One to One Functions; Graphs of Inverses

Determine if a function is one-to-one by a horizontal line test, or seeing if the y-value of the original function do not repeat. If the original function passes the horizontal line test and/or the y-values do not repeat, then it's inverse is a function, and the original is one-to-one.

Are the functions below one to one? (yes or no)

1)

x	y
-1	2
1	2
0	1
-2	4
2	4

NO

2)

x	y
1	2
2	3
3	4
4	5
5	6

Yes

INVERSES OF FUNCTIONS:

* The inverse of a one-to-one function is obtained by switching the role of x & y.
* The inverse is denoted $f^{-1}(x)$.

Example:

Function: $f(x) = \{(x,y) : (3, 2), (1, 4), (7, 6), (9,12)\}$

Inverse: $f^{-1}(x) = \{(x,y) : (2,3), (4,1), (6,7), (12,9)\}$

To Graph Inverse Functions:

1) Make a table of values for the original function.
2) Make a new table of values for the inverse function by switching the x and y-values.
3) Plot both functions on the same graph.

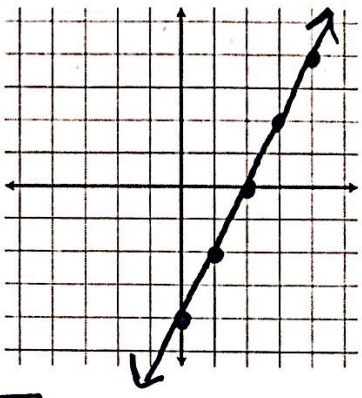
*** The two functions should be symmetrical across the line y = x.

***Remember, if the original graph passes the horizontal line test, then the inverse is a function and the original is one-to-one.

Example: Graph the function and it's inverse:

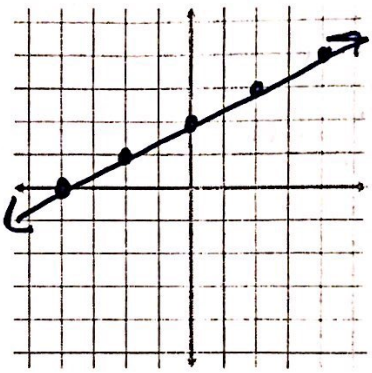
$f(x) = 2x - 4$

x	y
0	-4
1	-2
2	0
3	2
4	4



inverse:

x	y
-4	0
-2	1
0	2
2	3
4	4

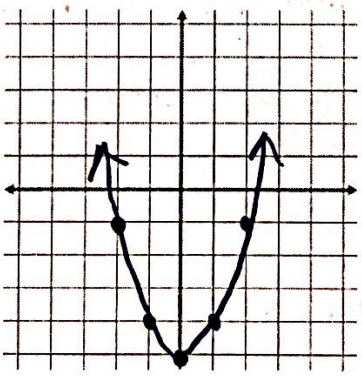


Is f(x) one-to-one? Yes

You Try!! Graph the function and it's inverse:

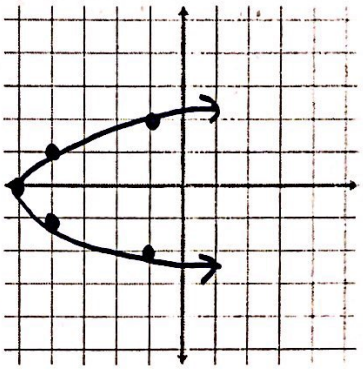
$f(x) = x^2 - 5$

x	y
-2	-1
-1	-4
0	-5
1	-4
2	-1



inverse:

x	y
-1	-2
-4	-1
-5	0
-4	1
-1	2



Is f(x) one-to-one? NO