7-4 Inverses **Jan 8, 2012** **std. 24.0**

Recall: A function is a relation where each x is paired with exactly one y.

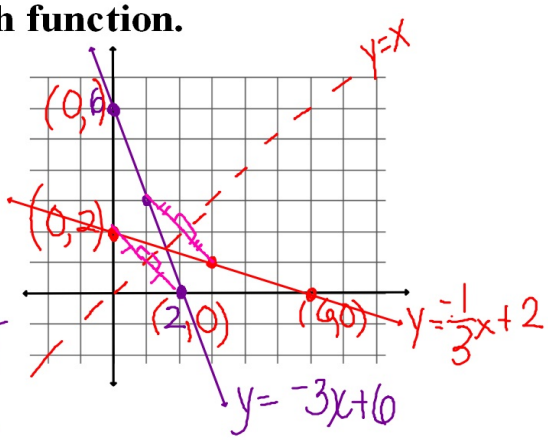
Find and graph the inverse of each function.

ex. 1 $y = -3x + 6$

$x = -3y + 6$

$\frac{x-6}{-3} = y$

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



ex. 2 $f(x) = 8x^3$

$y = 8x^3$

$x = 8y^3$

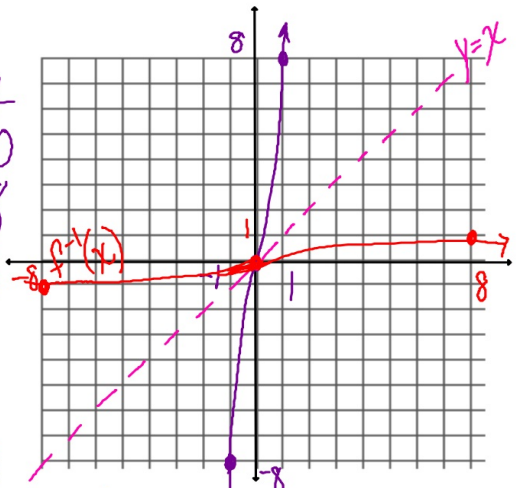
$\sqrt[3]{\frac{x}{8}} = \sqrt[3]{y^3}$

$\frac{\sqrt[3]{x}}{2} = y$

"f inverse of x"

$f^{-1}(x) = \frac{\sqrt[3]{x}}{2}$

x	y
0	0
1	8
-1	-8



$f^{-1}(x)$

x	y
0	0
8	1
-8	-1

Definition: **Functions f and g are inverses of each other if and only if $f(g(x)) = x$ and $g(f(x)) = x$.**

ex. 3

Verify that $f(x) = \frac{1}{3}x^2$ $(x \geq 0)$ **and** $g(x) = (3x)^{1/2}$ $(x \geq 0)$ **are inverses of each other.** (use the definition)

$$f(g(x)) = f\left((3x)^{1/2}\right) = \frac{1}{3}\left((3x)^{1/2}\right)^2 = \frac{1}{3}(3x) = x$$

$$g(f(x)) = g\left(\frac{1}{3}x^2\right) = \left(3 \cdot \frac{1}{3}x^2\right)^{1/2} = \left(x^2\right)^{1/2} = x$$