Today's Agenda:

1) Warm Up
   -review for quiz

2) Questions on Warm Up, HW, etc...

3) QUIZ on Composition

4) Use notes on inverses to try homework

You can use a calculator on the quiz

Let $f(x) = x^{1/2} + 2$, $g(x) = 3x^{1/2} - 1$, and $h(x) = -2x^{1/2} + 3$

1) Perform $f(x) - g(x)$

$\mathbf{-2x^{1/2} + 3}$

2) Perform $g(x) - h(x)$

$\mathbf{5x^{1/2} - 4}$

Let $f(x) = 4x^{3/2}$, $g(x) = 2x^{1/3}$, and $h(x) = -6x^{1/2}$

3) Perform $f(x) \cdot h(x)$

$\mathbf{-24x^2}$

4) Perform $\frac{f(x)}{g(x)}$

$\mathbf{2x^{7/6}}$

Let $f(x) = 2x^{-1}$, $g(x) = 2x + 5$, and $h(x) = \frac{x-4}{2}$

5) Perform $g(h(x))$

$\mathbf{x + 1}$

6) Perform $g(g(x))$

$\mathbf{4x + 15}$

Let $f(x) = 2x + 2$, $g(x) = x^2$, and $h(x) = \frac{3}{x-2}$

7) Perform $\frac{f(x)}{g(x)}$

$\mathbf{\frac{2(x+1)}{x^2}}$

Domain: $(-\infty, \mathbf{0}) \cup (\mathbf{0}, \infty)$

8) Perform $g(f(x))$

$\mathbf{4x^2 + 8x + 4}$

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

NOTES: Inverse Function (Part 1) **Day 19**

To find the inverse function…

From a *Table:*	From a *Graph:*	From an *Equation:*
Switch x and y values	**Switch** x and y values of points	1. Write the original function, using **y** to stand for f(x). 2. **Switch** x and y. 3. Solve for y using **inverse operations** 4. Replace y with **$f^{-1}(x)$**.

From a *Table:*

Switch x and y values

EXAMPLE 1:

Table for f(x):

x	−2	−1	0	1	2
y	4	2	0	−2	−4

Table for $f^{-1}(x)$:

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

Is the inverse a function?

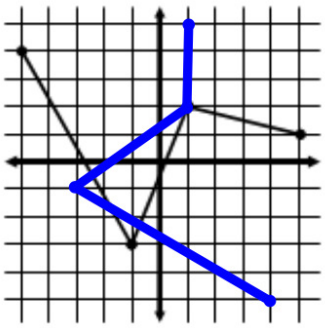
Yes, there is exactly one output(y) for every input(x)

From a *Graph:*

Switch x and y values of points

f(x):	$f^{-1}(x)$:
(-5, 4)	(4, -5)
(-1, -3)	(-3, -1)
(2, 1)	(1, 2)
(5, 1)	(1, 5)

EXAMPLE 2:



Is the inverse a function?

No, it fails the vertical line test

From an *Equation:*

1. Write the original function, using __y__ to stand for f(x).
2. **Switch** x and y.
3. Solve for y using __inverse operations__.
4. Replace y with __$f^{-1}(x)$__.

EXAMPLE 3:

$y = \frac{1}{2}x + 5$

$x = 1/2y + 5$

$-5 \qquad -5$

$(2)(x - 5) = (1/2y)(2)$

$2x - 10 = y$

$f^{-1}(x) = 2x - 10$

EXAMPLE 4:

$f(x) = (x-4)^2 + 7$

$y = (x - 4)^2 + 7$

$x = (y - 4)^2 + 7$

$-7 \qquad -7$

$\sqrt{x - 7} = \sqrt{(y - 4)^2}$

$\sqrt{x - 7} = y - 4$

$+4 \qquad +4$

$\sqrt{x - 7} + 4 = y$

$f^{-1}(x) = \sqrt{x - 7} + 4$

NOTATION: If we have a function $f(x)$, the inverse will be named : $f^{-1}(x)$

How do you find the inverse of a function?	Switching the x and y values means you are also switching the
switch x and y	input and output domain and range