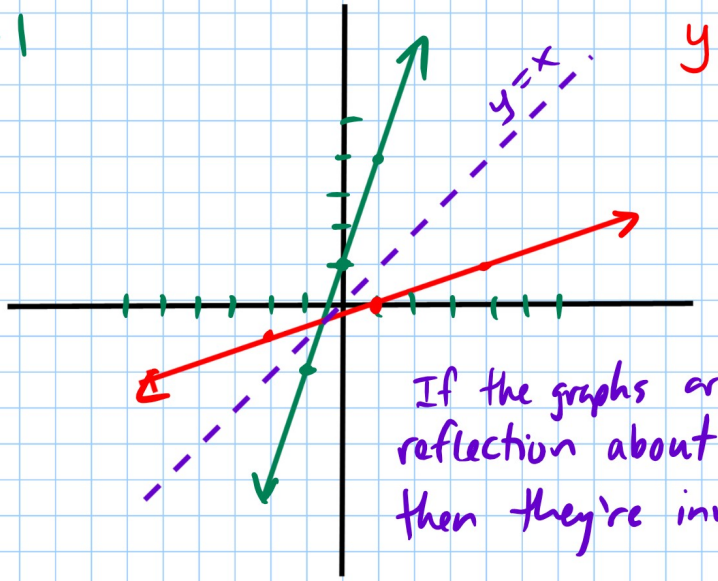
Inverses Continued

We can tell whether functions are inverses of each other in 2 ways:

1) Graphically:

$y = 3x + 1$

x	y
-1	-2
0	1
1	4



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

x	y
-2	-1
1	0
4	1

If the graphs are reflection about $y = x$ then they're inverses

Algebraically - show $(f \circ g)(x) = x$

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

$f(x) = 5x - 3$

$g(x) = \frac{x+3}{5}$

$(f \circ g)(x) = f\left(\frac{x+3}{5}\right) = 5\left(\frac{x+3}{5}\right) - 3$

$= x + 3 - 3 = x$

$(g \circ f)(x) = g(5x - 3) = \frac{5x - 3 + 3}{5}$

$= \frac{5x}{5} = x$

$g(x)$ on 2nd #1 says $g(x) = \frac{x+7}{4}$

$f(x) = 3x+5$

"Socks and shoes"

What does f do to x?

1) multiply by 3

2) add 5

$f^{-1}(x)$ means inverse of $f(x)$.

$f^{-1}(x) = \frac{x-5}{3}$

1) subtract 5

2) divide by 3

Method 2 $f(x) = -4x-3$

Change $f(x)$ to y: $y = -4x-3$

Switch x and y: $x = -4y-3$

Solve for Y: $-x \quad -x$

$0 = -4y-3-x$

$+4y \quad +4y$

$4y = -3-x$

$\frac{4y}{4} = \frac{-3-x}{4}$

$y = \frac{-3-x}{4}$

Rewrite y as $f^{-1}(x)$: $\boxed{f^{-1}(x) = \frac{-3-x}{4}}$

8) $p(x) = -\frac{3}{4}x+6$

$y = -\frac{3}{4}x+6$

$x = -\frac{3}{4}y+6$

$-6 \quad -6$

$x-6 = -\frac{3}{4}y$

$\left(-\frac{4}{3}\right)\left(-\frac{3}{4}\right)y = -\frac{4}{3}(x-6)$

$y = -\frac{4}{3}x+8$

$p^{-1}(x) = -\frac{4}{3}x+8$

$-\frac{4}{3}\cdot\frac{-6}{1}$

$\frac{24}{3} = 8$