Extra ~ Review of Inverse Functions

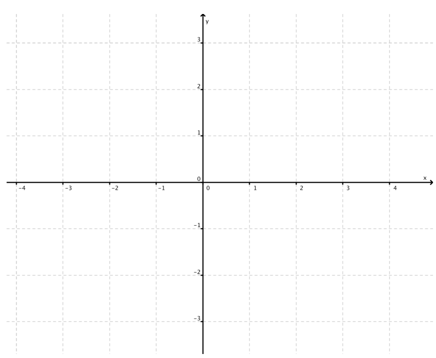
You will learn to:

- Determine whether a function has an inverse
- Find and verify the inverse function if there is one
- Sketch a function and its inverse

Reminders About a Function and Its Inverse

The inverse of a function, $f(x)$, is written $f^{-1}(x)$ (read *f*-inverse).

The -1 is NOT an exponent.
The original function must be *1-to-1*.
The graph $y = f^{-1}(x)$ (the inverse function) is a reflection of $y = f(x)$ across the line $y = x$.
An (a,b) pair on the function becomes a (b,a) pair on the inverse.
$f(f^{-1}(x)) = x$ for every x in the domain of $f^{-1}(x)$, and vice versa.
The domain of $f^{-1}(x)$ is the range of $f(x)$ and vice versa.



Some questions about a familiar function:

What is the square root of 4?

What number(s) can I square to get 4?

$x^2 = 4$, so $x = ?$

$\sqrt{4} = ?$

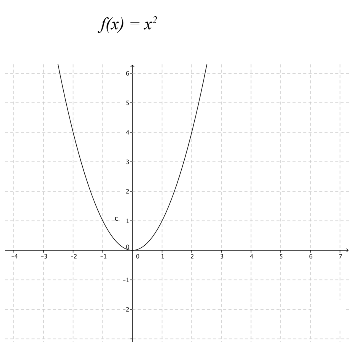
What is the ***principal*** square root of 4?

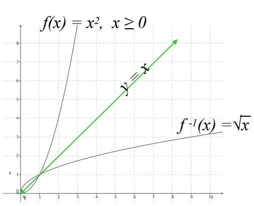
If $x = -3$, then $\sqrt{x^2} =$

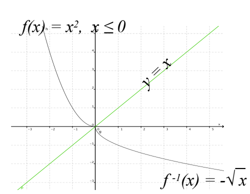
If $x = -3$, then $(\sqrt{x}\,)^2 =$

so, $\sqrt{x^2} =$

and $(\sqrt{x}\,)^2 =$







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As we determine inverses of our trigonometric functions, this is why

$sin\ x = 0.5$ has many solutions for x, and $sin^{-1}(0.5) = ?$ has <u>only one answer</u>.