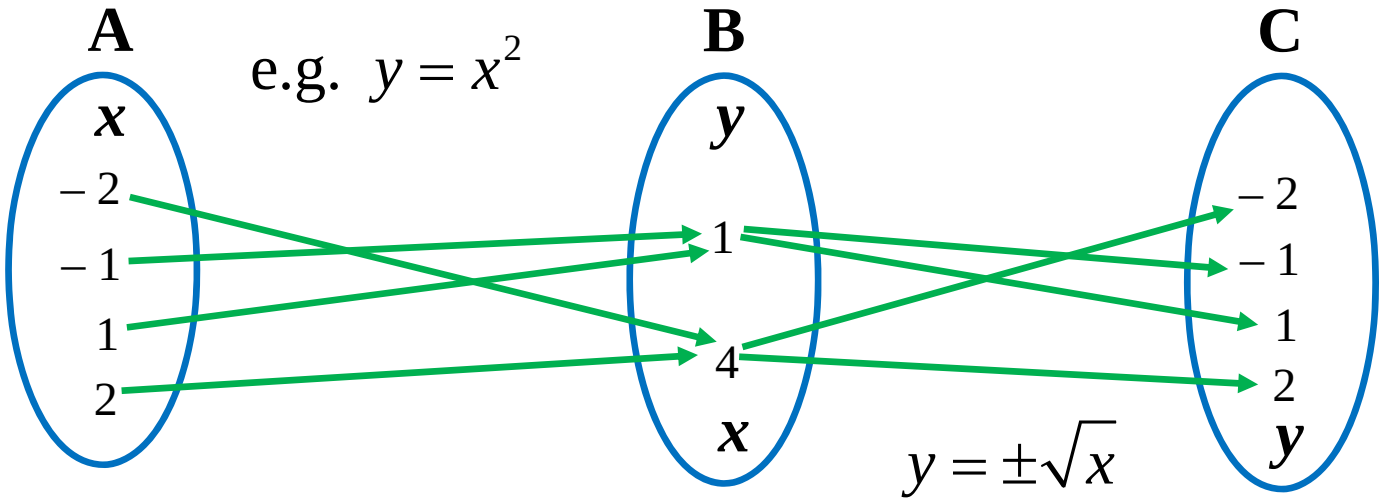
Inverse Relations

The inverse relation returns the set of dependent values to the set of independent values



A and **C** are equal sets

The inverse relationship can be found by swapping the variables

relation: $y = x^2$ inverse relation: $x = y^2 \Rightarrow y = \pm\sqrt{x}$

The domain of the relation is the range of its inverse relation

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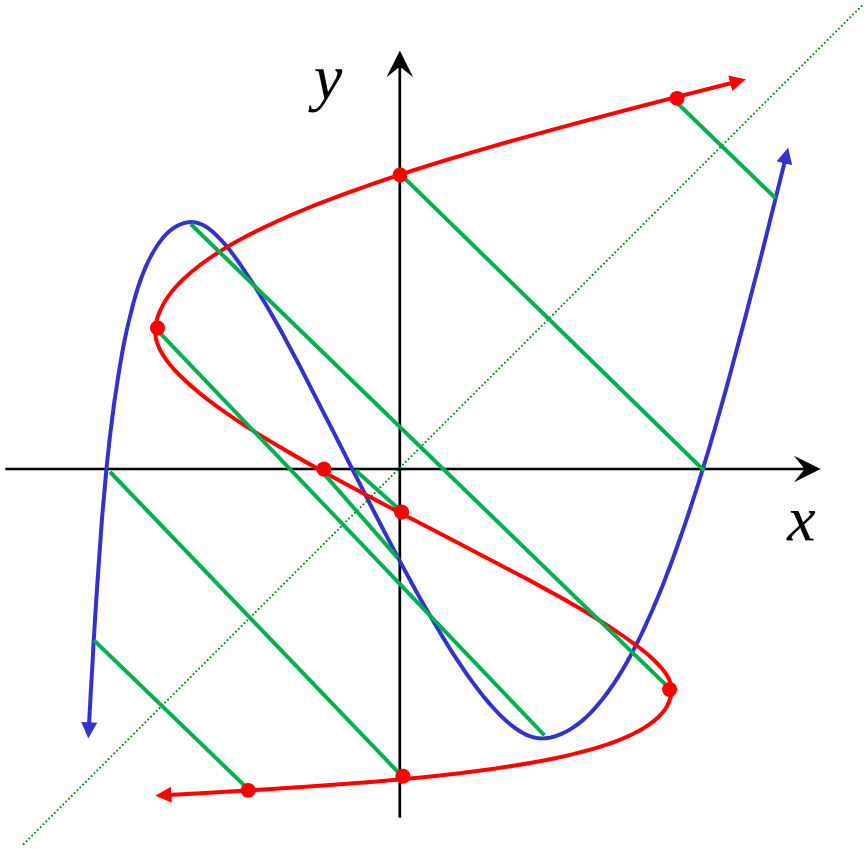
A relation and its inverse relation are reflections of each other in the line $y = x$.

e.g. Draw the inverse relation



Inverse Functions

If there exists a one-to-one relationship between the two sets, then both the relation and the inverse relation are functions.
In this situation the inverse relation is called the **inverse function.**

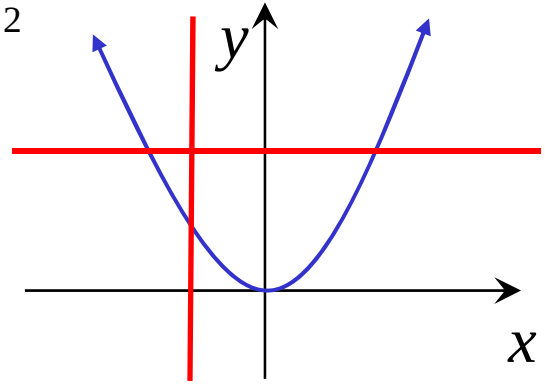
Testing For Inverse Functions

(1) The graph satisfies both the vertical and horizontal line tests

OR

(2) When $x = f(y)$ is rewritten as $y = g(x)$, $y = g(x)$ is unique.

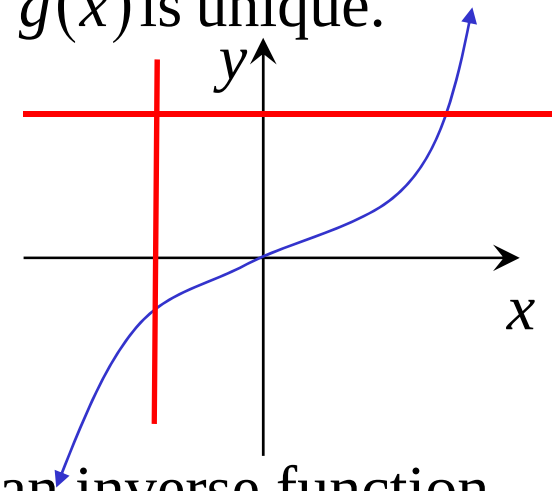
$(i)\ y = x^2$



Only has an inverse relation

OR $x = y^2$, $y = \pm\sqrt{x}$ NOT UNIQUE

$(ii)\ y = x^3$



Has an inverse function

OR $x = y^3$, $y = \sqrt[3]{x}$ UNIQUE

Exercise 5F; 1bdeg, 2, 3, 4bdf, 5bdf, 6ab (i,iv), 7bd, 8ab (i,iii), 9bd, 11, 12, 14, 15