

Find the inverse of the function

$f(x) = \sqrt{x+1}$

$D_f = [-1, \infty)$
 $R_f = [0, \infty)$

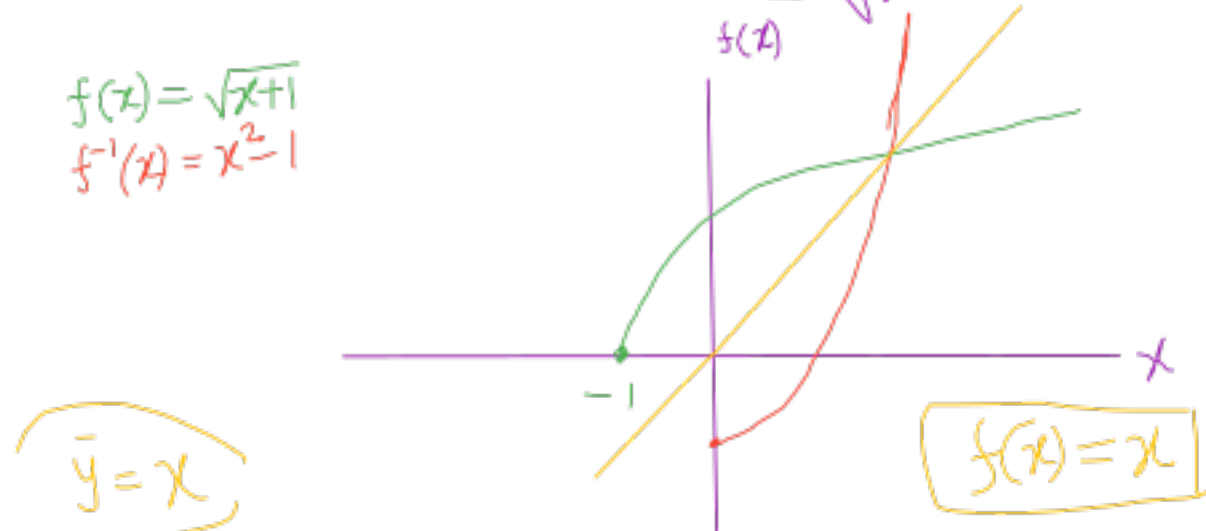
$y = \sqrt{x+1}$
 $\Rightarrow y^2 = x+1$
 $\Rightarrow x = y^2 - 1$
 $\Rightarrow x = f^{-1}(y) = y^2 - 1$
 \downarrow
 $y = f^{-1}(x) = x^2 - 1$

$D_{f^{-1}} = [0, \infty)$
 $R_{f^{-1}} = [-1, \infty)$

The inverse function of $f(x) = \sqrt{x+1}$ is $f^{-1}(x) = x^2 - 1$

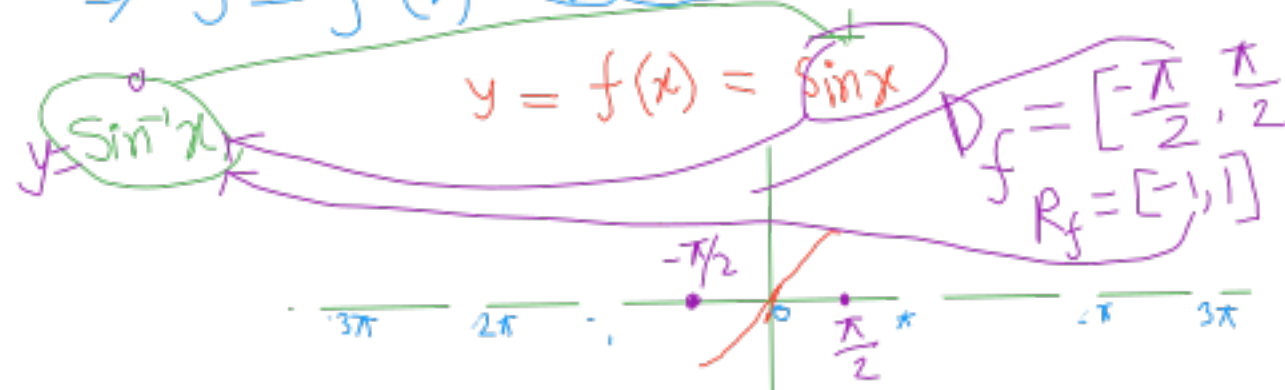
$f \circ f^{-1}(x) = f(f^{-1}(x)) = x$
 $f^{-1} \circ f(x) = f^{-1}(f(x)) = x$

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



Find the inverse of the function $f(x) = x^3 + 1$

$y = x^3 + 1$
 $\Rightarrow x^3 = y - 1$
 $\Rightarrow x = \sqrt[3]{y-1}$
 $\Rightarrow x = f^{-1}(y) = \sqrt[3]{y-1}$
 $\Rightarrow y = f^{-1}(x) = \sqrt[3]{x-1}$



Translation:

$f(x) = x^2 + 1$
 $x^2 - 1$

$f(x+1) = (x+1)^2$
 $(x-1)^2$

$y = x^2$

$y+2 = x^2 \Rightarrow y = x^2 - 2$

$y-2 = x^2 \Rightarrow y = x^2 + 2$

$y = (x+1)^2$

$y = (x-1)^2$

Reflection:

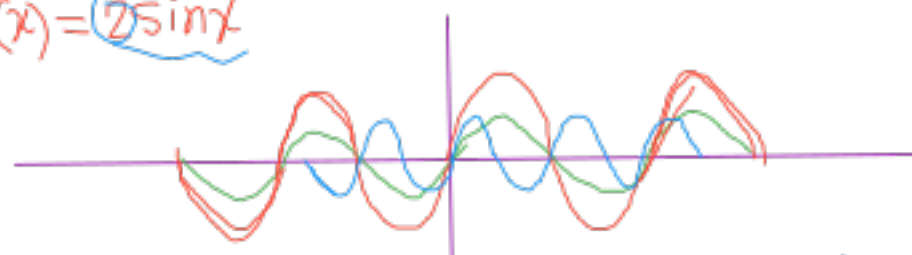
$y = \sqrt{x}$

$y = -\sqrt{x}$

$y = \sqrt{-x}$

$y = \sqrt{-x}$

$f(x) = 2\sin x$



$f(x) = \sin(2x)$