Bell Ringer

Get out your notecard & add:

~ 10 exponent rules + $\log_b N = x \Rightarrow b^x = N$
~ relationship between logs and exponents
~ laws of logarithms

$a^0 = 1$
$a^1 = a$
$(a^m)^n = a^{mn}$
$a^m \cdot a^n = a^{m+n}$
$\frac{a^m}{a^n} = a^{m-n}$
$\sqrt[n]{a^m} = a^{\frac{m}{n}}$
$a^{-n} = \frac{1}{a^n}$
$\frac{1}{a^{-n}} = a^n$
$(ab)^x = a^x b^x$
$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$

$\log AB = \log A + \log B$
$\log \frac{A}{B} = \log A - \log B$
$\log A^k = k \log A$
$\log A = \log B$ then $A = B$

Agenda

Homework Questions ✓
Quiz ✓ 15 min
Notes: Inverses
Notes: Inverses & HLT
Student Practice
Closure

Notation	Inverse
$f(x)$	$f^{-1}(x)$
$m(x)$	$m^{-1}(x)$
$l(x)$	$l^{-1}(x)$

$f(x) = 3x - 2$

$y = 3x - 2$

$x = 3y - 2$

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

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

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

$k(x) = (x-2)^3$

$y = (x-2)^3$

$x = (y-2)^3$

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

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

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

c. $h(x) = -x^2 + 4$ D: $\mathbb{R}$ R: $y \leq 4$

$y = -x^2 + 4$

$x = -y^2 + 4$

$-x = y^2 - 4$

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

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

$-x + 4 \geq 0$

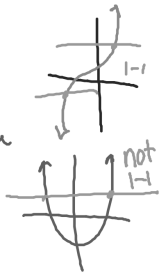
$\frac{-x}{-1} \geq \frac{-4}{-1}$

D: $x \leq 4$ R: $y \geq 0$

For one-to-one functions

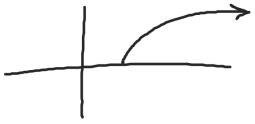
Domain Original $\Rightarrow$ Range Inverse

Range Original $\Rightarrow$ Domain Inverse



function, (1-1) one-to-one & inverse function

$g(x) = \sqrt{x-3}$

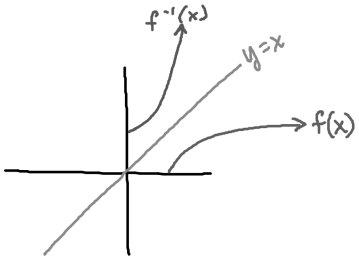


D: $x-3 \geq 0$
$x \geq 3$

R: $y \geq 0$

$y = \sqrt{x-3}$
$x = \sqrt{y-3}$
$x^2 = y-3$
$y = x^2-3$
$g^{-1}(x) = x^2-3$

D: $x \geq 0$
R: $y \geq 3$



7.

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

D: $x \neq 0$

R: $y \neq -1$

Inverse

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

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

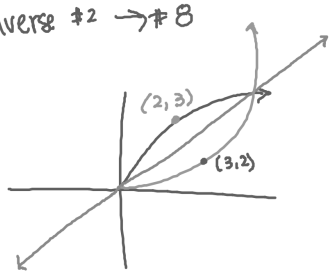
$y(x+1) = -2$

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

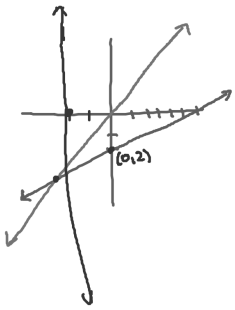
D = $x + 1 \neq 0$, $x \neq -1$

R: $y \neq 0$

Inverse #2 → #8



#9



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

D: $x \geq 0$ R: $y \geq -2$

$f(g(x))$

$f(\sqrt{x} - 2)$

$3(\sqrt{x} - 2) + 2$

$3\sqrt{x} - 6 + 2$

$3\sqrt{x} - 4$

$x \geq 0 \quad y \geq -4$

$f(x) = 3x + 2$

D: $\mathbb{R}$ R: $\mathbb{R}$

$g(f(x))$

$g(3x+2)$

$\sqrt{3x+2} - 2$

$3x + 2 \geq 0$

$3x \geq -2$

$x \geq -\frac{2}{3}$ $\quad y \geq -2$

Closure

One a post it note - with your name:

What ~~is~~ are the 2 things you are concerned about for the midterm.

What is the 1 thing you are NOT worried about for the midterm.

pink Sheet!