Inverse Functions

Inverse functions are a special class of functions that _____ each other.

Example: $f(x) = 2x + 1$ and $g(x) = \frac{x-1}{2}$ are examples of inverse functions

Mapping:

Notice that the _______of the first function $f(x)$ becomes the _______ for the second function $g(x)$. The function $g(x)$ undoes what $f(x)$ does. The ordered pairs of $g(x)$ can be found by switching the coordinates in each order pair of $f(x)$.

Notation:

We may check if two functions are inverses of each other by composition.

Two functions f and g are inverses of each other if and only if 1) $f(g(x)) = x$, for every value of x in the domain of g and 2) $g(f(x)) = x$, for every value of x in the domain of f

To find the inverse of a function $f(x)$ by **algebra**, follow the steps:

1) Verify that f is __________ (if not, the inverse is not a function)
2) Replace _____ with _____
3) Interchange ___and _____
4) Solve the new equation for ______
5) Replace the new y with _______

Example #1

Find the inverse of the following functions:

a) $y = 4x - 5$

b) $f(x) = 2x^2 - 1$

b) $f(x) = \frac{2x-1}{4-3x}$

d) $f(x) = \sqrt{x-1}$

To find the inverse of a function by **graphing,** follow the steps:

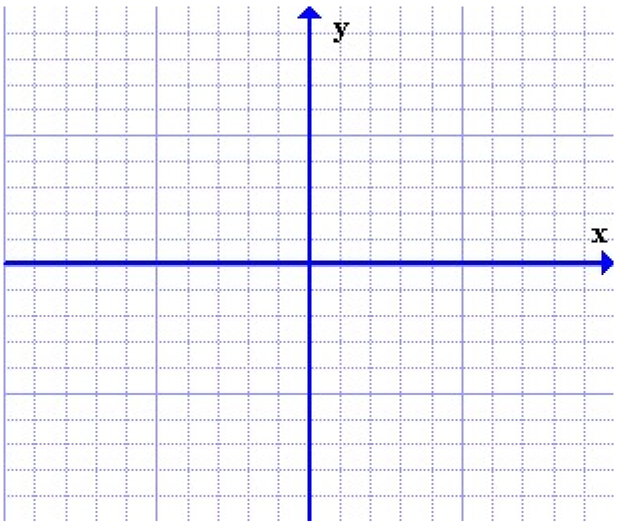
1) Graph the function ____
2) Take a few points and interchange their coordinates ______________
3) Plot the new points. This is the graph of the inverse function.

The graphs of _____ and ______ are symmetric about the line_____

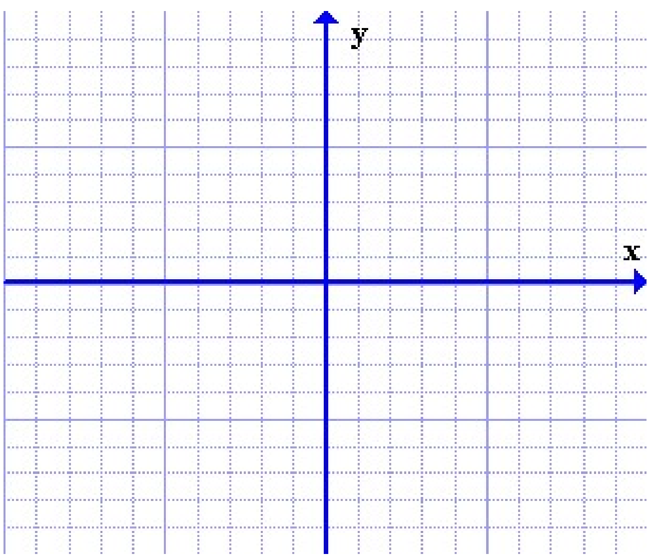
Example #2.

Find the inverse of $f(x)$ by graphing.

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



b) $f(x) = x^2 - 4$



c) Restrict the domain of the function $y = -2(x + 1)^2 - 3$ such that the inverse is a function.