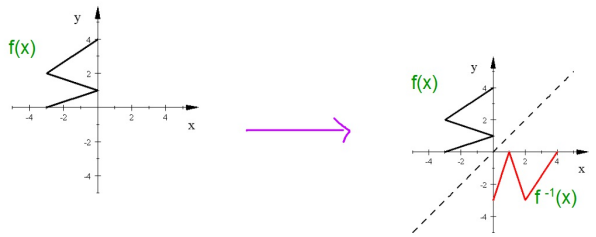
What I want you to know from Sec 7-7:

1. Given an original relation be able to tell if the inverse is a function or not.
2. Know the relationship between the Domain and Range of an original relation and the Domain and Range of the inverse relation.
3. Be able to write the equation of the inverse relation.

Will the inverse relation be a function?

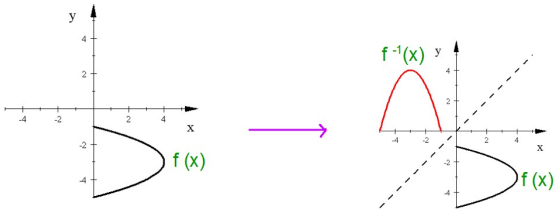
A



YES

Will the inverse relation be a function?

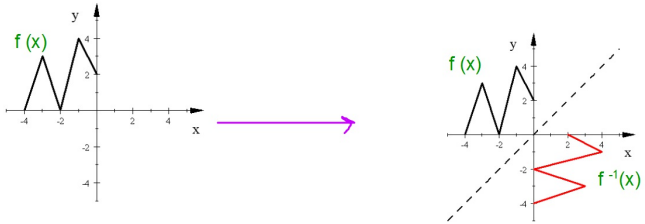
B



YES

Will the inverse relation be a function?

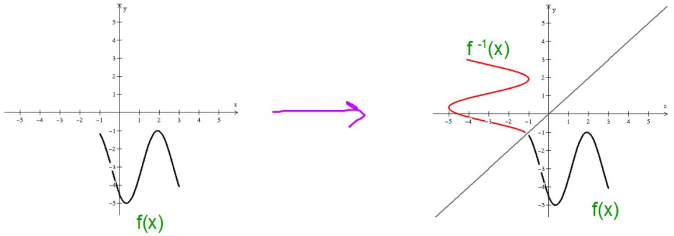
C



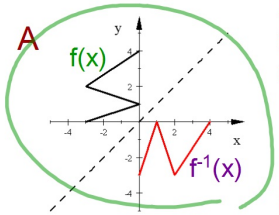
NO

Will the inverse relation be a function?

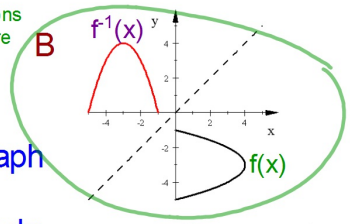
D



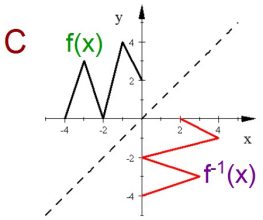
NO

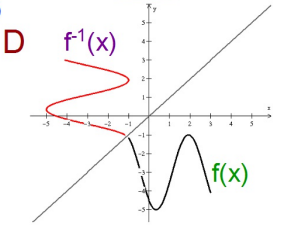


These original functions have inverses that are NOT functions.



Given the graph of an orginal relation, how do you tell if the inverse relation is a function?





Horizontal Line Test: a visual test to determine if the inverse relation will be a function.

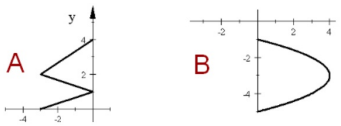
If any horizontal line can intersect a graph more than once then the graph of the inverse is NOT a function

One-to-One Functions:

Each y value is produced from exactly one x value.

If horizontal lines can touch a graph at most one time.

Inverses ARE functions



Many-to-One Functions:

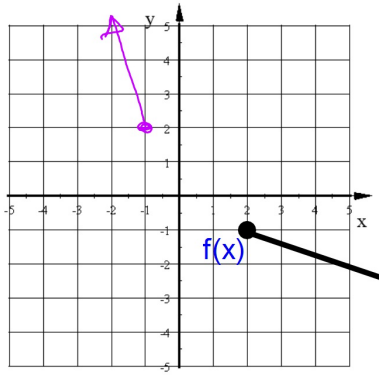
Each y value may be produced from more than one x value.

If a horizontal line can touch a graph "many" times (more than once)

Inverses are NOT functions

Original Relation		Inverse Relation
$f(x)$	Becomes	$f^{-1}(x)$
The point (a,b)	Becomes	The point (b,a)
Domain of $f(x)$	Becomes	Range of $f^{-1}(x)$
Range of $f(x)$	Becomes	Domain of $f^{-1}(x)$
Graph of $f(x)$	Reflect over $y=x$ Becomes	Graph of $f^{-1}(x)$

Given the graph of $f(x)$, find the domain and range of $f^{-1}(x)$



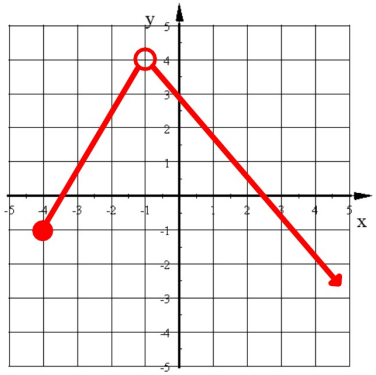
Domain of $f^{-1}(x)$: $x \le -1$

Range of $f^{-1}(x)$: $y \ge 2$

Domain of $f(x)$: $x \ge 2$

Range of $f(x)$: $y \le -1$

Given the graph of $f(x)$, find the domain and range of $f^{-1}(x)$



$f(x)$

Domain of $f^{-1}(x)$: $x < 4$

Range of $f^{-1}(x)$: $-4 \le y < -1$ $y > -1$

Domain of $f(x)$: $-4 \le x < -1$ $x > -1$

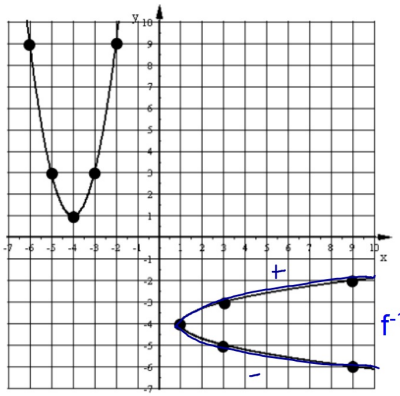
Range of $f(x)$: $y < 4$

Solve this equation for M

$$Q = \frac{\sqrt{CM - R}}{G} + A$$

$$M = \frac{\left(G(Q-A)\right)^2 + R}{C}$$

$f(x) = 2(x+4)^2 + 1$



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

Equations of Inverses

1. Switch the variables x and y
2. Solve equation for y

$y = 2(x+4)^2 + 1$

$x = 2(y+4)^2 + 1$

$y = \pm\sqrt{\frac{x-1}{2}} - 4$