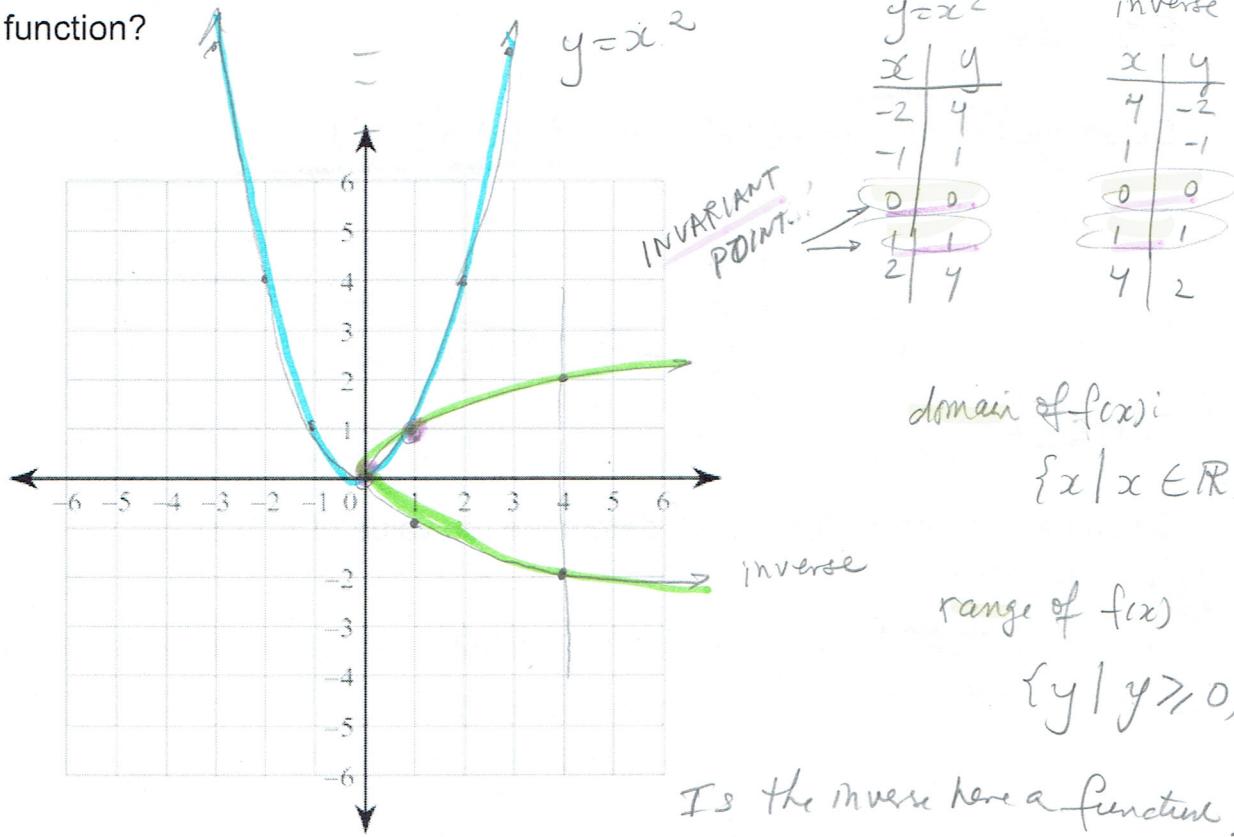


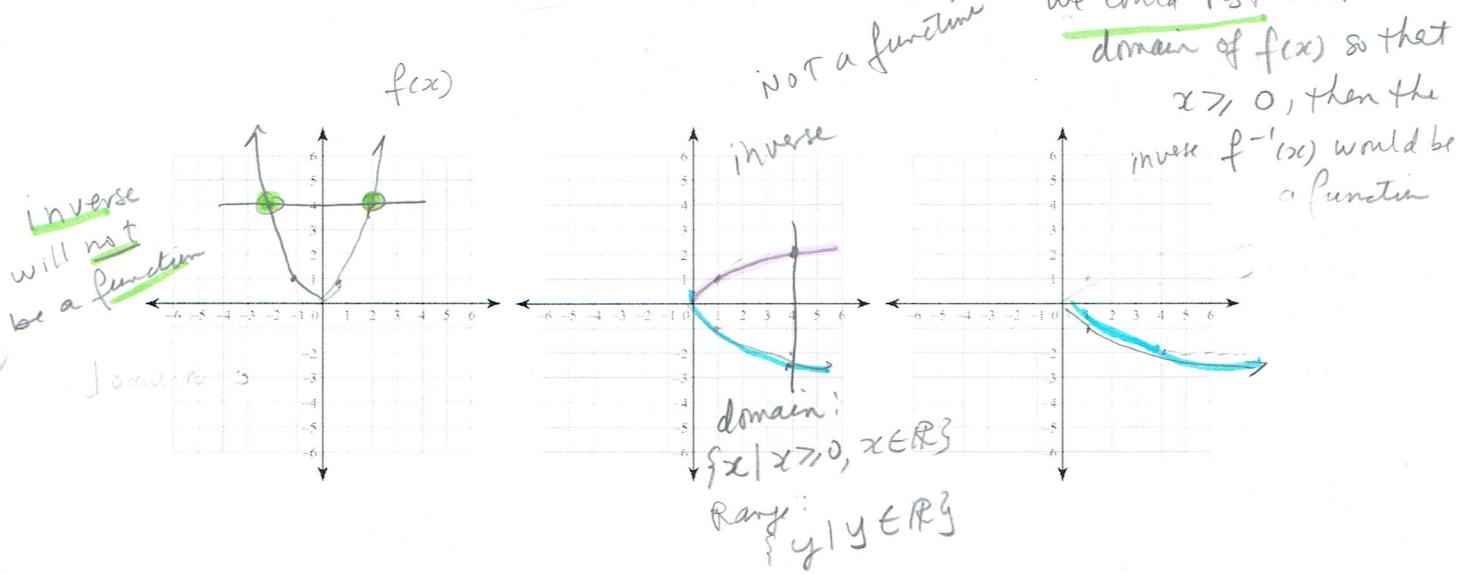
Example 2

Graph the function $f(x) = x^2$ and its inverse on the same graph. State the domain and range the function and its inverse. Is the inverse a function?

How can we restrict the domain of $f(x) = x^2$ so that its inverse is a function?



The HORIZONTAL LINE TEST is a way to determine whether or not the inverse of a function, will also be a function.



When the inverse of a function $f(x)$ is itself a function, we may denote the inverse by $f^{-1}(x)$. Note that this is not an exponent. $f^{-1}(x) \neq \frac{1}{f(x)}$.

Example 3

Determine the equation of the inverse of $f(x) = \frac{1}{2}x - 1$.

$$\begin{aligned} y &= \frac{1}{2}x - 1 \\ x &= \frac{1}{2}y + 1 \\ 2(x+1) &= y \end{aligned}$$

Step ① swap x & y
② solve for y

Example 4

$$2x + 2 = y$$

Given the function $f(x) = 4x - 3$ determine the value of $f^{-1}(2)$.

2 methods
Method 1

- ① swap x & y
- ② solve for y
- ③ plug in 2

$$\begin{aligned} y &= 4x - 3 \\ x &= 4y - 3 \\ x + 3 &= 4y \\ \frac{x+3}{4} &= y = f^{-1}(x) \end{aligned}$$

$$f^{-1}(2) = \frac{2+3}{4} = \boxed{\frac{5}{4}}$$

Method 2

$f^{-1}(2)$ means $(x, 2)$
 \uparrow x is an ordered pair for $f(x)$

$$f(x) = 4x - 3$$

$$2 = 4x - 3$$

$$5 = 4x$$

$$\boxed{x = \frac{5}{4}}$$

