Section 5.1: cont'd

Wednesday, February 04, 2015
12:50 PM

Assign #3 due on

Tuesday, Feb 17

Quiz #3 on

Thursday, Feb 19

on Chapter 5

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example: check to see if $f(x) = \sqrt[5]{x-3} + 2$

and $f^{-1}(x) = (x-2)^5 + 3$ are

truly inverses using the composition

of functions.

$$(f^{-1} \circ f)(x) = f^{-1}(f(x))$$

$$= \left((f(x)) - 2 \right)^5 + 3$$

$$= \left(\left(\sqrt[5]{x-3} + 2 \right) - 2 \right)^5 + 3$$

$$= \left(\sqrt[5]{x-3} \right)^5 + 3$$

$$= x - 3 + 3$$

$$= x \quad \checkmark$$

$$(f \circ f^{-1})(x) = \sqrt[5]{(f^{-1}(x)) - 3} + 2$$

$$= \sqrt[5]{(x-2)^5 + 3 - 3} + 2$$

$$= \sqrt[5]{(x-2)^5} + 2$$

$$= x - 2 + 2$$

$$= x \quad \checkmark$$

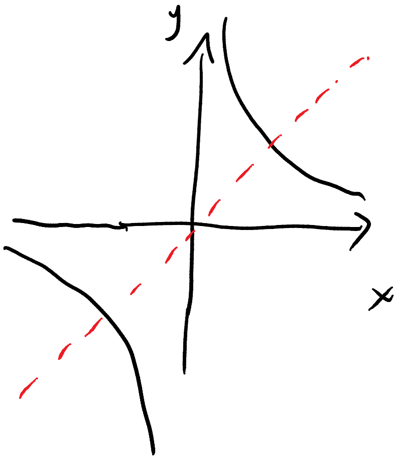
What's the inverse of $f(x) = \frac{1}{x}$?

replace $y = \frac{1}{x}$

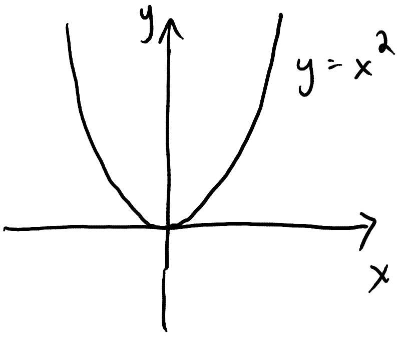
swap $x = \frac{1}{y}$

solve $y = \frac{1}{\ldots}$

replace $\qquad f'(x) = \frac{1}{x}$



domain restriction:



the inverse relation is

$$x = y^2$$

solve: $y^2 = x$

$$y = \pm\sqrt{x}$$

but what if we want an inverse which is a function?

$$\underbrace{\text{for } x \geq 0}_{\text{restrict domain}}, \quad f(x) = x^2 \text{ and } f^{-1}(x) = \sqrt{x}$$

are inverses