6.2 one-to-one functions, inverse functions

Inverse function defined by an equation

1) replace $f(x)$ w/ $y$

2) $x$ in all $x$ into $y$'s & all $y$'s into $x$'s

3) solve for $y$

4) replace $y$ w/ $f^{-1}(x)$

# 6.2.67 Find inverse

$f(x) = \frac{4x}{3y-7}$

1) step 1: replace $f(x)$ w/ $y$

$y = \frac{4x}{3y-7}$

2) set out $x$ in $y$ & $y$ in $x$'s

$y = \frac{4x}{3y-7} = x = \frac{4y}{3y-7}$

3) solve for $y$

$x = \frac{4y}{3y-7}$

$3y-7(x) = 4y$

$3x+7x = 4y$

$3y-7 = 4y$

$7 = 3y$
6.2 one-to-one functions; inverse functions

Inverse functions defined by an equation

1) replace \( f(x) \) w/ \( y \)

2) turn all \( x \)'s into \( y \)'s & all \( y \)'s into \( x \)'s

3) solve for \( y \)

4) replace \( y \) w/ \( f^{-1}(x) \)

# 6.2.67 find inverse

\[ f(x) = \frac{4x}{3x-7} \]

1) step 1 - replace \( f(x) \) w/ \( y \)

\[ y = \frac{4x}{3x-7} \]

2) turn all \( x \)'s into \( y \)'s & all \( y \)'s into \( x \)'s

\[ y = \frac{4y}{3y-7} \Rightarrow x = \frac{4y}{3y-7} \]

3) solve for \( y \)

\[ x = \frac{4y}{3y-7} \]

\[ x(3y-7) = 4y \]

\[ 3xy - 7x = 4y \]

\[ 3xy - 3xy = 4y + 7x \]

\[ 0 = 4y + 7x \]

\[ y = \frac{-7x}{4} \]
\[-7x = 4y - 3x y \]
\[\frac{-7x}{4-3x} = y \]

4.) replace \( y \) w/ \( f^{-1}(x) \)

\[ f^{-1}(x) = \frac{-7x}{4-3x} \]

\[-1 \left( f^{-1}(x) \right) = \left( \frac{-7x}{4-3x} \right)^{-1} \]
\[= \frac{7x}{4-3x} \]
\[= \frac{7x}{3x-4} \]