

$$f(x) = |x-1| - |x-r|$$

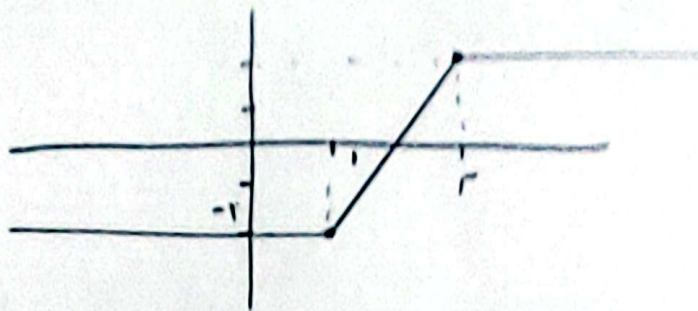
$$[a, b] \rightarrow a=1 \quad b=r$$

$$[1, r]$$

$$f(x) = x-1 + x-r = 2x-r$$

$$y = 2x - r$$

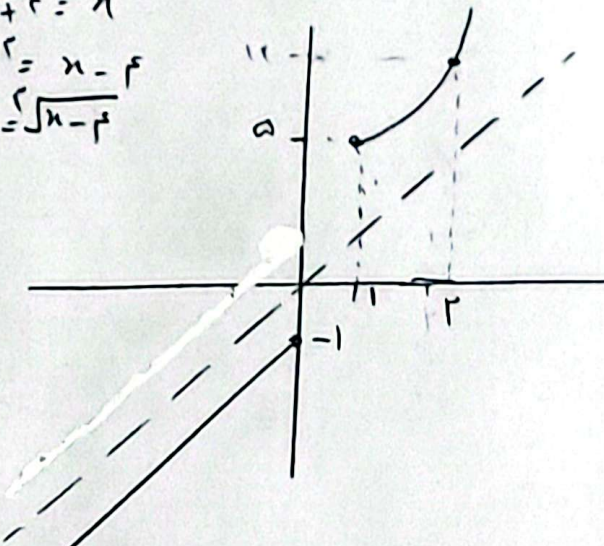
$$\rightarrow x = \frac{y+r}{2} \rightarrow 2y = x+r \rightarrow \boxed{y = \frac{1}{2}x + \frac{r}{2}}$$



$$f(x) = \begin{cases} x^r + r; & x \geq 1 \rightarrow y^r + r = x \\ & y^r = x - r \\ & y = \sqrt[r]{x-r} \\ x-1; & x \leq 0 \end{cases}$$

عكس و عكس

$$f^{-1} = \begin{cases} \sqrt[r]{x-r} & x \geq r \\ \frac{x+1}{r} & x \leq -1 \end{cases}$$



$$x = ry - 1 \rightarrow ry = x+1 \rightarrow y = \frac{x+1}{r}$$

$$f(x) = \frac{x^r - \frac{(x+1)^r}{r}}{x+r} \quad f^{-1}(x) = \frac{ax+b}{rx+d} \quad f^{-1}(b) = ?$$

$$y = \frac{x^r + rx - x - 1 - rx - rx}{x+r} = \frac{-1-rx}{x+r} \rightarrow x = \frac{-1-ry}{y+r} \rightarrow y = -\frac{rx+1}{x+r} \rightarrow y = \frac{-rx-1}{x+r}$$

$$f^{-1}(-r) = \frac{-r(-r)-r}{r(-r)+r} = \frac{10}{r} = \boxed{a} \quad d=r, \quad b=-r, \quad a=-4 \quad \leftarrow \frac{-4x-r}{rx+r} \quad \leftarrow \begin{matrix} \text{مخرج مشترك} \\ x_r \end{matrix}$$

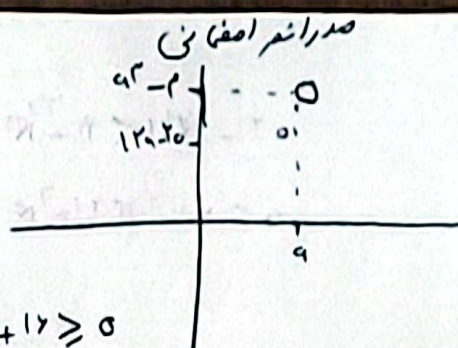
$$f(x) = \frac{x}{x^r+1}$$

$$y = \frac{x}{x^r+1} \rightarrow x = \frac{y}{y^r+1} \rightarrow y^r x + x = y$$

$$y = \frac{1 \pm \sqrt{1-4x^r}}{2x}$$

$$y^r x - y + x = 0$$

$$f(x) = \begin{cases} x^2 - 4 & ; x > 4 \\ 12x - 20 & ; x \leq 4 \end{cases}$$



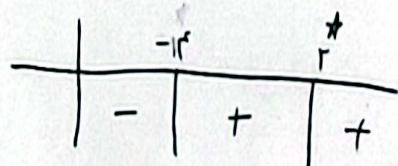
$$a^2 - 4 \geq 12a - 20$$

$$a^2 - 12a + 16 \geq 0$$

$$(a-2)(a^2 + 2a - 1) \geq 0$$

$$\boxed{a \geq -f}$$

$$f + 22 = 2 \Rightarrow \frac{-2 \pm 4}{2} = 1, -3$$



$$f(x) = 2x + k \quad f^{-1}(2) = 4$$

$$12 + k = 2$$

$$\boxed{k = -10}$$

$$a) f(4) \rightarrow 2 \cdot 4 - 10 = 18$$

$$b) f(f(x)) \rightarrow 2(2x - 10) - 10 \Rightarrow 4x - 20 - 10 \Rightarrow \boxed{4x - 30}$$

$$\frac{a^2}{a-1} = 24$$

$$2a^2 - 24 = a^2$$

$$a^2 - 24 = 0$$

$$a(a-2) = 0$$

$$\boxed{2}$$

چون آنکه 0 باشد تابع ثابت
نمی شود و تابع ثابت یک یک نیست

$$f = \{(2, 4), (4, 2), (6, 4), (8, 2)\} \quad g = \{(2, 2), (4, 4), (6, 4), (8, 4)\}$$

$$f^{-1} = \{(4, 2), (2, 4), (4, 6), (2, 8)\} \quad g^{-1} = \{(2, 2), (4, 4), (6, 4), (8, 4)\}$$

$$a) f \circ f^{-1} = \{(2, 2), (4, 4), (6, 6), (8, 8)\}$$

$$b) f^{-1} \circ f = \{(2, 2), (4, 4), (6, 6), (8, 8)\}$$

$$c) f \circ g^{-1} = \{(2, 4), (4, 2)\}$$

$$d) g^{-1} \circ f = \{(2, 4), (4, 2)\}$$

$$f = \{(1, 2), (2, 1), (4, 0)\} \quad g = \{(2, 1), (1, 2), (4, 0)\} \quad h = \{(1, 2), (2, 1), (4, 0)\}$$

$$f \circ g^{-1} = \{(1, 2), (2, 1), (4, 0)\}$$

$$g^{-1} = \{(1, 2), (2, 1), (4, 0)\}$$

$$\frac{h}{f \circ g^{-1}} = \{(1, \frac{1}{2}), (2, \frac{1}{4})\}$$

$$y = \frac{2x+1}{x-2}$$

یک به یک است

$$x = \frac{2y+1}{y-2} \rightarrow y = -\frac{-2x-1}{x-2} = \frac{2x+1}{x-2}$$

$$f^{-1} = \frac{2x+1}{x-2}$$

