Name: Key Date: _____

Math III Honors Unit 1 Test Review

1) Describe the transformations from the parent function $f(x) = \frac{1}{x}$ to the function $g(x) = \frac{1}{x-3} - 1$? (A.SSE.1a, F.BF.3)

right 3, down 1

2) What is the minimum value of the function f(x) = |-5x + 4| +7? Is it relative or absolute? (F.IF.7)

(0.8, 7); absolute

3) What is the equation of the inverse of $f(x) = \frac{x-7}{8}$? (F.BF.4c)

$y = \frac{x-7}{8} \rightarrow x = \frac{y-7}{8} \rightarrow 8x = y - 7$ $\boxed{y^{-1} = 8x + 7}$

4) If the graph of $y = x^2$ is shifted right 10 units and up 4 units, what is the equation of the new graph? (F.BF.3)

$y = (x-10)^2 + 4$

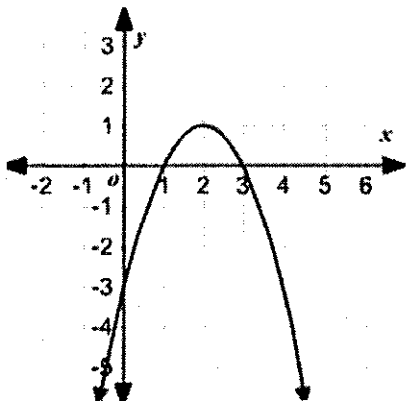
5) What is the equation of the line of symmetry for the graph $f(x) = 2x^4 - x^2 + 1$? (F.IF.7)

$x = 0$

6) Given the function graphed to the right, state the domain and range of its inverse. (F.BF.4a, F.BF.4b)

$D^{-1}: (-\infty, 1]$

$R^{-1}: (-\infty, \infty)$



Switch

$D: (-\infty, \infty)$

$R: (-\infty, 1]$

7) Given the piecewise graphed below. Answer the following questions. (F.IF.7).

Domain: $(-\infty, \infty)$

Range: $[-7, \infty)$

Absolute Max: N/A Absolute Min: $(0, -7)$

Relative Max: $(-2, 3)$ & $(2, -3)$ Relative Min: N/A

Increasing: $(0, \infty)$

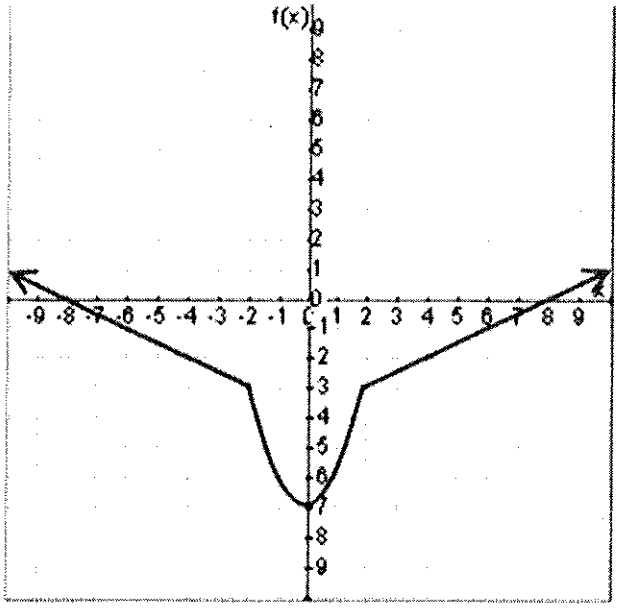
Decreasing: $(-\infty, 0)$

X-intercept(s): $(8, 0)$ & $(-8, 0)$

Y-intercept: $(0, -7)$

End Behavior: as $x \to -\infty$, $y \to \infty$

$x \to +\infty$, $y \to \infty$



8) Graph the following functions. (F.IF.2 & F.IF.7)

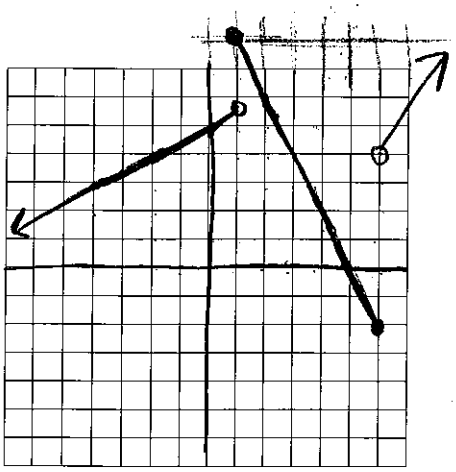
a.

$$f(x) = \begin{cases} \frac{1}{2}x + 5; & x < 1 \\ -2x + 10; & 1 \le x \le 6 \\ x - 2; & x > 6 \end{cases}$$

$f(8) = 8 - 2 = 6$

$f(-1) = \frac{1}{2}(-1) + 5 = 4.5$

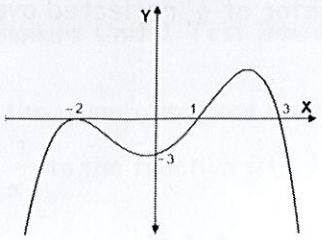
$f(4) = -2(4) + 10 = 2$



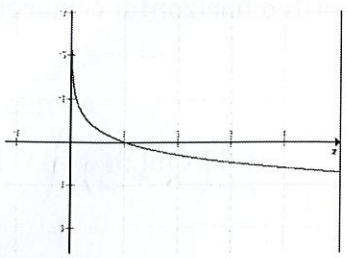
b. You go to Giant to buy some candy. You decide to buy snickers because they have a special deal on snickers. A pound of snickers costs $3.45, but if you buy 4 or more pounds, they only cost $3.00per bag. Write a piecewise function to represent this situation.

$$f(x) = \begin{cases} 3.45x, & 0 < x < 4 \\ 3x, & x \ge 4 \end{cases}$$

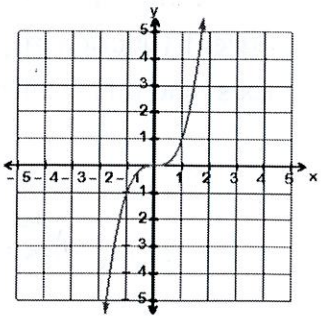
Identify the following graph types.

9) 

Quartic

10) 

log

11) 

Cubic

12) Find the inverse of the function. Graph the function and its inverse. Use a different color to graph the inverse. (F.BF.4b, F.BF.4c)

*domain is restricted!

$f(x) = \sqrt{-3x-6}$

D: $(-\infty, -2]$ $y = \sqrt{-3x-6}$

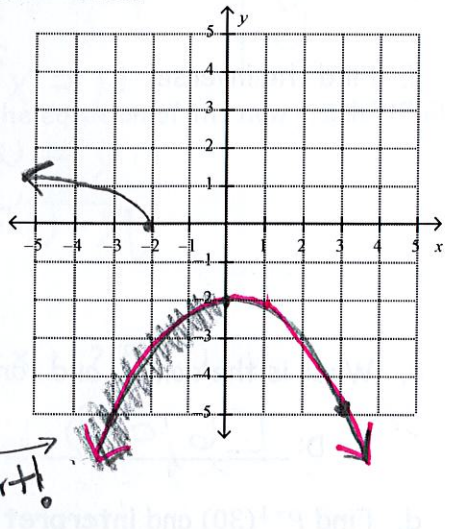
R: $[0, \infty)$ $x = \sqrt{-3y-6}$

$x^2 = -3y-6$

D': $[0, \infty)$

R': $(-\infty, -2]$ $\frac{x^2+6}{-3} = \frac{-3y}{-3}$

$y^{-1} = \frac{x^2+6}{-3}$



don't draw this part!

Based on the rates of change, identify each graph and **explain** your reasoning with words. If you cannot identify the graph, write "none".

13)

x	y	
-2	.08	x5
-1	.4	x5
0	2	x5
1	10	x5
2	50	

on graph

exponential

*being multiplied by same value

14)

x	y
-2	-6
-1	-6
0	-4
1	0
2	6

not being times by same value

Quadratic & has symmetry

15. Write the equation of the transformed functions given the parent function and transformations. Parent function of $f(x) = |x|$ with a horizontal compression by a factor of $\frac{1}{2}$, reflected over the y-axis, and left 3 units.

$g(x) = |-2(x+3)|$

16. Suppose that $P(x) = x^2 + 6$ represents the profit made from selling x number of pencils.

a. What is the domain and range of the function in the context of the problem?

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

b. Find the inverse. $y = x^2 + 6$

$x = y^2 + 6$

$\sqrt{x-6} = \sqrt{y^2}$

$P^{-1} = \pm\sqrt{x-6}$

c. What is the domain and range of $P^{-1}(x)$ in the context of the problem?

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

d. Find $P^{-1}(30)$ and **interpret** your answer in terms of the problem.

$P^{-1} = \sqrt{30-6} = \sqrt{24} \approx 4$ pencils

for \$30, you sold appx. 4 pencils

17. **Draw a rough sketch** of the table of values, **label the concavity**, and **determine what type of function it best represents.**

x	y	
-2	-2	+9
1	7	+3
2	10	+6
4	16	+3
5	19	

linear $y = 3x + 4$ no concavity