

$$1. \sqrt{x+4} - 3 = 1$$

$$\sqrt{x+4} = 4$$

$$x+4 = 16$$

$$x = 16 - 4$$

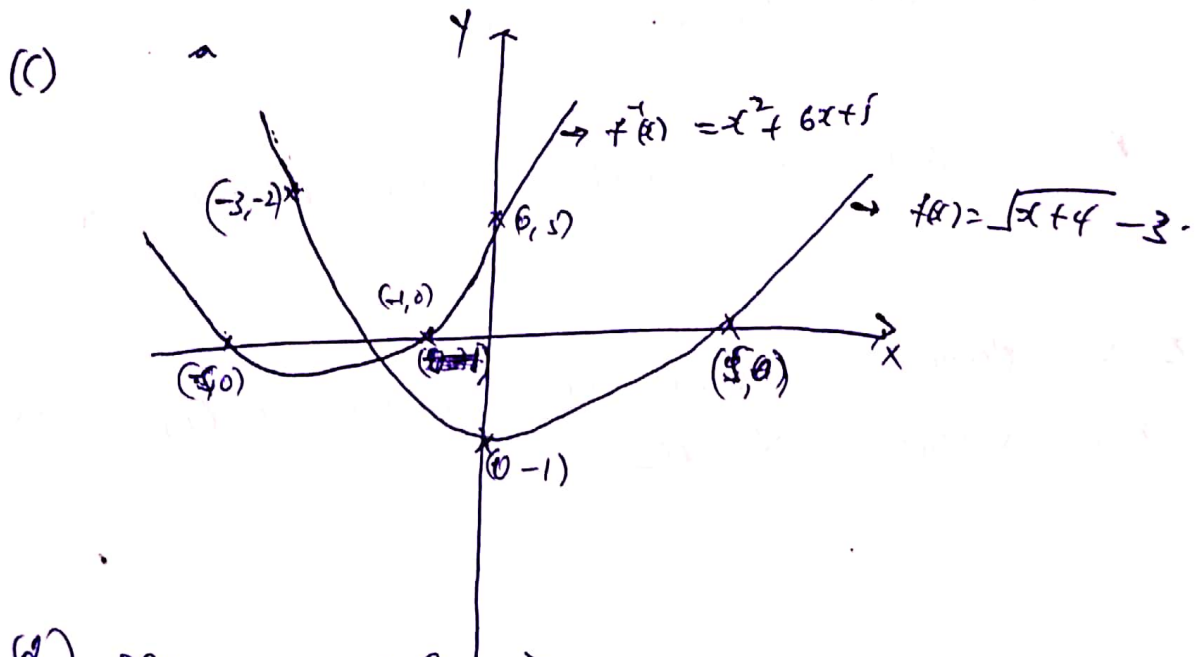
$x = 12 \rightarrow$ The original number.

$$2. (a) f(x) = \sqrt{x+4} - 3$$

$$(b) x+4 \geq 0$$

$$x \geq -4$$

$x \geq -4 \rightarrow$ Domain



$$(d) \text{ range} = x \in [-4, \infty]$$

$$3. \text{ let } f(x) = y$$

$$y = \sqrt{x+4} - 3$$

$$y+3 = \sqrt{x+4}$$

$$(y+3)^2 = x+4$$

$$y^2 + 6y + 9 = x+4$$

$$x = y^2 + 6y + 5$$

$$f^{-1}(y) = y^2 + 6y + 5$$

$$\therefore f^{-1}(x) = x^2 + 6x + 5$$

b. Domain should be non repeated values = All non negative real numbers included with zero.

c. The inverse $[f^{-1}(x)]$ domain should be restricted because to exist an inverse of a function, values should not be repeated.

d. Consult 2c graph.

e. Range: All positive real numbers except zero

4. Both domain and range of $f(x)$ and $f^{-1}(x)$ have non-repeated values.

$$5. \quad f^{-1}(f(x)) = [f(x)]^2 + 6f(x) + 5$$

$$= [\sqrt{x+4} - 3]^2 + 6[\sqrt{x+4} - 3] + 5$$

$$= x+4+9-6\sqrt{x+4} + 6\sqrt{x+4} - 18 + 5$$

$$= x+13-13$$

$$= x.$$

$$f \circ f^{-1}(x) = \sqrt{f^{-1}(x) - 4} - 3$$

$$= \sqrt{x^2 + 6x + 5 + 4} - 3$$

$$= \sqrt{x^2 + 6x + 9} - 3$$

$$= (x+3) - 3$$

$$= x.$$

$$\text{hence } f^{-1} \circ f(x) = f \circ f^{-1}(x) = x$$

hence shown.