

## 2.5 Inverses of Functions.

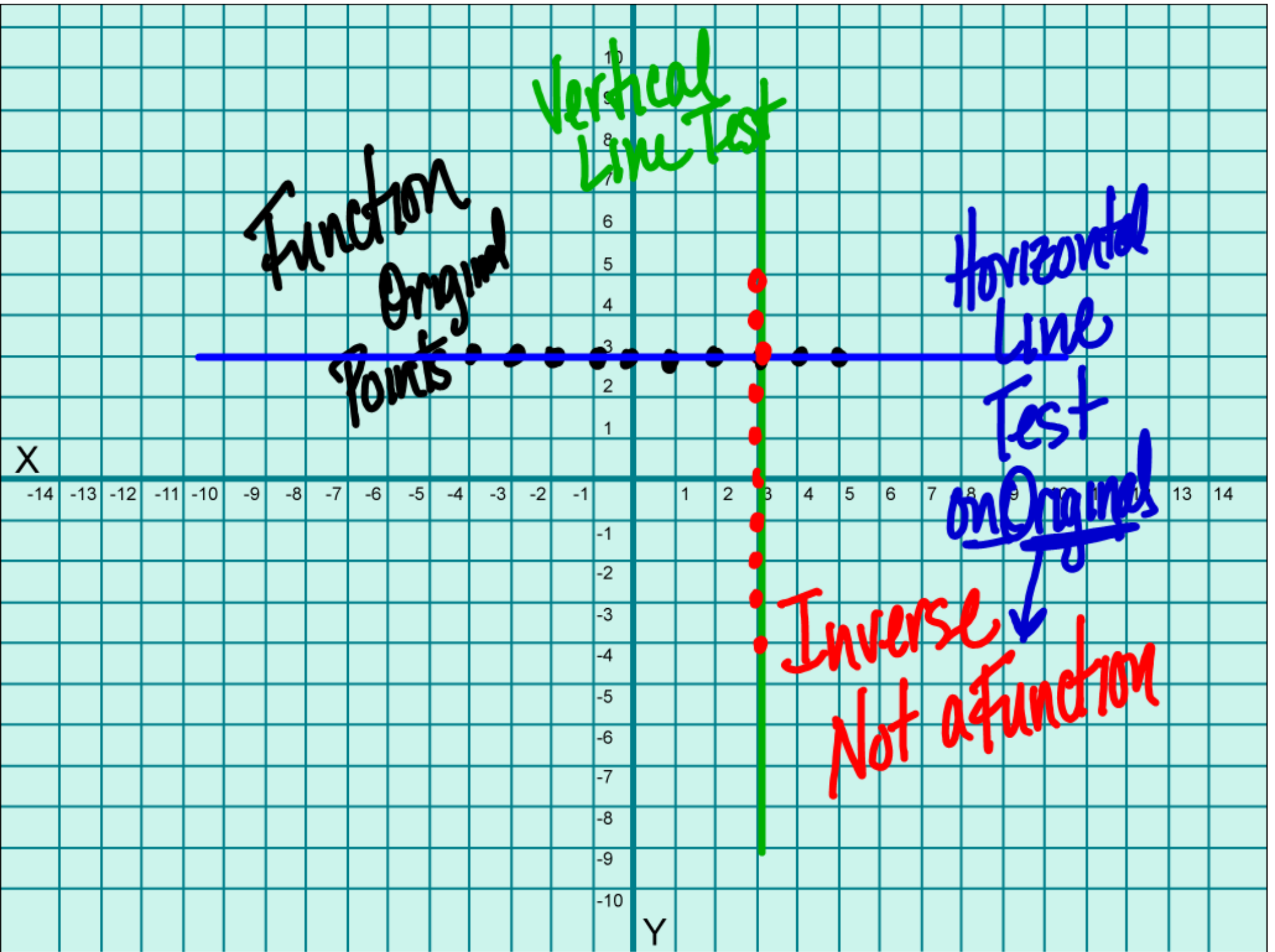
### Inverse of a Relation

Original  
 $\{ (4, 1) (5, 2) (6, 3) (7, 4) \}$

Inverse  
 $\{ (1, 4) (2, 5) (3, 6) (4, 7) \}$

Original  
 Not a function  
 $\{ (1, 8) (1, 9) (1, 10) (1, 11) \}$

Inverse  
 Function  
 $\{ (8, 1) (9, 1) (10, 1) (11, 1) \}$



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

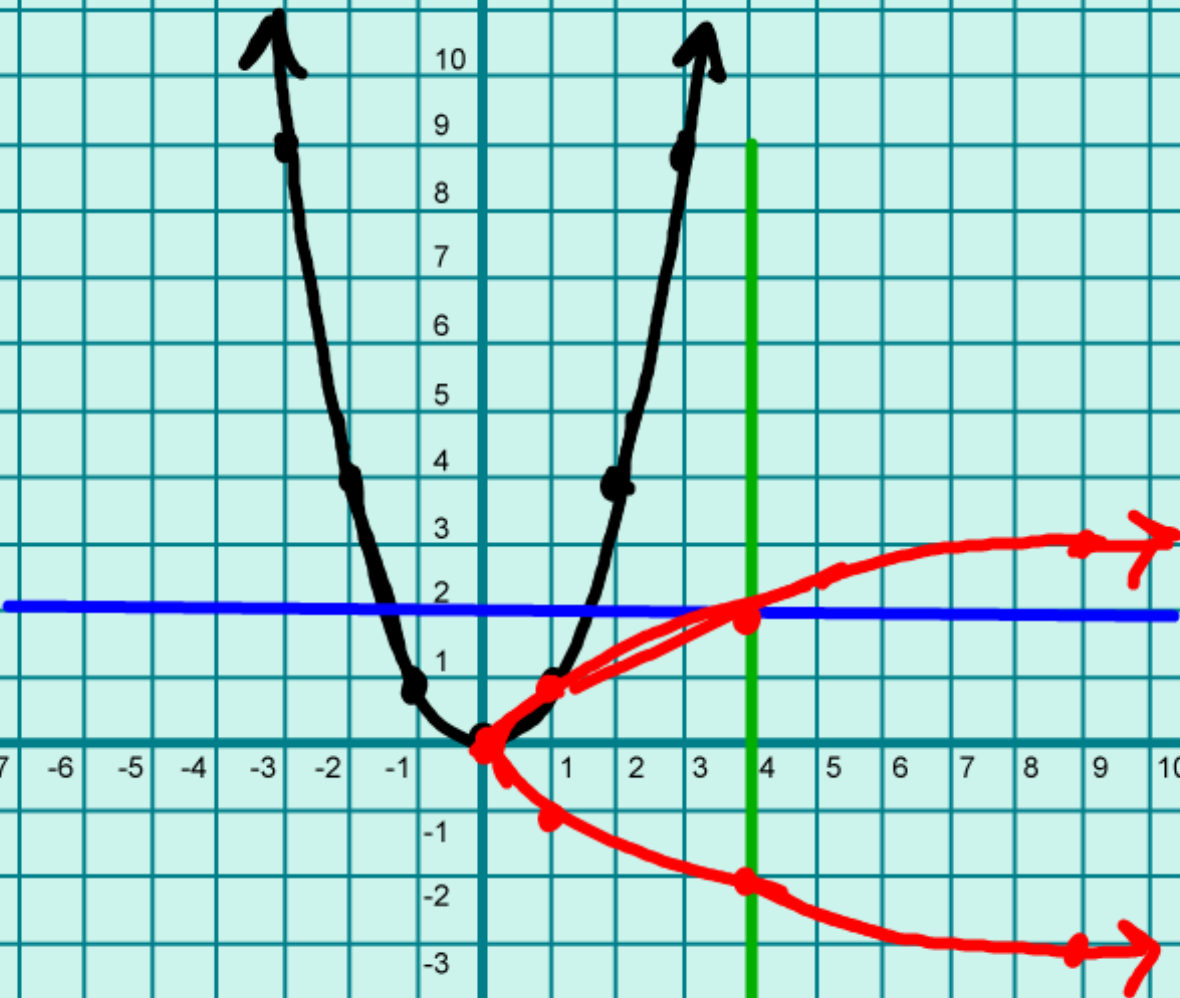
Original  
Function

X

-14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13 14

10  
9  
8  
7  
6  
5  
4  
3  
2  
1  
-1  
-2  
-3  
-4  
-5  
-6  
-7  
-8  
-9  
-10

Y



Inverse not a  
function

Write the inverse of

①  $f(x) = 5x + 1$

Change  
into an  
equation  
y =

$$y = 5x + 1$$

② Interchange  
x and y

$$x = 5y + 1$$

③ Solve for y  
y =

$$x = 5y + 1$$

$$x - 1 = 5y$$

$$\frac{x-1}{5} = \frac{5y}{5}$$

$$\frac{x-1}{5} = y$$

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

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

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

Write  
as a  
function

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

Read as: f inverse of x equals  $\frac{1}{5}x - \frac{1}{5}$

$$f(x) = \frac{2x-3}{4}$$

Equation  
y =  $y = \frac{2x-3}{4}$

Switch  
x and y  $x = \frac{2y-3}{4}$

Solve for  
y  $4 \cdot x = \frac{2y-3}{4} \cdot 4$

$$4x = 2y - 3$$

$$\frac{4x+3}{2} = \frac{2y}{2}$$

$$\star \frac{4x+3}{2} = y$$

or  $\frac{4x}{2} + \frac{3}{2} = y$

$$\star 2x + \frac{3}{2} = y$$

$$\star y = 2x + \frac{3}{2}$$

Write  
as a function  $f^{-1}(x) = \frac{4x+3}{2}$

or  $f^{-1}(x) = 2x + \frac{3}{2}$

p122

12-50 E

30-40 Find inverse only

42-48 Calc