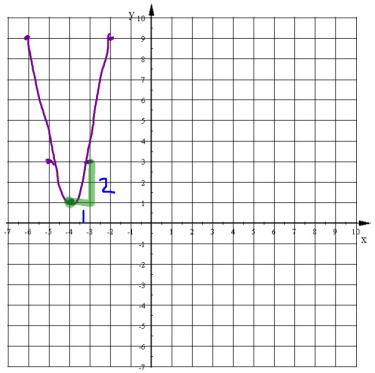
By definition a Relation is a set of ordered pairs
(a bunch of points)

What is a function?

A relation such that every x-value is paired with one and only one y-value.

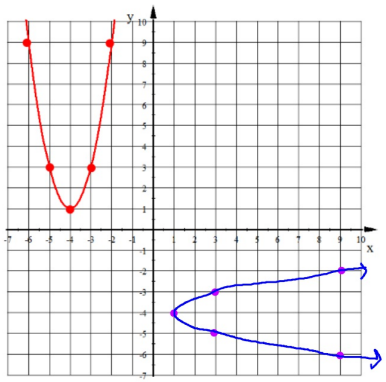
1. Plot the following points and connect them to form a parabola.
$(-6,9),(-5,3),(-4,1),(-3,3),(-2,9)$



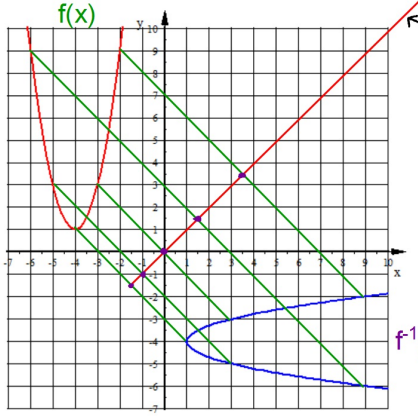
2. Write the equation of this parabola.

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

3. parabola. Do this with all five points and connect them with a smooth curve. Example: $(-6,9)$ becomes $(9,-6)$



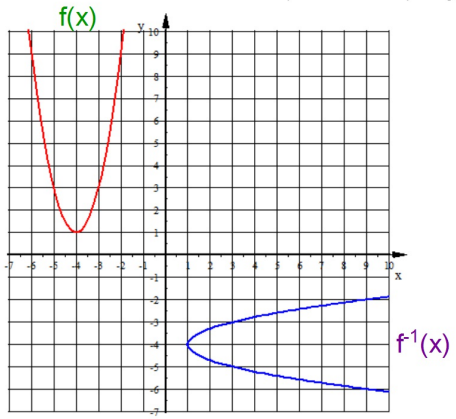
4. You have just created the **inverse relation** of $f(x)$. The inverse is denoted by the symbol $f^{-1}(x)$
The graph of $f^{-1}(x)$ is actually a reflection of $f(x)$ over a line. What is this line of reflection?
(Remember, a Line of Reflection is the line that is equidistant from corresponding points on $f(x)$ and $f^{-1}(x)$. i.e. it's exactly in the middle of the two graphs)



$y = x$

To find the equation of the line of reflection you can draw segments connecting corresponding points in the Original and Image then find their midpoints. The line created by connecting these midpoints is the Line of Reflection.

4. You have just created the **inverse relation** of $f(x)$. The inverse is denoted by the symbol $f^{-1}(x)$



$f^{-1}(x)$ is the notation we use to represent the inverse of f(x). It doesn't represent an exponent.

The concept of an Inverse Relation is all about...

switching X and Y

Graphing an inverse using the graphing calculator.

Graph the following in a Standard Window.

$Y_1 = 2(x+5)^2 - 3$

To draw the inverse relation. This set of key strokes only works for newer versions of the Ti-84 calculator.

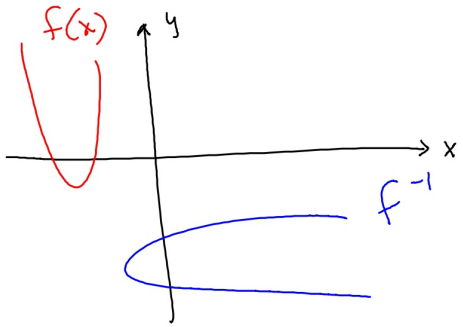
1. Press 2nd
2. Press PRGM (DRAW)
3. Choose option 8: DrawInv
4. Press ALPHA then TRACE
5. Choose Y_1
6. Press ENTER

Is the inverse relation to

$Y_1 = 2(x+5)^2 - 3$

a function?

No, the inverse doesn't pass the Vertical Line Test

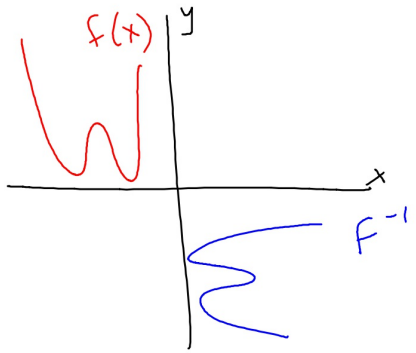


Is the inverse relation to

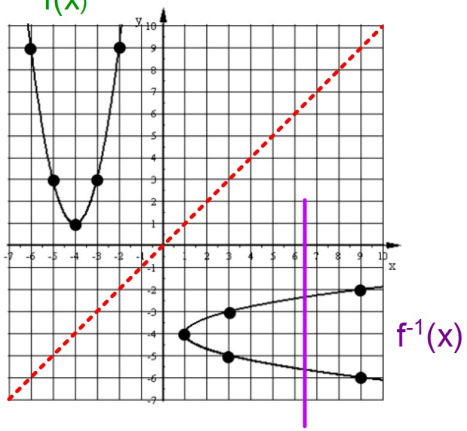
$Y = 0.5(X+5)^2(X+1)^2$

a function?

No, the inverse doesn't pass the Vertical Line Test



f(x)

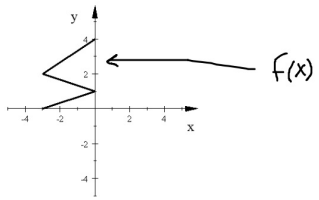


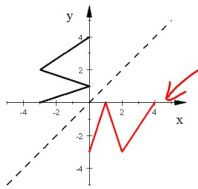
Is $f^{-1}(x)$ a function?

No, the inverse f^{-1} doesn't pass the vertical line test.

Will the inverse relation be a function?

A

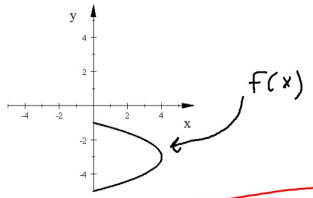


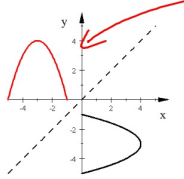


f^{-1} is a function

Will the inverse relation be a function?

B

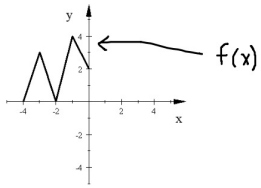


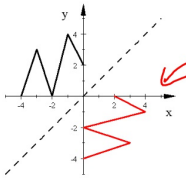


f^{-1} is a function

Will the inverse relation be a function?

C

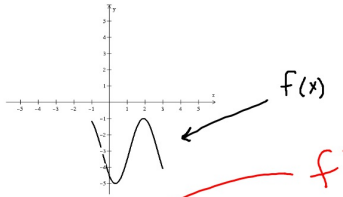


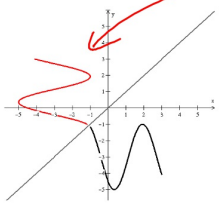


f^{-1} is not a function

Will the inverse relation be a function?

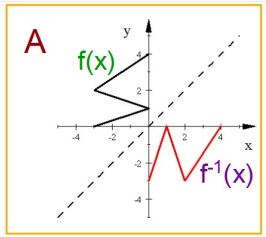
D



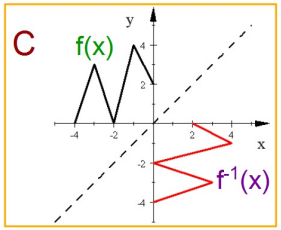


f^{-1} not a function

A

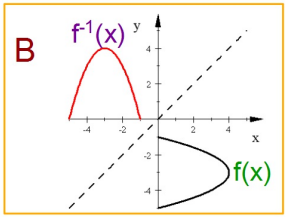


C

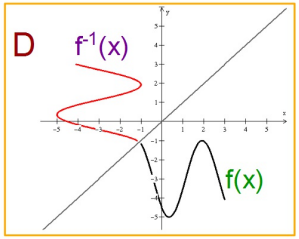


Given the graph of an orginal relation, how do you tell if the inverse relation is a function without actually graphing the inverse?

B



D



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