What's Going On?

Checking In Homework Logs

Minds on One Last Little Thing

Action! Practice Test

Consolidation Any Questions?

Learning Goal - I will be ready for tomorrow's test!

Checking In

Homework Logs

I will be collecting them on Tuesday.

Do not throw out any of your completed homework.

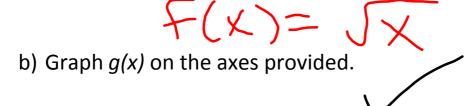
If you don't want it, give it to me and I will hold onto it for you.

Yesterday's F.F.M. Suide + roordinat 5

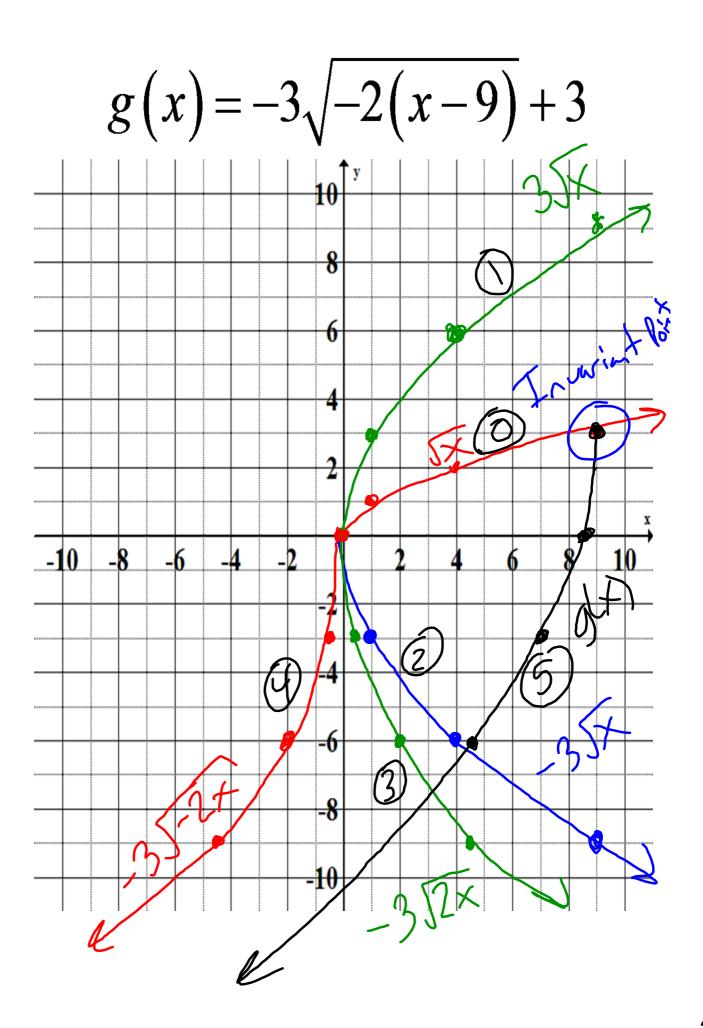
Given the funcon

$$g(x) = -3\sqrt{-2(x-9)} + 3$$
multiply y-coordinates

a) Idenfy and graph its parent funcon on the axes provided.



- c) List the transformaons you applied to the parent funcon, in order, to properly plot g(x).
- d) List any invariant points between your two funcons.
- e) State the domain and range of f(x) using proper notaon.
- f) State the domain and range of q(x) using proper notaon.



 $g(x) = -3\sqrt{-2(x-9)} + 3$

O'We graphet parent function.

() (I. We multiplied each y-value 3) of the purent function by 3.

(2. We flipped the new function function of the point the x-axis.

Me divided each X-coordinate Mof the graph from 2 by 2. i') U We flipped the graph from 3 about the 4-axis.

> 5. We shifted each point to the right quaits many 3 units. (1=9, c=3)

d) There is one invariant point at
$$(xy)=(1/3)$$

e) For $f(x)=5x$
Domain = $5x \in \mathbb{R}[x7/0]$
Range = $5x \in \mathbb{R}[x7/0]$
f) for $g(x)=-35-2(x-9)+3$
Domain = $5x \in \mathbb{R}[x]$
Runge = $5x \in \mathbb{R}[x]$

Minds on

One Last Little Thing...

When we are dealing with transformations, we need our functions to be in the form:

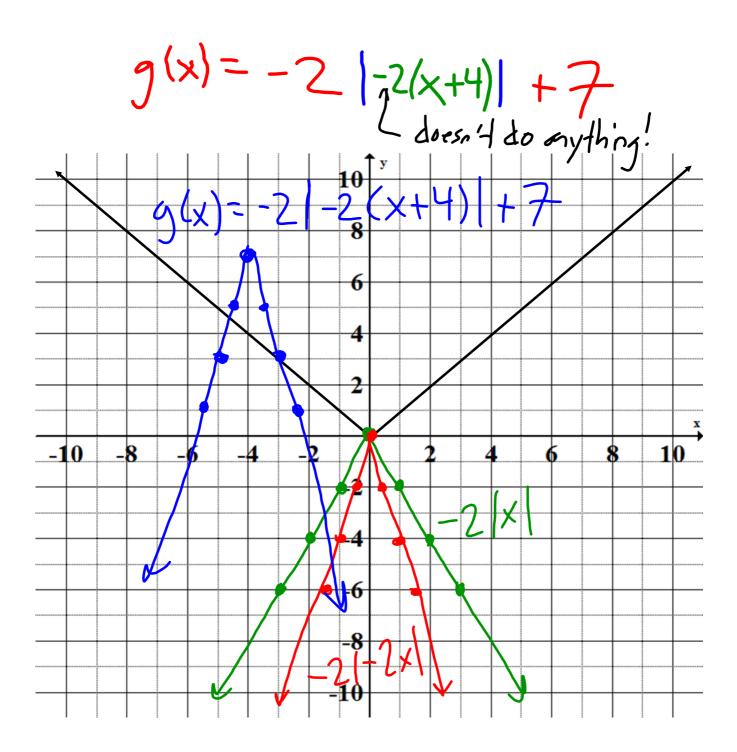
$$y = af \left[k (x-d) \right] + c$$

$$y = af \left[k (x-d) \right] + c$$

For
$$f(x) = |x|$$
, sketch the graph of $g(x) = -2f(-2x - 8) + 7$
 $g(x) = -2 | -2x - 8 | + 7$
Huh?! That isn't $k(x - d)$ FACTOR IT!

$$g(x) = -2|-2(x+4)| + 7$$

- 0. Graph the parent function f(x) = |x|
- 1. Multiply each y-coordinate by -2
- 2. Divide each x-coordinate by -2
- 3. Shift the graph 4 units left and 7 units up.



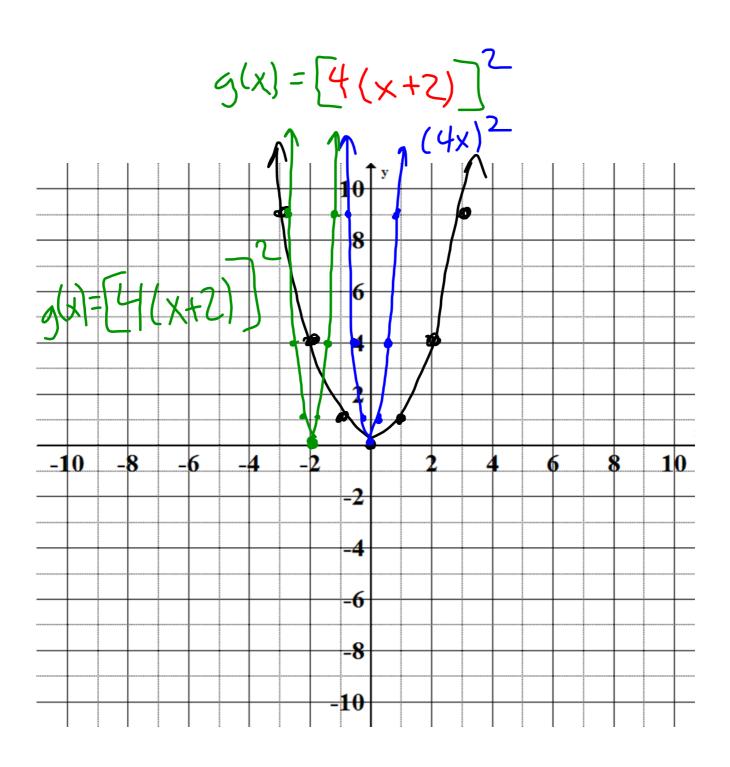
$$y = af \left\lceil k \left(x - d \right) \right\rceil + c$$

For
$$f(x) = x^2$$
, sketch the graph of $g(x) = f(4x + 8)$

$$g(x) = (4x + 8)^2$$

$$g(x) = [4(x + 2)]^2$$

- O. Graph the parent function $f(x) = x^2$
- 1. Divide each x-coordinate by 4
- 2. Shift the graph 2 units left.



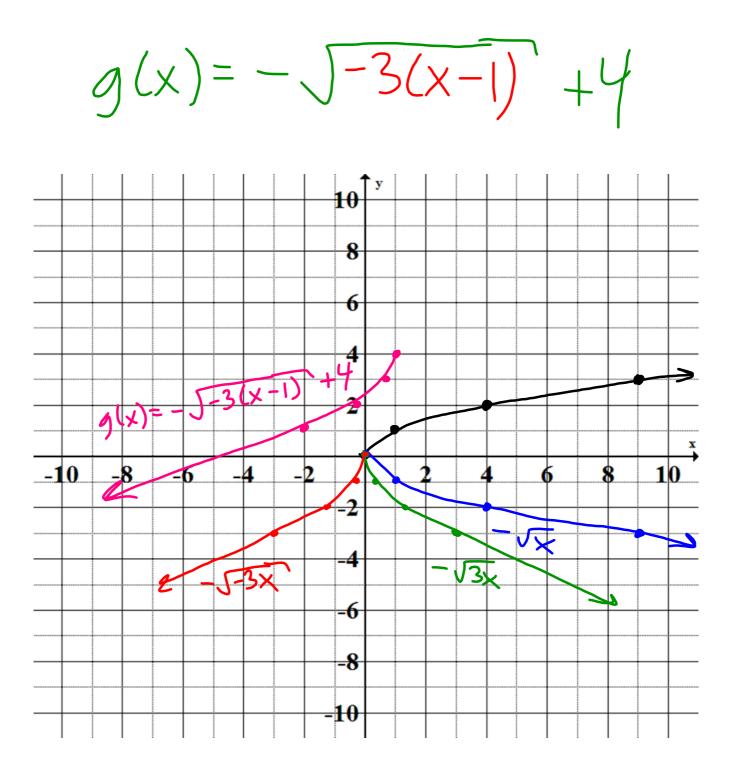
$$y = af \left\lceil k \left(x - d \right) \right\rceil + c$$

For $f(x) = \sqrt{x}$, sketch the graph of g(x) = -f(-3x + 3) + 4

$$g(x) = -\sqrt{-3x+3} + 4$$

 $FACTOR$
 $g(x) = -\sqrt{-3(x-1)} + 4$

- 0. Graph the parent function $f(x) = \sqrt{x}$
- 1. Multiply each y-coordinate by -1 (flip about the x-axis)
- 2. Divide each x-coordinate by -3
- 3. Shift the graph 1 unit right and 4 units up.



$$y = af \left\lceil k \left(x - d \right) \right\rceil + c$$

For
$$f(x) = x^2$$
, sketch the graph of $g(x) = f(3-x) + 2$

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

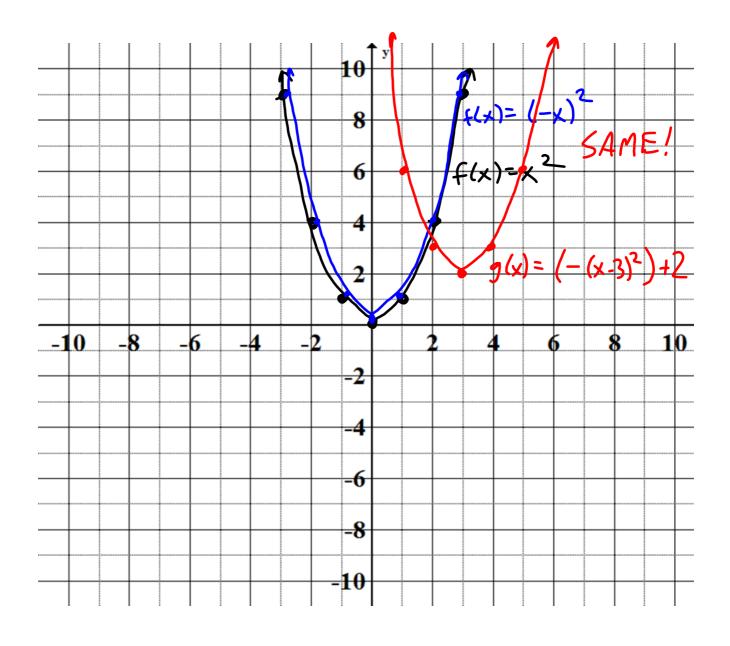
$$g(x) = (-(x-3))^2 + 2$$

- 0. Graph the parent function $f(x) = x^2$
- 1. Divide each x-coordinate by -1

(flip about the y-axis...has no effect on a parabola!)

3. Shift the graph 3 units right and 2 units up.

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



Action!

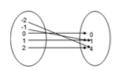
The Practice Test

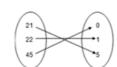
- 1. The domain of the function $y = \frac{1}{x^2}$ is:
- a) $\{x \in \mathbf{R}\}$
- (b) $\{x \in \mathbf{R} \mid x \neq 0\}$
- c) $\{x \in \mathbf{R} \mid x \neq 0, \pm 1\}$
- d) $\{y \in \mathbf{R} \mid y \neq 0\}$
- 2. The vertex of the equation $y = -3\left(x \frac{1}{2}\right)^2 + 2$ is:

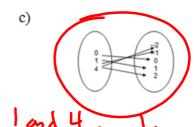
 (b) (1/2, 2)(c) (3, -1/2)

- d)(3,2)

- 3. Which of the following relations is not a function?



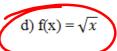




- 4. Which relation is not a function?
- a) y = 3x 7
- (b) $x^2 + y^2 = 36$
- d) y = x
- 5. Which of the following is the parent function for $y = 3\sqrt{x-2} + 7$:
- a) f(x) = x

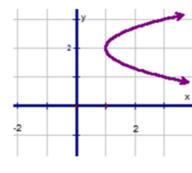
- b) $f(x) = x^2$
- c) f(x) = |x|

b)



- State which relations are functions. Explain. [2]
 - a) $\{(-2, 1), (-1, 2), (0, 4), (1, 1), (2, 2)\}$

Yes! each value of the independent variable maps to one value of the dependent



variable

7. Determine the domain and range of each relation <u>and</u> state whether the relation is a function. Explain your reasoning. [6]

a)
$$y = -2\sqrt{x-2} + 4$$

Parent function is
$$f(x) = Jx$$

Lydomain = $\{x \in R \mid x > x > 0\}$

Lyrange = $\{y \in R \mid y > x > 0\}$

This function has been shifted 2 units right,

I units up and has been reflected in

the $x - axis$!

The relation IS a function because it is a member of the square root family.

Parent function is
$$f(x)=x^2$$

Lo Domain = $\{x \in R\}$

Lo Range = $\{y \in R \mid y \neq y \neq y \}$

Function has been shifted 2 laft (no effect on domain) and $\{y \in R\}$

Domain = $\{x \in R\}$

Name = $\{x \in R\}$

PARAGORAS

Range = $\{y \in R \mid y \neq y \}$

The relation IS a function because it is a member of the quadratic family.

Part B: Application

1. For
$$f(x) = x^{2} + 2$$
 AND $g(x) = 8 - 7x$, evaluate: [6]

a) $g(-3a+1)$ put in for x

$$g(-3a+1) = 8 - 7(-3a+1)$$

$$= 8 + 2|a - 7$$

$$= |+2|a$$
b) $g(-3a+1) - f(a+4) = [8 - 7(3a+1)] - [(a+4)^{2} + 2]$

$$= [8 + 2|a - 7] - [(a+4)(a+4) + 2]$$

$$= [1 + 2|a] - [a^{2} + 8a + 16 + 7]$$

$$= [1 + 2|a] - [a^{2} + 8a + 18]$$

$$= |+2|a - a^{2} - 8a - 18$$

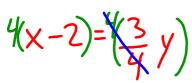
$$= -a^{2} + |3a - 17|$$

c) x when g(x) = 5

2. For the function $f(x) = \frac{3}{4}x + 2$, determine the inverse <u>and</u> sketch the graph of the function and its inverse. [3]

 $Y = \frac{3}{4}x + 2$

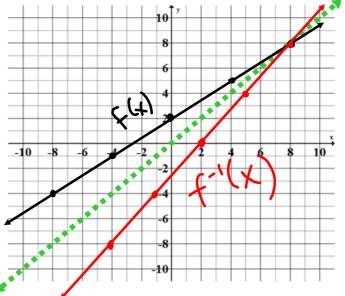
-2 -2



 $\frac{4x-8}{3} = \frac{3y}{3}$

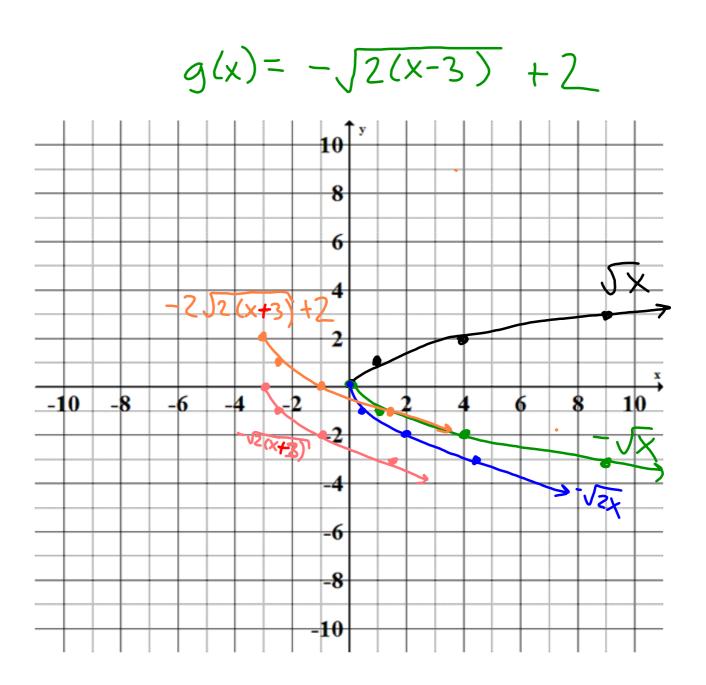
$$Y = \frac{4}{3}x - \frac{8}{3}$$

$$f^{-1}(x) = \frac{4}{3}x - \frac{8}{3}$$



3. The function y = f(x) has been transformed to y = af[k(x - d)] + c. Determine a, k, c, and d; write the equation; and sketch the graph of the transformed function. [6]

A horizontal compression by a factor of $\frac{1}{2}$ a reflection in the x-axis, a horizontal translation 3 units to the left and a vertical translation 2 units up are applied to $f(x) = \sqrt{x}$. Set up your table using x values 0, 1, 4, 9.



Part C: Thinking/Inquiry/Problem Solving

4. A farmer has 90 m of fencing to enclose a rectangular area and divide it into two sections as shown.



a) Write an equation to express the total area enclosed as a function of the width. [2]

$$A(x) = (x)$$

$$A(x) = (40-3x)(x)$$

$$A(x) = 90x-3x^{2}$$

$$A(x) = 45x - \frac{3}{2}x^{2}$$

$$A(x) = -\frac{3}{2}x^{2} + 45x$$

b) Determine the domain and range of this area function. [2]

The graph is a parabola, so the domain is

Domain =
$$\frac{2}{2} \times \frac{2}{2} \times \frac{2}{3} \times \frac{$$

c) Determine the dimensions that give the maximum area. [2]

$$A(x) = -\frac{3}{2}x^2 + 45x$$

We already know that X=15 at the vertex (max area) i the width is 15

From earlier.

$$length = 90-3x$$

$$= 90-3(15)$$

$$= 90-45$$

width=15

louth=22.5 when max area is achieved

Part D: Communication

- 1. Explain how to determine the inverse of a function given: [4]
 - a) An equation.
 - 1. Swap your variables (often x and y)
 - 2. Solve for your previously independent variable.
 - 3. Write as $f^{-1}(x) = ...$

b) A graph.

Reflect each point across the line y=x

c) A set of points.

Swap the values of the independent variable (often x) and the dependent variable (often y).

Consolidation

Any Questions?

email me: (david.gilbert@tldsb.on.ca)

OR

come and see me at lunch!