Recall: Solve for y.

1. $3y = 6x + 5$

$\frac{3y}{3} = \frac{6x+5}{3}$

$y = 2x + 5/3$

2. $7x - \sqrt{y+5} = 11$

$-7x \quad -7x$

$\frac{-\sqrt{y+5}}{-1} = \frac{-7x+11}{-1}$

$(\sqrt{y+5})^2 = (7x-11)^2$

$(7x-11)(7x-11)$

$y + 5 = 49x^2 - 154x + 121$

$-5 \qquad -5$

$y = 49x^2 - 154x + 116$

3. $2x + \frac{3}{4}y = -12$ $-2x$

$-2x$

$\frac{4}{3}\left(\frac{3}{4}y\right) = \left(-2x - 12\right)\frac{4}{3}$

$$y = -\frac{8}{3}x - 16$$

4. $2(y-1)^4 + 5 = x$ -5

-5

$$\frac{2(y-1)^4}{2} = \frac{x-5}{2}$$

$$\left((y-1)^4\right)^{\frac{1}{4}} = \left(\frac{x-5}{2}\right)^{\frac{1}{4}}$$

$$y - 1 = \left(\frac{x-5}{2}\right)^{\frac{1}{4}}$$

$+1$ $+1$

$$y = \left(\frac{x-5}{2}\right)^{\frac{1}{4}} + 1$$

Inverse Functions

EQ: How do you find and verify the inverse of a given function?

Standards:

Build new functions from existing functions

MCC9-12.F.BF.4a Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse.

MCC9-12.F.BF.4b Verify by composition that one function is the inverse of another.

MCC9-12.F.BF.4c Read values of an inverse function from a graph or table, given that the function has an inverse.

A relation is a mapping of input values (domain) onto output values(range).

An **inverse** relation maps the output values back to their original input values.

f(x)

D: $\{x|x \geq 3\}$ D: $3 \leq x < \infty$ $[3, \infty)$

R: $\{y|y \leq 7\}$ R: $-\infty < y \leq 7$ $(-\infty, 7]$

If g(x) is the inverse of f(x) what is its domain & range?

g(x) D: $(-\infty, 7]$

R: $[3, \infty)$

Find the inverse for

{(-9, 6), (- 3 ,2), (0, - 3), (5, 7)}

{(6,-9)(2,-3)(-3,0)(7,5)}

Switch x ÷ y

Original Relation

$y = 2x - 4$

x	y
-2	-8
-1	-6
0	-4
1	-2
2	0

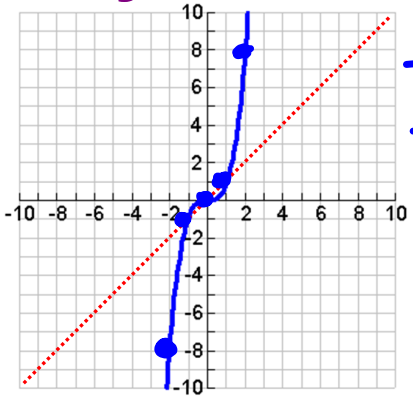
Inverse Relation

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

x	y
-8	-2
-6	-1
-4	0
-2	1
0	2

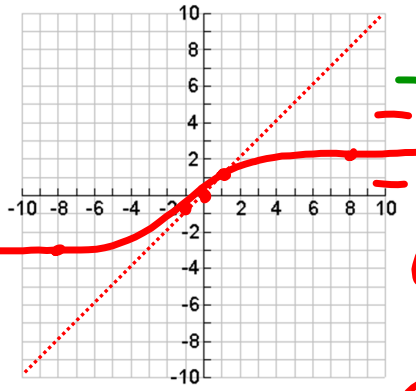
The graph of an inverse is the original function reflected over **y = x.** To have inverse, must pass the horizontal line test.

$y = x^3$



x	y
-2	-8
-1	-1
0	0
1	1
2	8

$y^{-1} = \sqrt[3]{x} = x^{\frac{1}{3}}$



x	y
-8	-2
-1	-1
0	0
1	1
8	2

Reminder: To be a function it must pass the vertical line test...the inverse must pass the horizontal line test.