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For example: if $y = f(x) = x^2$ then $f(1) = 1^2 = 1 = (-1)^2 = f(-1)$

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For an inverse to be a function, it can only send each y back to one x
Does the inverse send the $y-$value $y = 1$ back to $x = 1$ or $x = -1$?
Since a function can't give both outputs; this inverse is not function!

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Still: f^{-1} finds which input of f gives a particular output of f