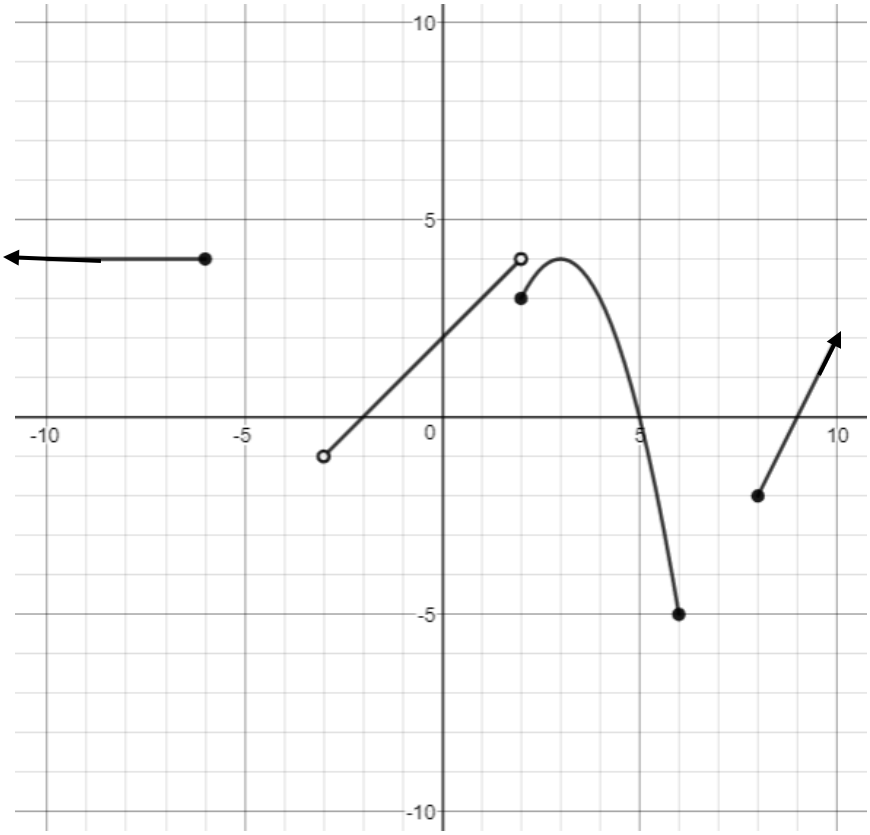
Name: Key! PD: _____ Date: _____

Honors Algebra 2: Practice, Practice, Practice! = $(Practice)^3$!

1. List the key features for the graph below



Domain: $(-\infty, -6] \cup (-3, 6] \cup [8, \infty)$

Range: $[-5, \infty)$

Is the function continuous? YES or NO

Constant: $(-\infty, -6)$

Increasing: $(-3, 2) \cup (2, 3) \cup (8, \infty)$

Decreasing: $(3, 6)$

Turning point(s): $(3, 4)$

Intercept(s): $(-2, 0)$ $(5, 0)$ $(9, 0)$ $(0, 2)$

Zero(s): $x = -2$ $x = 5$ $x = 9$

End Behavior: $As\ x \to -\infty,\quad f(x) \to$ 4

$As\ x \to \infty,\quad f(x) \to$ ∞

Name: _____ PD: _____ Date: _____

Honors Algebra 2: Practice, Practice, Practice! = $(Practice)^3$!

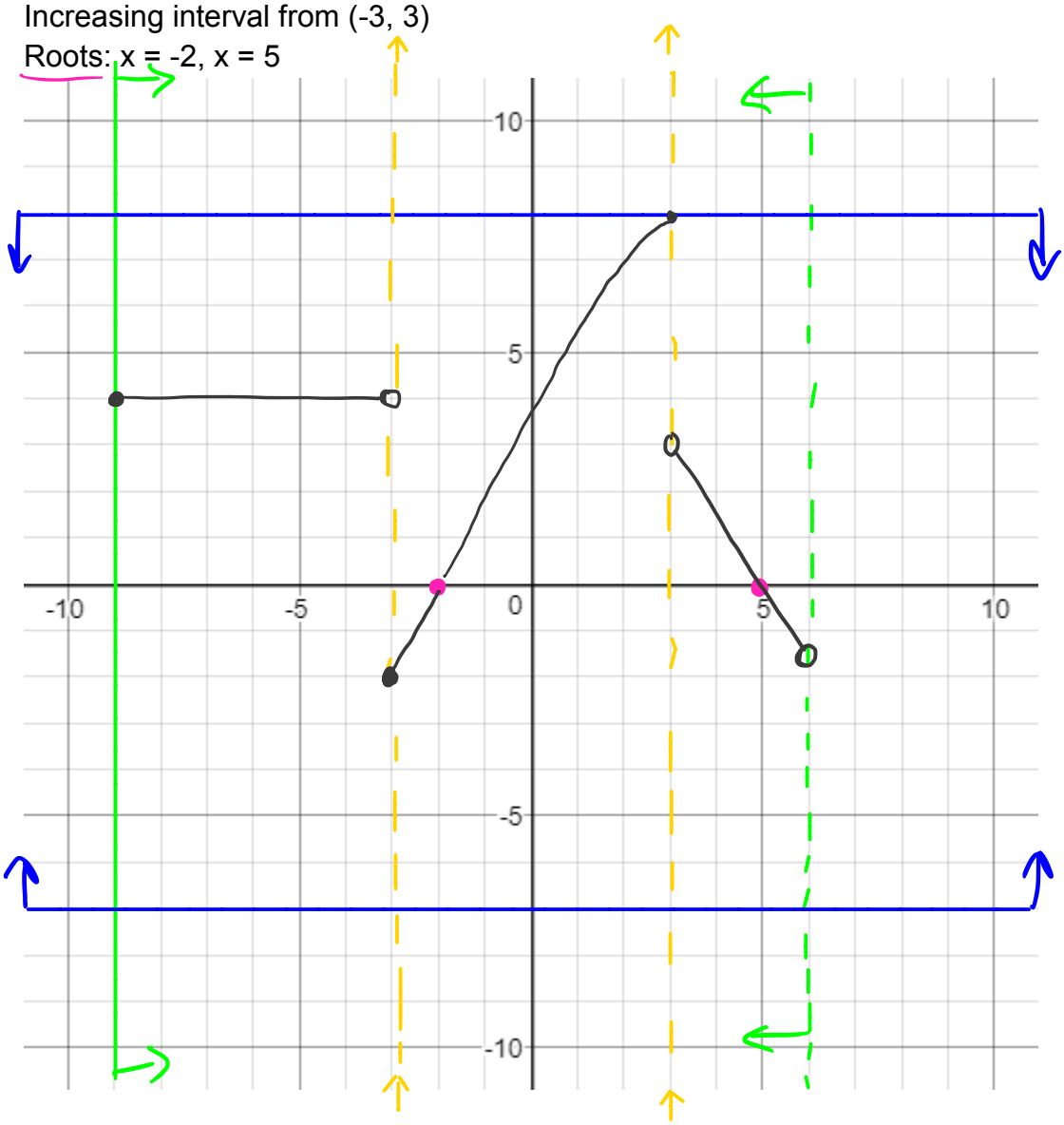
2. Given the key features below, graph the function on the xy-coordinate plane. Make sure you label your function.

Domain: $[-9, 6)$

Range: [-7, 8]

Increasing interval from (-3, 3)

Roots: x = -2, x = 5



*many answers!

Check your work!

Name: _____ PD: _____ Date: _____

Honors Algebra 2: Practice, Practice, Practice! = $(Practice)^3$!

3. Solve each equation for the indicated variable.

a. $-2(x + 4) = 30 - (8 - 2x)$ for x.

$-2x - 8 = 30 - 8 + 2x$

$+8 \quad +8$

$-2x = 30 + 2x$

$-2x \quad -2x$

$\frac{-4x}{-4} = \frac{30}{-4}$

$x = -7.5$

$x = -7.5$ or $-\frac{15}{2}$

b. $g = 4ca - 3ba$ for a

$\frac{g}{4c-3b} = \frac{a(4c-3b)}{4c-3b}$

$\frac{g}{4c-3b} = a$

$a = \frac{g}{4c-3b}$

4. Solve for x algebraically and solve the equation graphically

$\frac{-2|x+4|}{-2} = \frac{-6}{-2}$

$|x+4| = 3$

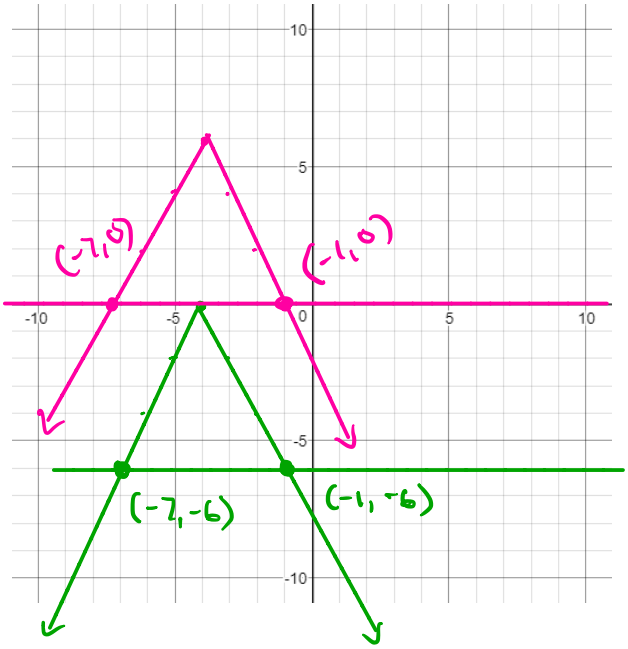
$x+4 = 3 \quad -(x+4) = 3$

$-4 \quad -4 \quad -1 \quad -1$

$x = -1 \quad x+4 = -3$

$-4 \quad -4$

$x = -7$



Method 1

* $y = -2|x+4|$

$y = -6$

* vertex $(-4,0)$

slope 2

Method 2

$-2|x+4| = -6$

$+6 \quad +6$

$-2|x+4| + 6 = 0$

vertex $(-4,6)$

slope 2

Name: _____ PD: _____ Date: _____

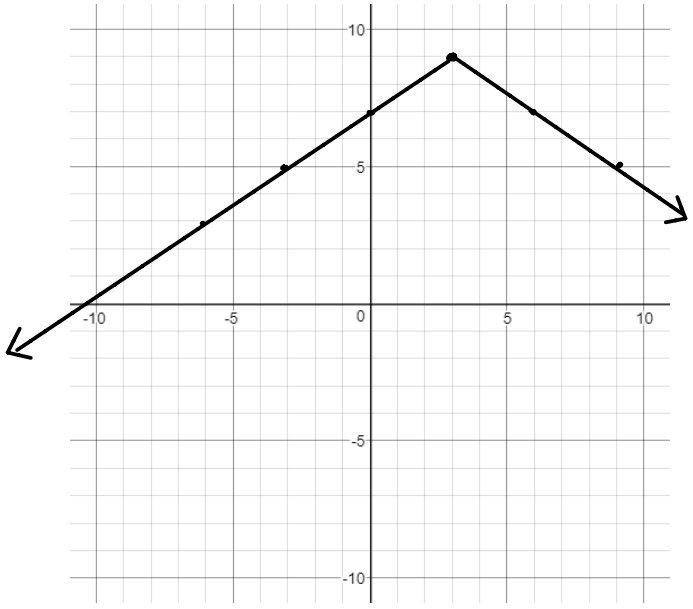
Honors Algebra 2: Practice, Practice, Practice! = $(Practice)^3$!

5. Graph the following function and write all transformations in order.

$$f(x) = -\frac{2}{3}|x-3| + 9$$

vertex (3, 9)

slope 2/3



Transformations:

1. Horizontal Shift right 3
2. Reflected over x-axis
3. Vertical compression of 2/3
4. Vertical shift up 9

6. Solve for x, write your answer on the number line and in interval notation.

$$4 - 2|x-4| \leq 8$$

$-4 \quad -4$

$$\frac{-2|x-4|}{-2} \leq \frac{4}{-2}$$

$$|x-4| \geq -2$$

$(-\infty, \infty)$

7. Solve for x, write your answer on the number line and in interval notation.

$$3|x+6| - 8 < 7$$

$+8 \quad +8$

$$\frac{3|x+6|}{3} < \frac{15}{3}$$

$$|x+6| < 5$$

$x+6 < 5$

$-6 \quad -6$

$x < -1$

$-(x+6) < 5$

$-1 \quad -1$

$x+6 > -5$

$-6 \quad -6$

$x > -11$

$(-11, -1)$

Name: _____ PD: _____ Date: _____

Honors Algebra 2: Practice, Practice, Practice! = $(Practice)^3$!

8. Solve for x, write your answer on the number line and in interval notation.

$4 + |x - 7| \geq 17$

$-4 \quad -4$

$|x-7| \geq 13$

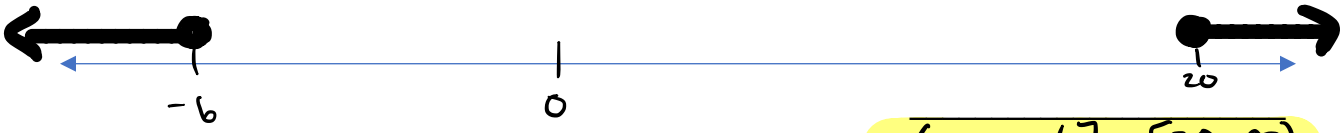
$x - 7 \geq 13$ $\quad +7 \quad +7$

$x \geq 20$

$\frac{-(x-7)}{-1} \geq \frac{13}{-1}$

$x - 7 \leq -13$ $\quad +7 \quad +7$

$x \leq -6$

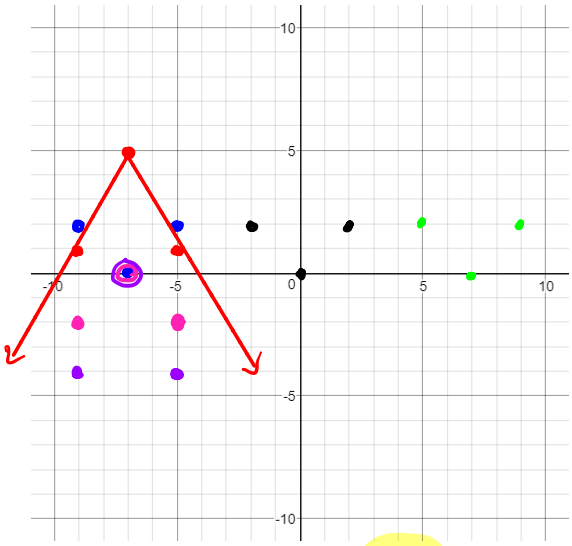


$(-\infty, -6] \cup [20, \infty)$

9. Let f(x) = |x|. Graph $-2f(-x-7)+5$ and write the transformations in order.

Transformations:

1. Horizontal Shift right 7
2. reflect over y-axis
3. reflect over x-axis
4. vertical stretch of 2
5. vertical shift up 5



10. For the functions $g(x) = x + 3$ and $h(x) = \frac{1}{x^2}$,

a. Find $\frac{h(x)}{g(x)}$ $= \frac{\frac{1}{x^2}}{x+3} = \frac{1}{x^2} \div x+3 = \frac{1}{x^2} \cdot \frac{1}{x+3} = \frac{1}{x^2(x+3)} = \frac{1}{x^3+3x^2}$

b. Find $h \circ h(3)$ $h(h(3)) = h\left(\frac{1}{3^2}\right) = h\left(\frac{1}{9}\right)$ $\quad 81$

$h\left(\frac{1}{9}\right) = \frac{1}{\left(\frac{1}{9}\right)^2} = \frac{1}{\frac{1}{81}} = 1 \div \frac{1}{81} = 1 \cdot \frac{81}{1} =$

c. h(g(x))

$h(x+3) = \frac{1}{(x+3)^2} = \frac{1}{x^2+6x+9}$

$\frac{1}{x^2+6x+9}$

Name: _____ PD: _____ Date: _____

Honors Algebra 2: Practice, Practice, Practice! = $(Practice)^3$!

11. Given $f(x) = \frac{1}{x-2}$

a. Compute *f*(2) and *f*(0).

$f(2) = \frac{1}{2-2} = DNE$ $\quad f(0) = \frac{1}{0-2} = -\frac{1}{2}$

f(2) = DNE

f(0) = $-\frac{1}{2}$

b. Solve *f*(*x*) = 0.

DNE

c. What do the answers to parts a. and b. tell you about the key features of the function *f*(*x*)?

y-intercept @ $(0, -\frac{1}{2})$, domain cannot include 2, range cannot include 0

d. Find $f^{-1}(x)$

$f(x) = \frac{1}{x-2}$

$(y-2) \cdot x = \frac{1}{y-2} \cdot (y-2)$

$x(y-2) = 1$

$xy - 2x = 1$

$+2x \quad +2x$

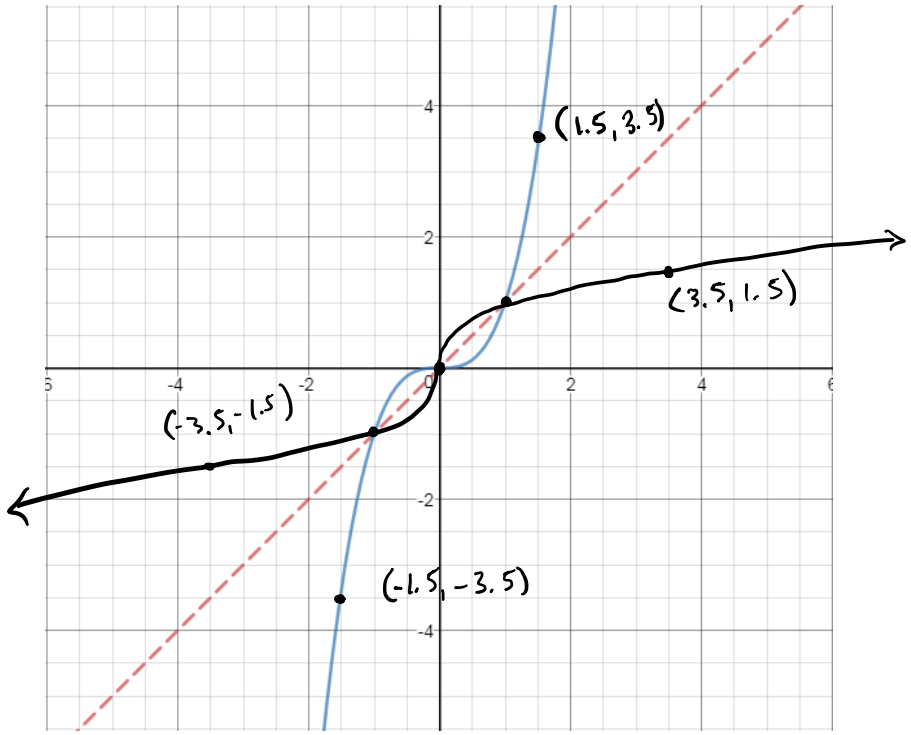
$\frac{xy}{x} = \frac{1+2x}{x}$

$y = \frac{1+2x}{x}$

$f^{-1}(x) = \frac{1+2x}{x}$

$f^{-1}(x) =$ $\frac{1+2x}{x}$

12. . The graph of $f(x)$ is shown below along with the y=x line. Draw and label the graph of $f^{-1}(x)$.



Name: _____ PD: _____ Date: _____

Honors Algebra 2: Practice, Practice, Practice! = $(Practice)^3$!

13. Using the table, find the following values:

x	2	-5	-9	10	0	-1	9	7	4
f(x)	0	4	9	-1	-9	2	-5	-5	10
g(x)	-9	10	9	4	-5	2	0	-5	-1

a. $f(-5)$

$f(-5) = 4$

b. $g(f(2))$

$f(2) = 0$

$g(0) = -5$

$g(f(2)) = -5$

c. $f^{-1}(10)$

$f^{-1}(10) = 4$

d. $f^{-1}(f^{-1}(9))$

$f^{-1}(9) = -9$

$f^{-1}(-9) = 0$

$f^{-1}(f^{-1}(9)) = 0$

e. $g^{-1}(-9)$

$g^{-1}(-9) = 2$

f. $f(g^{-1}(\mathbf{0}))$

$g^{-1}(0) = 9$

$f(9) = -5$

$f(g^{-1}(0)) = -5$

g. $g \circ f(0)$

$g(f(0))$

$f(0) = -9$

$g(-9) = 9$

$g \circ f(0) = 9$

h. $(f^{-1} \circ g^{-1})(2)$

$f^{-1}(g^{-1}(2))$

$g^{-1}(2) = -1$

$f^{-1}(-1) = 10$

$(f^{-1} \circ g^{-1})(2) = 10$