HW questions?

INVERSE FUNCTIONS!

lasrever

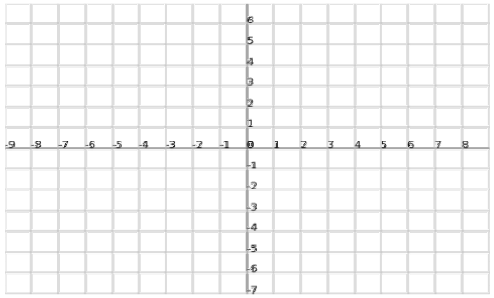
reversal

inverse of the point (2,3)

Let's find the inverse of the function $y=x^2$

points of function

points of inverse



QUESTION:

Is the inverse of $y=x^2$ a function?

a **relation** is simply a set of points

so we can call the inverse of $y=x^2$ an inverse relation.

YOU'RE GOING TO FIND

A POWERFUL THEOREM

year	postage stamp price
1984	20
1989	25
1991	29
1995	32
1999	33
2001	34
2004	37

function

postage stamp price	year
20	1984
25	1989
29	1991
32	1995
33	1999
34	2001
37	2004

inverse

A QUICK REFRESHER!

domain:

range:

Domain of function	Range of function
1984	20
1989	25
1991	29
1995	32
1999	33
2001	34
2004	37

function

Domain of inverse	Range of inverse
20	1984
25	1989
29	1991
32	1995
33	1999
34	2001
37	2004

inverse

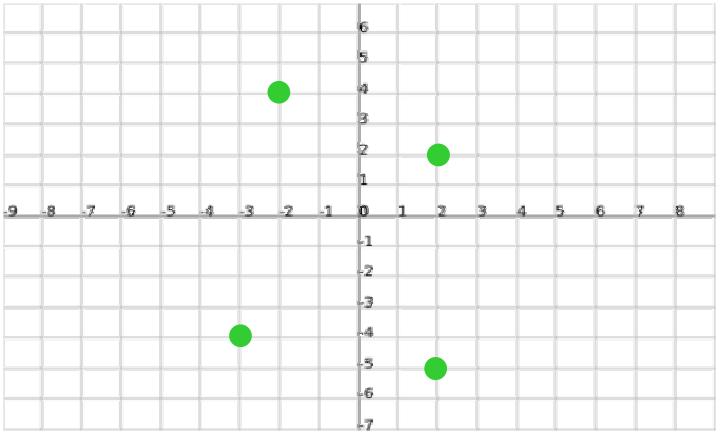
theorem (not in book):

Theorem:

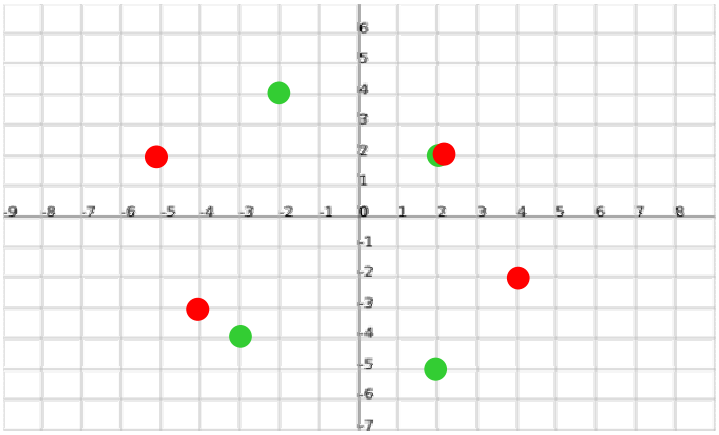
the DOMAIN and RANGE of a function become the RANGE and DOMAIN of the inverse

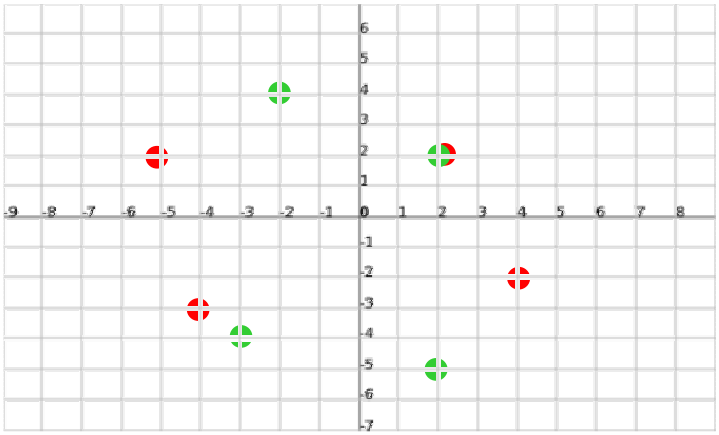
Problem:
If $f(x)=x^2$,
what is the domain and range of the **inverse?**

On a graph, plot the points
(2,2) (-3,-4) (2,-5) and (-2, 4)

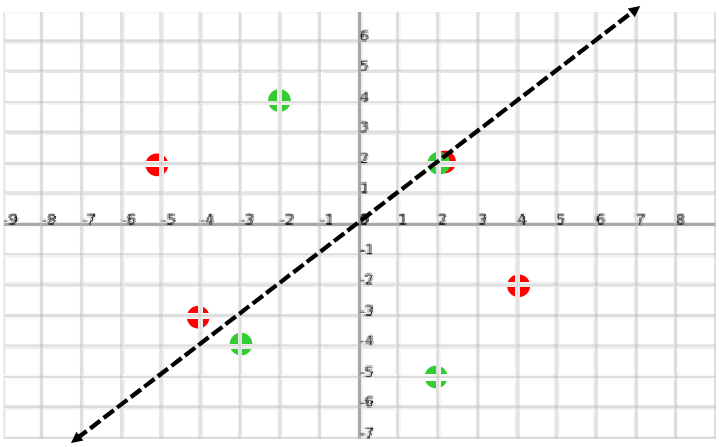


On a graph, plot the points
(2,2) (-3,-4) (2,-5) and (-2, 4)
Now plot the inverses
(2,2) (-4,-3) (-5,2) and (4,-2)



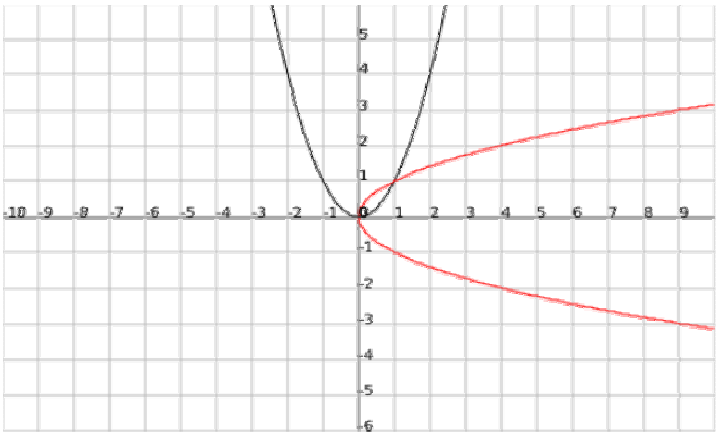


NOTICE ANYTHING?



an inverse is simply a reflection over the line **y=x**

Let's check our first graph $y=x^2$ and it's inverse!



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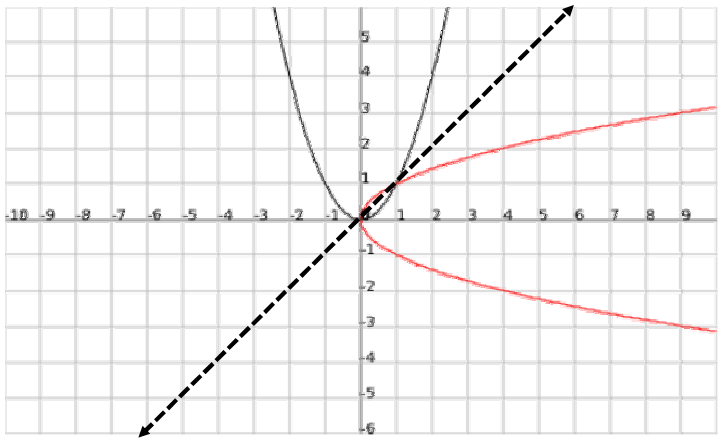


Let's find an equation for the inverse of $y=x^2$

inverse of the point (2,3) is (3,2)

x and y get swapped!

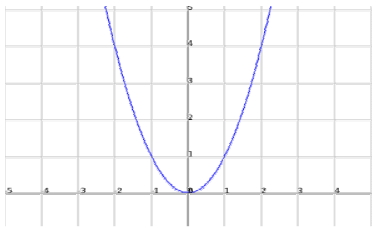
Let's find an equation for the inverse of $y=x^2$

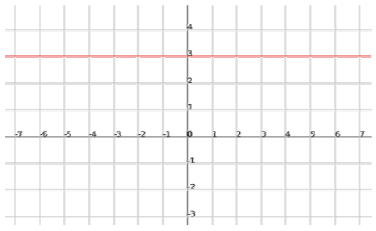
What about the inverse of $y=2x-1$?

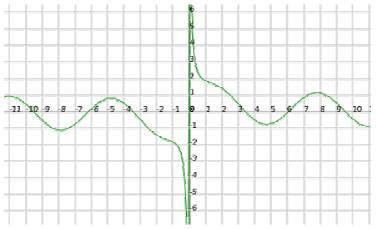
What about $y=4-1/x$?

How do we know when the inverse is going to be a function and when it is not?

Will the inverses of these functions below be functions?







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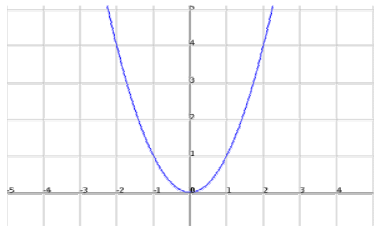

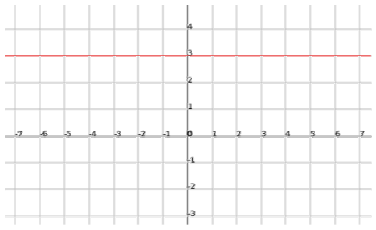

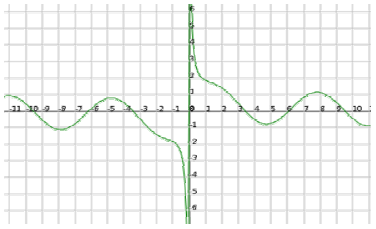

HORIZONTAL LINE TEST: if a function passes the test, then the inverse is also a function!

Terminology: A function whose inverse is also a function is called "one - to - one"

[in other words, a function which passes the horizontal line test is "one to one"]

WHY is it called ONE TO ONE?

(1) every x coordinate has only one y coordinate
(2) every y coordinate has only one x coordinate

1. Graph the equation $y=x^2+1$ by hand. Then reflect the graph across the line $y=x$ to obtain the graph of its inverse.

2. Given $f(x)=\sqrt[3]{x}$, prove that it is one-to-one.

3. Find the inverse of $f(x)=4/(x+7)$. Is the inverse a function?

Homework (light):

Section 4.1: 1-9(odd), 12-14, 25-32, 55-59 (odd)

(it looks like a lot but it shouldn't take you more than 20 minutes; the questions are simple)