Happy Daisy Day!

- Park your phones
- Grab your warm up on circle table (Composition)
- HW ?'s

WARM UP – Composition

Find $h(f(x))$ and $f(h(x))$

1) $h(x) = -2x - 8$

$f(x) = -4 - \frac{1}{2}x$

$h(f(x)) = -2\left[-4 - \frac{1}{2}x\right] - 8 = \boxed{x}$

$f(h(x)) = \boxed{x}$

Find $g(f(x))$ and $f(g(x))$

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

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

$\frac{3}{\frac{3}{x} - 1 + 1} = \frac{3}{\frac{3}{x}} = \frac{\frac{3}{1}}{\frac{3}{x}}$

$\frac{3}{1} \cdot \frac{x}{3} = \boxed{x}$

Find $f(g(x))$ and $g(f(x))$

A

3. $f(x) = \frac{1}{x+1} - 3$

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

A $\frac{1}{\frac{1}{x+3} - 1 + 1} - 3$

$\frac{\frac{1}{1}}{\frac{1}{x+3}} = \frac{1}{1} \cdot \frac{x+3}{1}$

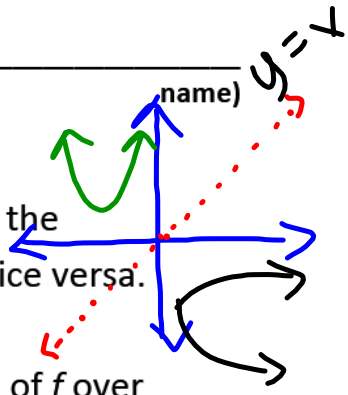
$\frac{1}{\frac{1}{x+3}} - 3$

$x + 3 - 3$

$\boxed{x}$

Inverse Functions Notes & Practice name_____

Inverse Functions



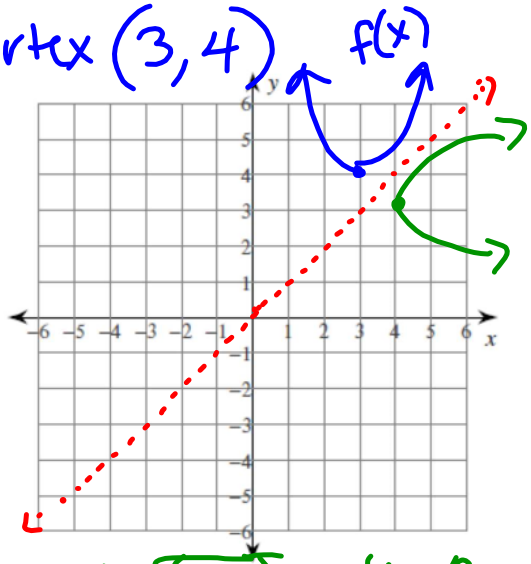
- If the point (a, b) lies on the graph of f, then the point (b, a) lies on the graph of f^{-1} and vice versa.
- The graph of f^{-1} is a reflection of the graph of f over the line y = x

Domain & Range Switch!

Example 1: Graph the function $f(x) = (x-3)^2 + 4$

Quad
right 3
up 4

Vertex (3, 4)



Find the domain and range of f(x).

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

R: $[4, \infty)$

Find the inverse, $f^{-1}(x)$ =

1. Switch x & y
2. Solve for y

$y = (x-3)^2 + 4$

$x = (y-3)^2 + 4$

$\sqrt{(x-4)} = \sqrt{(y-3)^2}$

$\pm\sqrt{(x-4)} = y-3$

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

Graph the inverse function, $f^{-1}(x)$ and find its domain and range.

D: $[4, \infty)$

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

$y = \sqrt{x}$
right 4
up 3

Inverse Functions Notes & Practice name_____
name)

Example 2: Find the inverse of

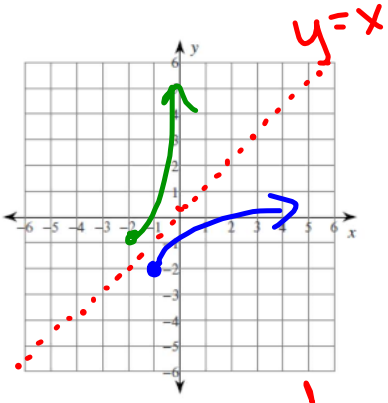
$$g(x) = \sqrt{x+1} - 2$$

$y=\sqrt{x}$ Left 1 down 2

Graph $g(x)$ and find the domain and range:

Domain (function): $[-1, \infty)$

Range (function): $[-2, \infty)$



Graph $g^{-1}(x)$ find the domain and range:

Domain (inverse): $[-2, \infty)$

Range (inverse): $[-1, \infty)$

$y = \sqrt{x+1} - 2$

$x = \sqrt{y+1} - 2$

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

$(x+2)^2 = y+1$

$(x+2)^2 - 1 = y$

Restricted Domain

Example 3: Find the inverse of $g(x) = \frac{2}{x+3} - 4$ *Do not graph.

$y = \frac{1}{x}$ Left 3 down 4 V.S by 2

$y = \frac{2}{x+3} - 4$

$x = \frac{2}{y+3} - 4$

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

$(x+4)(y+3) = 2$

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

$y = \frac{2}{x+4} - 3$ f^{-1}

If $f(g(x)) = x$ (and $g(f(x)) = x$) then $f(x)$ and $g(x)$ are inverses of each other.

Inverse Functions Notes & Practice **name_____**
name)

Find the inverse of each function.

1) $h(x) = \sqrt[3]{x} - 3$

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

3) $h(x) = 2x^3 + 3$

4) $g(x) = -4x + 1$

5) $h(x) = -5x + 15$

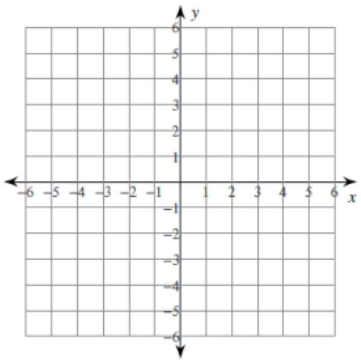
6) $h(x) = \frac{3}{x-2} + 1$

7) $y = (x+4)^2 + 1$

8) $y = \sqrt{x-1} - 5$

Find the inverse of the function. Graph both the function and its inverse, then identify domain/range.

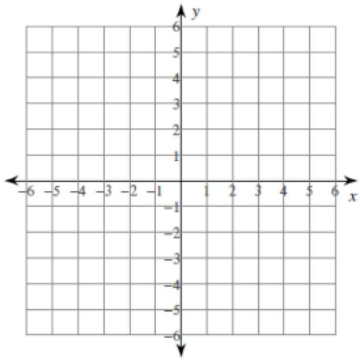
9. $f(x) = (x + 3)^2 - 1$



Domain (function): Domain(inverse):

Range (function): Range (inverse):

10. $g(x) = \sqrt{x-2} + 5$



Domain (function): Domain(inverse):

Range (function): Range (inverse):