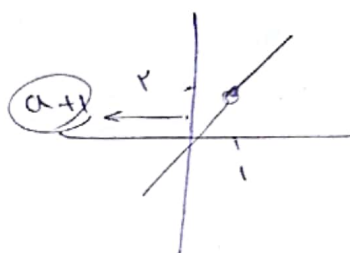


الف) $(m, r) \rightarrow m = r$
 $(3, 2) \rightarrow (3, n^2 - n)$
 $n^2 - n = 2 \quad n^2 - n - 2 = 0$
 $(n+1)(n-2) = 0$
 $n = 2$

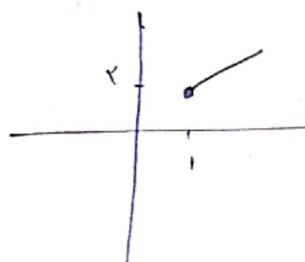
ب) $(m, r) \rightarrow m = 2$
 $(2, 0) \rightarrow (a, m)$
 $(-1, 1) \rightarrow (a, m)$
 $(1, 2) \rightarrow (a+2, n)$
 $a = -1$
 $n = 2$

$f(x) = \begin{cases} 3x-1 & x \geq 1 \\ x+a & x < 1 \end{cases}$



$a+1, 2$
 $a < 1$

$f(x) = \begin{cases} 3x-1 & x \geq 1 \\ ax+a-1 & x < 1 \end{cases}$
 $y = a-1 \leftarrow x=0$



$a < 3$
 $\rightarrow a < 3$

الف) $y = x^2 + 2$
 $y_1 = y_2 \quad x_1^2 + 2 = x_2^2 + 2$
 $f(x)^{-1} \Rightarrow x = y^2 + 2$
 $y = \sqrt{x-2}$

ب) $y = x^2 - 2x + 2$
 $y = x^2 - 2x + 2 + 2 - 2$
 $(y-2) = (x-1)^2 - 1$
 $(y-2)^2 = (x-1)^2$
 $x = 1 \pm \sqrt{y-2}$

الف) $y = \frac{3x+1}{x-2}$
 $f(x) = \frac{3x+1}{x-2}$

ب) $y = \frac{4+x}{x+2} = \frac{2(2+x)}{x+2}$
 $x = \frac{2y-4}{y-2}$

الف)

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

$$y_1 = y_2 \quad \sqrt{x_1-4} = \sqrt{x_2-4}$$

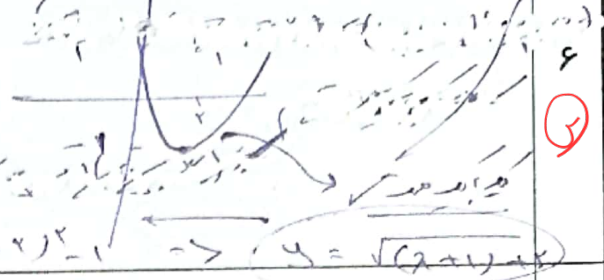
$$x_1-4 = x_2-4$$

$$f(x)^{-1} = x \sqrt{y-4} \rightarrow x^2 = y-4$$

$$x = (y-4)^{\frac{1}{2}}$$

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

$$x \in [4, +\infty)$$



$$f(x) = x + \sqrt{x} \rightarrow f(x)^{-1} = x = y + \sqrt{y}$$

$$\begin{cases} a=1 \\ b=\frac{1}{4} \\ c=-\frac{1}{4} \end{cases} \rightarrow a+4b+4c=1$$

$$y = \frac{x}{\sqrt{x^2-4}} \xrightarrow{y_1=y_2} \left(\frac{x_1}{\sqrt{x_1^2-4}} \right)^2 = \left(\frac{x_2}{\sqrt{x_2^2-4}} \right)^2$$

این هم رابطه بین متغیرها نیست

$$\frac{x_1^2}{x_1^2-4} = \frac{x_2^2}{x_2^2-4} \rightarrow x_1^2(x_2^2-4) = x_2^2(x_1^2-4) \rightarrow x_1^2 x_2^2 - 4x_1^2 = x_2^2 x_1^2 - 4x_2^2 \rightarrow -4x_1^2 = -4x_2^2 \rightarrow x_1^2 = x_2^2 \rightarrow x_1 = x_2$$

$$f(x)^{-1} \Rightarrow x^2 = \frac{y^2}{y^2-4} \rightarrow y^2 = \frac{x^2}{x^2-1} \rightarrow y = \pm \sqrt{\frac{x^2}{x^2-1}}$$

$$g(x) = \sqrt{x} - 1 = -\frac{x}{\omega} \rightarrow (\sqrt{x} + \frac{x}{\omega})^2 = x = \frac{4}{\omega^2}$$

$$g^{-1}(\frac{x}{\omega}) = \frac{4}{\omega^2}$$

$$\frac{x}{1+x} = -\frac{x}{\omega} \rightarrow -\omega x = x + x|x| \rightarrow -\omega x = x - x|x|$$

$$-\frac{x}{\omega} + \frac{4}{\omega^2} = \frac{-x}{\omega} \rightarrow x = -\frac{x}{\omega} = f(-\frac{x}{\omega})$$

$$f^{-1}(x) \Rightarrow y = \sqrt{x-1} \rightarrow y^2 = x-1 \rightarrow x = y^2 + 1$$

$$f(x) = x^2 + 1$$

$$y(x) = x^2 + 1 + \sqrt{x^2 + 1} \rightarrow y = x^2 + 1 + \sqrt{x^2 + 1} \rightarrow x^2 + 1 + \sqrt{x^2 + 1} = 11$$

$$x^2 + \sqrt{x^2 + 1} = 11 \rightarrow x = 2 \rightarrow g^{-1}(11) = 2$$