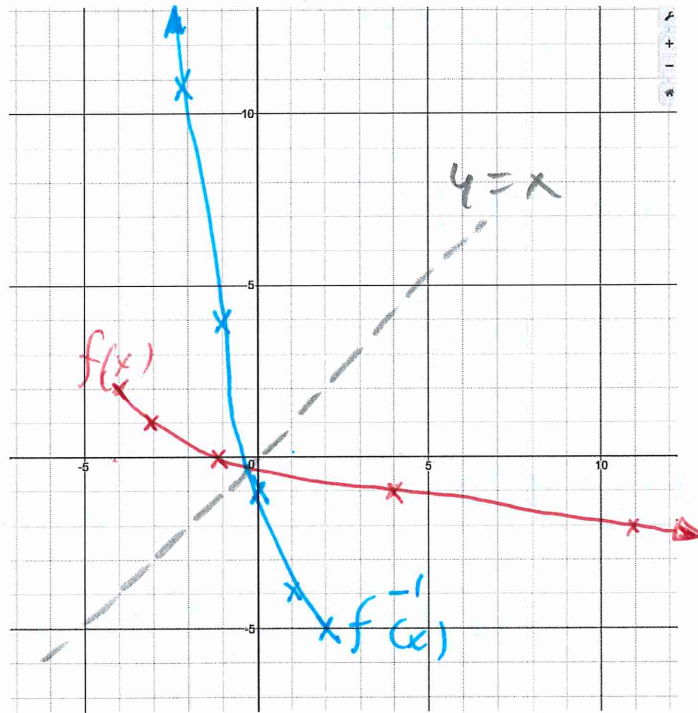# Unit 12: Inverse functions

I. Given the function:

$$f(x) = 2 - \sqrt{x + 5}$$

1. Indicate in the table a few key values for (x,y).
2. Plot the function on the axes below.
3. **Table Method:** Fill in the table below based on the table you filled for f(x).
4. Mark these points on the graph.
5. **Graph Method:** Graph the line y=x as dotted line.

$f(x)$

x (in)	y (out)
-5	2
-4	1
-1	0
4	-1
11	-2

Domain
$[5, \infty)$

Range
$(-\infty, 2]$

$f^{-1}(x)$

(in) x	(out) y
2	-5
1	-4
0	-1
-1	4
-2	11

Domain:
$(-\infty, 2]$

Range
$[-5, \infty)$

Algebraic method

$$f(x) = 2 - \sqrt{x + 5}$$

6. Using swapping x $\longleftrightarrow$ y method, find the formula for the inverse function.

$$y = 2 - \sqrt{x + 5}$$

$$x = 2 - \sqrt{y + 5}$$

$$x - 2 = -\sqrt{y + 5}$$

$$x^2 - 4x + 4 = y + 5$$

$$\boxed{y = x^2 - 4x - 1}$$

$$\boxed{\begin{array}{l} \text{Domain: } (-\infty, 2] \\ \text{w/ Range: } [-5, \infty) \end{array}}$$