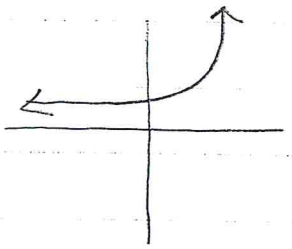
Notes Section 1.7 – inverse relations & functions

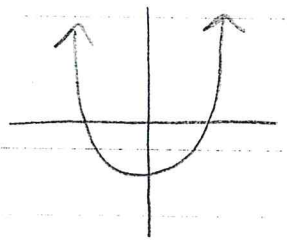
how do you find an inverse?
by interchanging the x and y coordinates

a function and its inverse are symmetric to $y = x$

<u>horizontal line test</u>:
a function f has an inverse function, f^{-1}, if and only if, each horizontal line intersects the graph of f in at most one point



has inverse function

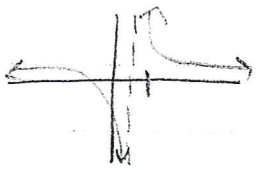


does not have inverse function

If a function passes the horizontal line test, then it is <u>one-to-one</u>

- determine whether f has an inverse function. If it does, find the inverse function and state any restrictions to the domain

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



has inverse function

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

$x(2y-1) = y$

$2xy - x = y$

$2xy - y = x$

$y(2x-1) = x$

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

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

$x \neq 1/2$

- show that $f(x) = 2/3x + 2$ and $g(x) = 3/2(x-2)$ are inverse functions

$f(g(x)) = x$ $\quad$ $g(f(x)) = x$

$f(g(x)) = 2/3(3/2x - 3) + 2$

$= x - 2 + 2 = x$

$g(f(x)) = 3/2(2/3x + 2 - 2)$

$= 3/2(2/3x) = x$

- use the graph of each function to graph its inverse function