

$$f(n) = \begin{cases} n^2 - 1 & n > a \\ 12n - 2 & n \leq a \end{cases} \longrightarrow \begin{cases} (a^2 - 1, +\infty) \\ (-\infty, 12a - 2] \end{cases} \left. \vphantom{\begin{matrix} n > a \\ n \leq a \end{matrix}} \right\} \text{اشکال پیدا می شود! بدتر می باشد}$$

$$a^2 - 1 \geq 12a - 2$$

$$a^2 - 12a + 14 \geq 0$$

$$a^2 - 12a + 12a + 14 \geq 0$$

$$\frac{a(a^2 - 14)}{a(a+1)(a-1)} \geq 0$$

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

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



$$a \in [-1, +\infty)$$

-۲

$$f^{-1}(x) = x \Rightarrow f(x) = x = 12x - 1 \quad h = -1$$

$$f(n) = 3n - 1$$

$$\text{ان) } f(x) = 11$$

$$\text{ب) } f(f(n)) = f(3n - 1) = 3(3n - 1) - 1 = 9n - 4$$

$$f^{-1}(x) = a$$

$$f(a) = 2a = \frac{a^2}{a-1}$$

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

$$a^2 - 2a = 0 \quad a(a-2) = 0$$

$$a = 0 \rightarrow \boxed{a = 2}$$

در این صورت تابع f
خاصیت شریک دارد
بنابراین! شریک
a = 2

-۳

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

$$g(n) = \{(2, 2), (4, 4), (4, \infty)\} \quad g^{-1}(n) = \{(2, 2), (4, 4), (\infty, 4)\}$$

$$\text{ان) } f \circ f^{-1} = \{(\infty, \infty), (4, 4), (2, 2), (4, 4)\}$$

$$\text{ب) } f^{-1} \circ f = \{(2, 2), (4, 4), (4, 4), (4, 4)\}$$

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

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

$$f(x) = \{(2, 4)(1, 1)(4, 0)\} \quad g^{-1} = \{(1, 2)(3, 1)(\omega, 4)\}$$

$$h(x) = \{(1, 2)(2, 1)(4, 1)(\omega, 1)\}$$

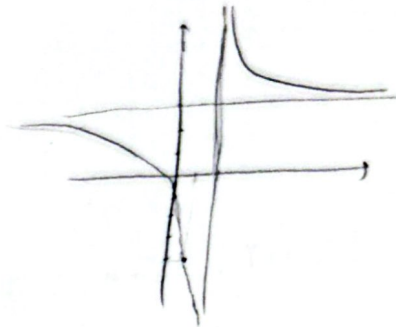
$$\frac{h}{f \circ g^{-1}} = \left\{ \left(1, \frac{2}{4}\right) \left(3, \frac{1}{1}\right) \left(\omega, \frac{1}{4}\right) \right\} = \left\{ \left(1, \frac{1}{2}\right) \left(3, 1\right) \right\}$$

$$D_{f \circ g^{-1}} = \{x \in D_{f^{-1}} : g^{-1}(x) \in D_f\} = \{1, 3, \omega\} \cap \{1, 3, \omega\} = \{1, 3, \omega\}$$

$$D = D_{f \circ g^{-1}} \cap D_h = \{1, 3, \omega\}$$

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

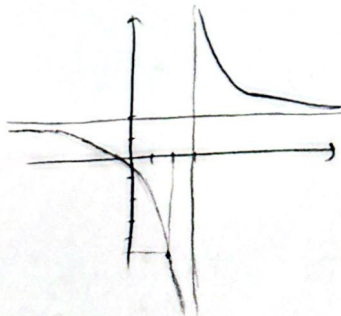
مجاہد افقی = 3
مجاہد عمودی = 2



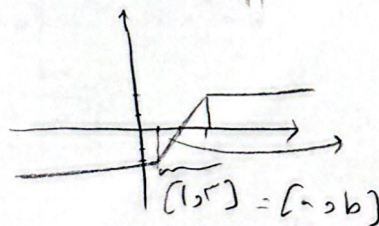
$$x = \frac{y+1}{y-2}$$

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

مجاہد افقی = 2
مجاہد عمودی = 3



$$y = |x-1| - |x-2|$$



$$x-1 + x-2 = x-1-2 = x-3$$

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

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

$$f(x) = \begin{cases} x^2 + 1 & x \geq 1 \rightarrow [\omega, +\infty) \\ x-1 & x \leq 0 \rightarrow (-\infty, -1] \\ \sqrt{x-1} & 1 \leq x < \omega \end{cases}$$

$$f^{-1}(x) = \begin{cases} \sqrt{x-1} & x \geq \omega \\ \frac{x+1}{2} & x \leq -1 \end{cases}$$

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

$$n = \frac{-r y - 1}{y + 1}$$

$$y = -\frac{r n + 1}{n + 1} = \frac{-r n - 1}{n + 1} = \frac{-r n - 1}{r n + 1}$$

$$a = -4$$

$$d = 4$$

$$b = -1$$

$$f^{-1}(b) = \frac{-4b - 1}{4b + 1} = a$$

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

$$n = \frac{y}{y^r + 1}$$

$$y^r + n = y$$

$$R_f: y^r + n = y \quad y^r - n + y = 0$$

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

$$1 - 4y^r \geq 0$$

$$y^r \leq \frac{1}{4} \quad y^r \leq \frac{1}{r}$$

$$|y| \leq \frac{1}{r} \Rightarrow D_{f^{-1}}$$

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

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

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

-10