### What's Going On?

Checking In Homework Logs

Minds on The Effects of **a**, **d** and **c**.

Whiteboards

Action! The Effects of **k** 

Consolidation Tell Me About Myself

Learning Goal - I will understand the effects of *k* on our parent functions.

# Pre R.A.F.T.

Use a red pen and correct yesterday's FFM question.

Determine the inverse of the given function.

$$h(x) = 3\sqrt{x+1} - 4$$
Let  $y = h(x)$ 

$$y = 3\sqrt{x+1} - 4$$
Switch the variables
$$x = 3\sqrt{y+1} - 4$$
Solve for  $y$ 

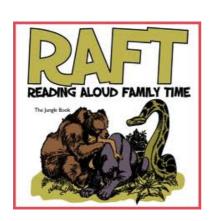
$$x = 3\sqrt{y+1} - 4$$

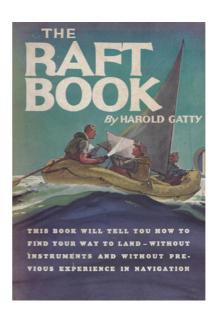
$$\frac{x+4}{3} = (x+4)^{2}$$

$$y + 1 = (x+4)^{2}$$

$$y = (x+4)^{2}$$

# R.A.F.T.





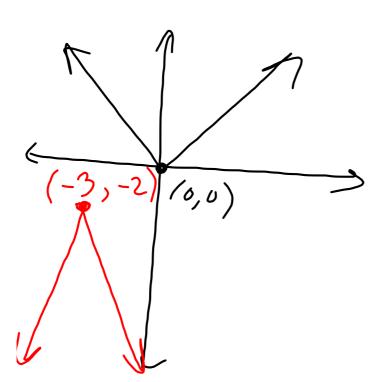
# Homework Logs

# F.F.M.

and its parent function. Lake the vertice 5.

Describe what transformations were applied to the original parent function.

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



x=-2 - Vertically Stretch by Factor of 2 - reflection He X-axis - Shifted 3 with to the left C=-2 -shiffed? mits Lowa

What's happening at

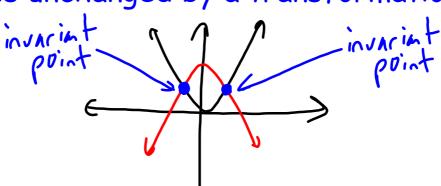
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Soooo much!

# A New Term!



An <u>invariant point</u> is a point on a graph that is unchanged by a transformation.



## Minds on

# From Yesterday

$$y = a(x - h)^2 + k$$

becomes...

$$g(x) = a(x - d)^2 + c$$

$$g(x) = af[k(x-d)] + c$$

This function describes a transformation of the graph of f. f(x) can be:

$$f(x) = x^2 \qquad f(x) = \sqrt{x} \qquad f(x) = \frac{1}{x} \qquad f(x) = |x|$$

#### a: reflection in the x-axis

- when a is negative

#### vertical stretch or compression

- stretch when |a| > 1
- compression when |a| < 1

#### c: vertical translation

- up when **c** is positive
- down when c is negative

#### d: horizontal translation

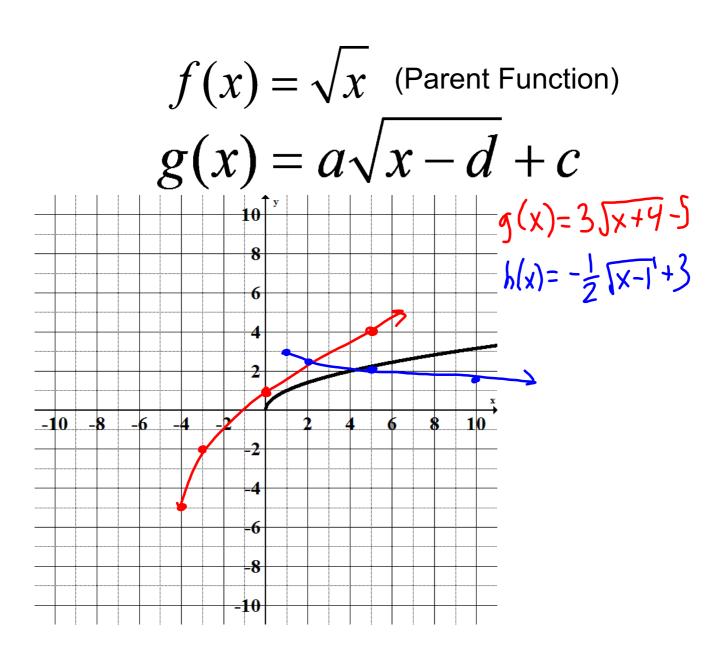
- to the right when d is positive
- to the left when **d** is negative

$$f(x) = x^{2} \text{ (Parent Function)}$$

$$g(x) = a(x - d)^{2} + c$$

$$g(x) = 2(x-3)^{2} - 4$$

$$h(x) = -0.5(x+4) + 3$$



$$f(x) = \frac{1}{x} \text{ (Parent Function)}$$

$$g(x) = \frac{\alpha}{x - d} + c$$

$$x - d$$

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

$$f(x) = \frac{1}{x} \text{ (Parent Function)}$$

$$g(x) = \frac{a}{x - d} + c$$

$$g(x) = \frac{3}{x - d} + c$$

$$g(x) = \frac{3}{x - d} - 2$$

$$f(x) = \frac{1}{x} \text{ (Parent Function)}$$

$$g(x) = \frac{a}{x - d} + c$$

$$f(x) = \frac{a}{x - d} + c$$

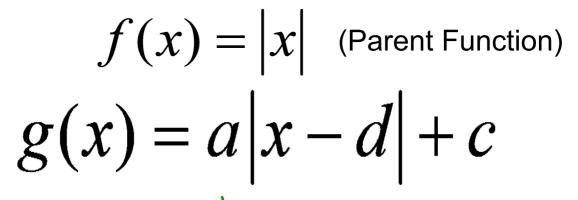
$$f(x) = \frac{-1}{x}$$

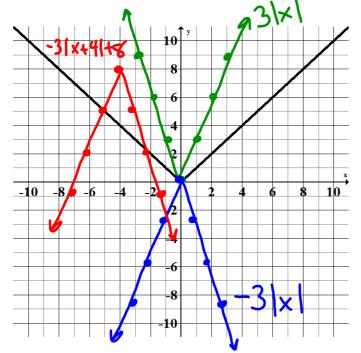
$$f(x) = \frac{1}{x} \text{ (Parent Function)}$$

$$g(x) = \frac{a}{x - d} + c$$

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

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





green-> blue-> re&

# Tell me about myself.

$$f(x) = 2\left|x + 5\right| - 1$$

#### I have been:

vertically stretched by a factor of 2, shifted 5 units to the left, shifted 1 unit down,.

$$g(x) = \frac{3}{x-4} + 5$$

#### I have been:

vertically stretched by a factor of 3 shifted 4 units to the right, shifted 5 units up.

$$h(x) = 0.25\sqrt{x+1} - 4$$

#### I have been:

vertically compressed by a factor of 0.25 shifted 1 unit to the left, shifted 4 units down.

Action!

# The Effects of **k**

# Demo!

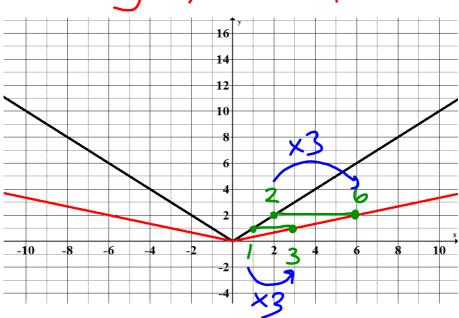
## Action!

# The Effects of **k**

What's my equation?

I have been horizontally stretched by a factor of 3!





### Action!

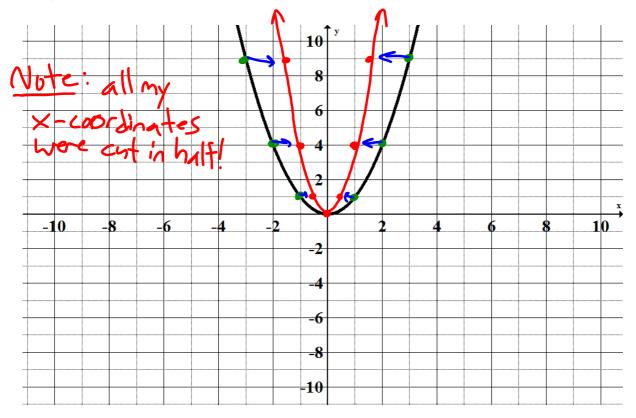
# The Effects of **k**

Draw my graph! 
$$g(x) = (-2x)^2$$

My k-value is -2.

Therefore, I have been horizontally **compressed** by a factor of of 1/2 and because my **k** value is negative, I have been reflected about the y-axis.

However, because I am already symmetrical about the y-axis, this reflection has no effect!



$$g(x) = af(kx - d) + c$$

This function describes a transformation of the graph of f. f(x) can be:

$$f(x) = x^2 \quad f(x) = \sqrt{x} \quad f(x) = \frac{1}{x} \quad f(x) = |x|$$

#### a: reflection in the x-axis

- when a is negative

#### vertical stretch or compression

- stretch when |a| > 1
- compression when |a| < 1

#### k: reflection in the y-axis\*

- when k is negative

#### horizontal stretch or compression

- compression when  $|\mathbf{k}| > 1$
- stretch when  $|\mathbf{k}| < 1$

#### c: vertical translation

- up when c is positive
- down when **c** is negative

#### d: horizontal translation

- to the right when **d** is positive
- to the left when **d** is negative

# Consolidation

Homework!

Pg. 58

1 - 12

You may pick some of 3-7 and 10

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