

1.7 Inverses of functions & relations

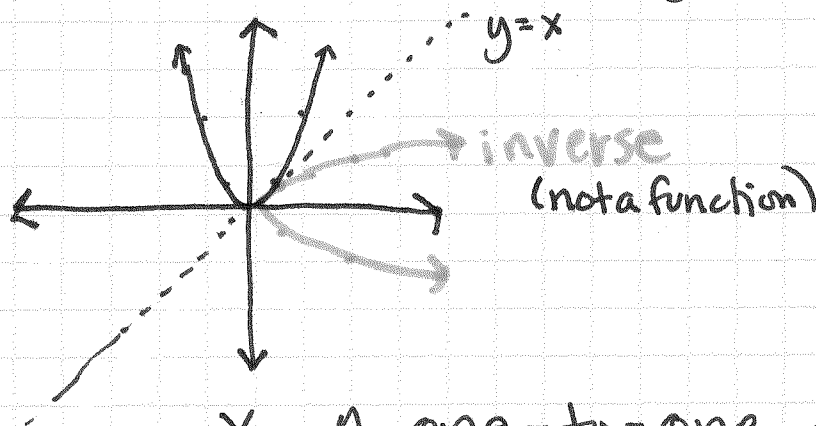
$f(x)$ inverse $\rightarrow f^{-1}(x)$
"f inverse of x"

iff \leftarrow An inverse relation will contain (b, a) if and only if the original function contains (a, b)

* Switch x 's & y 's

* reflect over $y=x$

To check that the inverse will be a function, use the horizontal line test on the original function.



* A one-to-one function passes both vertical & horizontal line test.

exactly one x for every one y

* if a function is \neq one to one, then its inverse is also a function

find the equation for an inverse function algebraically

step 1 \rightarrow is the function 1-1?
pass horizontal line test?

step 2 \rightarrow replace $f(x)$ with y * $f(x) = y$

step 3 \rightarrow switch all x 's and y 's

step 4 \rightarrow solve for y

step 5 \rightarrow replace y with $f^{-1}(x)$

check domain

Example: find $f^{-1}(x)$ if $f(x) = \sqrt{x-4}$

Step 1 \rightarrow pass HLT

Step 2 $\rightarrow y = \sqrt{x-4}$

Step 3 \rightarrow

Step 4 \rightarrow

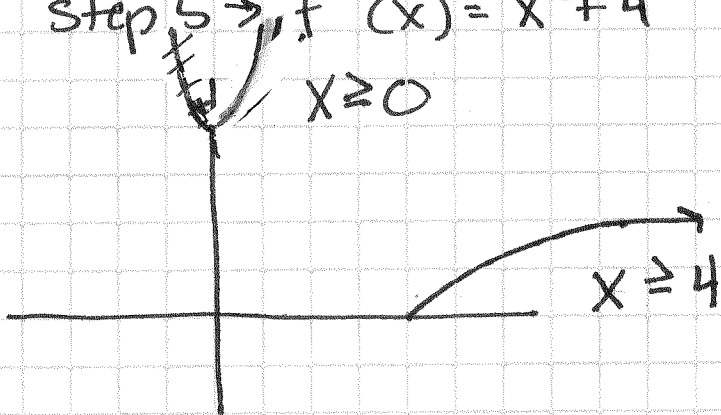
$$x = \sqrt{y-4}$$

$$x^2 = y-4$$

$$x^2 + 4 = y$$

Step 5 $\rightarrow f^{-1}(x) = x^2 + 4$

$$x \geq 0$$



HW: 70

~~27~~ 27-28 EVEN

27, 30, 38-42 EVEN

47, 55, 83-85