

# 1.8 Inverse Functions

$$f(x) = \{ (1, 3) (2, 4) (3, 5) \}$$

$$x \text{'s Domain} = \{ 1, 2, 3 \}$$

$$y \text{'s Range} = \{ 3, 4, 5 \}$$

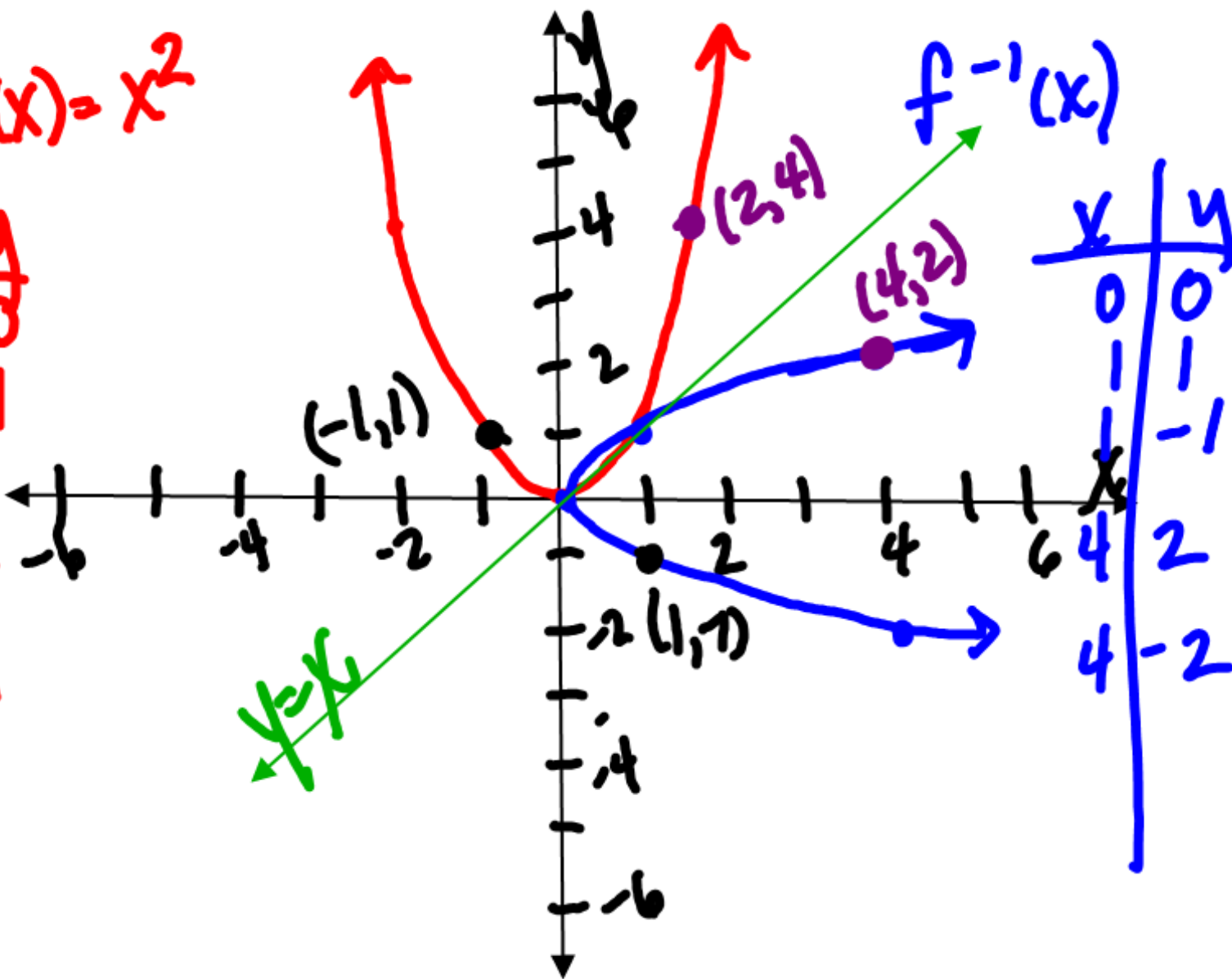
$$f^{-1}(x) = \{ (3, 1) (4, 2) (5, 3) \}$$

$$\text{Domain} = \{ 3, 4, 5 \}$$

$$\text{Range} = \{ 1, 2, 3 \}$$

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

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



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

$$f(x) = 5x + 1$$

Write the  
Inverse

①  
Change  
y =

$$y = 5x + 1$$

②  
Switch  
x & y

$$x = 5y + 1$$

③  
Solve for  
y

$$\begin{aligned} x - 1 &= 5y + 1^{-1} \\ x - 1 &= 5y \\ \frac{x-1}{5} &= \frac{5y}{5} \end{aligned}$$

$$\frac{x-1}{5} = y \quad \text{or} \quad \frac{x}{5} - \frac{1}{5} = y$$

④  
Write as  
a function

$$f^{-1}(x) = \frac{x-1}{5}$$

$$f^{-1}(x) = \frac{x}{5} - \frac{1}{5}$$

$$f^{-1}(x) = \frac{1}{5}x - \frac{1}{5}$$

$$f(x) = 5x + 1 \quad f^{-1}(x) = \frac{x-1}{5}$$

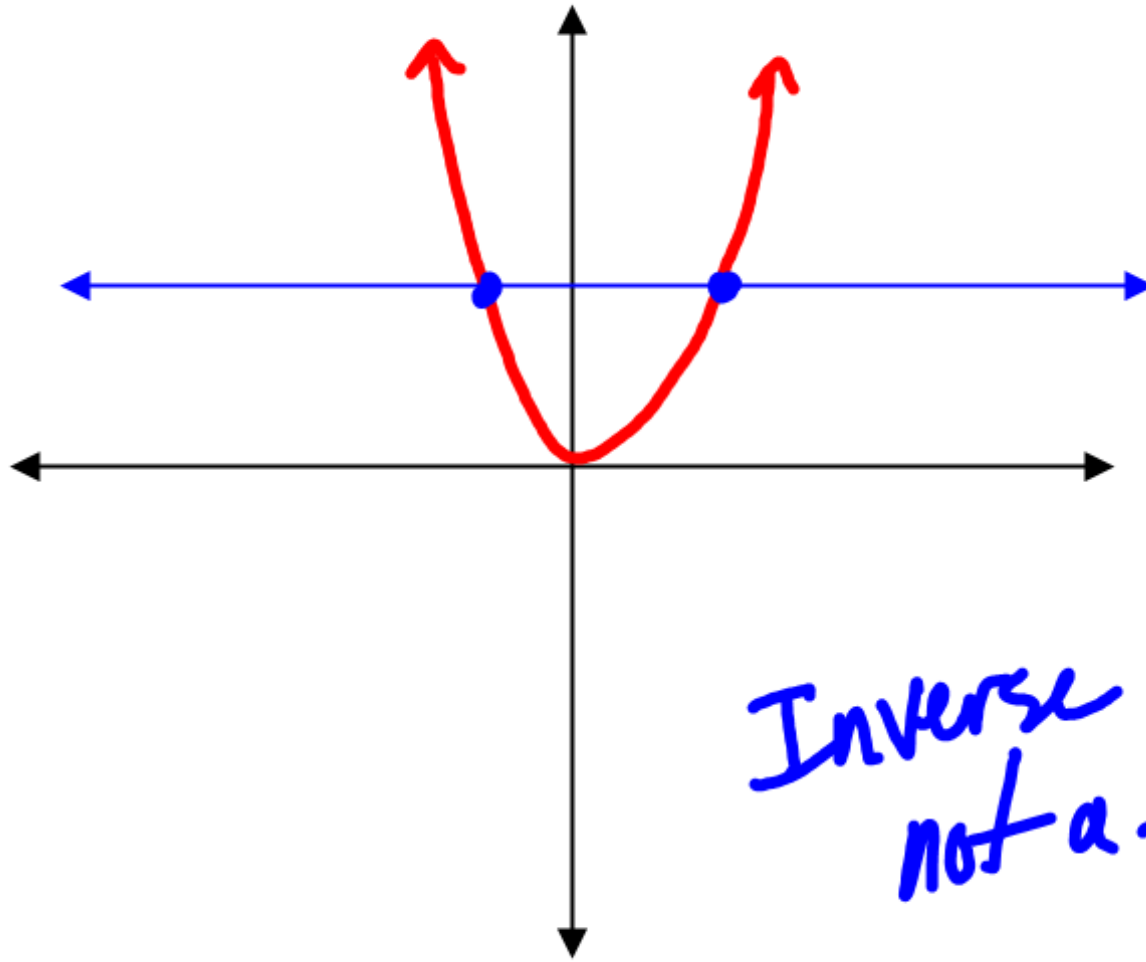
x	f(x)
0	1
2	11

x	f <sup>-1</sup> (x)
1	0
11	2

$$f(x) = 5x + 1 \quad f^{-1}(x) = \frac{x-1}{5}$$

$$\begin{aligned} f(f^{-1}(x)) &= 5x + 1 \\ (f \circ f^{-1})(x) &= 5\left(\frac{x-1}{5}\right) + 1 \\ &= x - 1 + 1 \\ &= x \end{aligned}$$

$$\begin{aligned} f^{-1}(f(x)) &= \frac{x-1}{5} \\ (f^{-1} \circ f)(x) &= \frac{5x+1-1}{5} \\ &= \frac{5x}{5} \\ &= x \end{aligned}$$



Inverse is  
not a function

13. p91

$x$	0	1	2	3	4
$f^{-1}$	-2	0	1	2	4