

Cornell Notes Inverse Functions	Topic/Objective:	Name:
	Students will determine if a function has an inverse & then find the inverse.	Class/Period:
		Date:

Essential Question: How do you determine if a function has an inverse?

Standard: Build new functions from existing functions (F-BF.4a - Inverse Functions)

Questions:

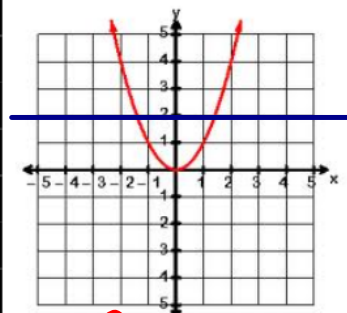
Notes:

Horizontal Line Test (HLT):

If a horiz. line passes through the graph of a function 2 or more times (above $y=0$), then the function has no inverse.

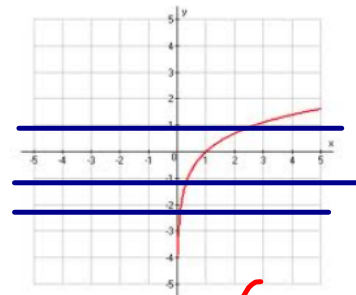
Example 1: Determine if the following functions have an inverse using the HLT.

a.



fails

b.



passes (inverse)

If a function passes the HLT, then inverse can be algebraically by following these steps:

1. Replace $f(x)$ with y
2. Switch x to y and y to x
3. Solve for y
4. Replace y with $f^{-1}(x)$

Summary:

Questions:

Notes:

Example 1: Find an equation for $f^{-1}(x)$ if $f(x) = \frac{2x}{2x-1}$

1. $y = \frac{2x}{2x-1}$

2. $\frac{x}{1} = \frac{2y}{(2y-1)}$

3. $x(2y-1) = 2y$
 $2xy - x = 2y$

$\frac{2xy - x + x}{+x} = \frac{2y + x}{+x}$
 $2xy = 2y + x$

$\frac{2xy = 2y + x}{-2y \quad -2y}$

$2xy - 2y = x$

$\frac{y(2x-2) = x}{2x-2 \quad 2x-2}$

$y = \frac{x}{2x-2}$
 4. $f^{-1}(x) = \frac{x}{2x-2}$

If a function fails the HLT, then the domain needs to be restricted to produce an inverse.

*** USE the Range of $f(x)$.**

Example 2: Graph $f(x) = x^2 + 3$. Determine if it is invertible. If it is, find the inverse. If it is not, restrict the domain and then find the inverse.

$R_{f(x)} = [3, \infty)$

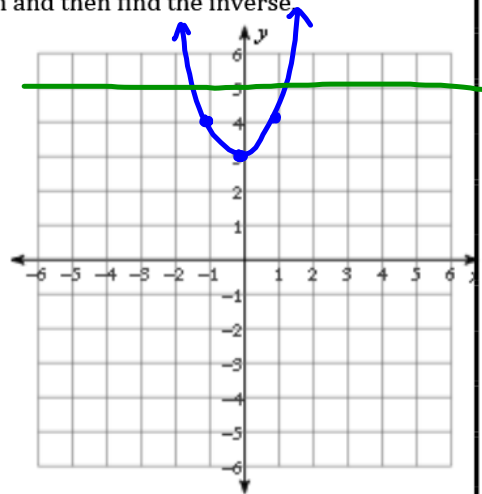
$D_{f^{-1}(x)} = [3, \infty)$

① $y = x^2 + 3$

② $x = y^2 + 3$

③ $y^2 = x - 3$
 $y = \sqrt{x-3}$

④ $f^{-1}(x) = \sqrt{x-3}$



Summary:

Questions:

How can I tell if functions are inverses of each other?

DAY 2 Notes:

Two Methods: _____ or _____

Example 3: Show that each function is the inverse of the other.

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

$$g(x) = \frac{-x+1}{2}$$

Summary:

Questions:

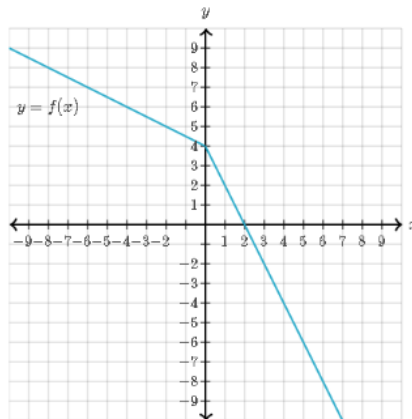
Notes:

Example 4: Evaluate the following using the information given.

a) Given the table, find $f^{-1}(3)$.

x	f(x)
4	-1
5	4
9	3

b) Given the graph, find $f^{-1}(4)$.



c) Given the table, find $f^{-1}(8)$ AND $f^{-1}(f^{-1}(13))$.

x	-7	11	-13	6	5	-9
f(x)	7	12	8	-7	13	5

Summary:

