Name: _____   Date: _____

AP Calc AB: Derivatives of Inverse Functions   Ms. Loughran

Do Now:

1. If $y = 6^{\tan^2 x}$, find $\dfrac{dy}{dx}$.

2. If $y = \log_4(x^2 + 3x)$, find $\dfrac{dy}{dx}$.

Inverses of functions:

Given $f(x)$ is a function, we call its inverse function $f^{-1}(x)$. If (x,y) falls on $f(x)$, then (y,x) falls on $f^{-1}(x)$.

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

Example

If $f(x) = x^2$, $x \geq 0$, find :

(a) $g(x)$ the inverse of $f(x)$ (b) $f'(x)$ (c) $g'(x)$

Let's take some points that are on $f(x)$ and investigate.

Points on $f(x)$: (2,4)   and   (3,9)

Find: $f'(2)$ $g'(4)$

          $f'(3)$ $g'(9)$

$\therefore$ If f and g are inverses, then $g'(y) = \dfrac{1}{f'(x)}$. [(x,y) is a point on $f(x)$.]