

$$f(x) = \begin{cases} x^2 - 4 & ; x > a^* \rightarrow \text{صحودى} \\ 12x - 20 & ; x \leq a^* \rightarrow \text{صحودى} \end{cases} \quad * \quad x^2 - 4 \geq 12x - 20$$

$$\rightarrow x^2 - 12x + 14 \geq 0 \rightarrow x = a = 12 \rightarrow y = 0 \rightarrow \frac{y}{x} = \frac{(a-2)(a+4)}{(a+2)} = (a-2)(a^2 + 2a - 1)$$

$$\rightarrow \frac{(a-2)^2(a+4)}{a^2-4} > 0 \rightarrow a > -4 \rightarrow$$

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$$f^{-1}(r) = 4 \rightarrow f(e) = 2 \rightarrow r = 12 + k \rightarrow k = -10$$

$$\text{الف)} f(v) = 21 - 10 = 11$$

$$\text{ب)} f \circ f = 3(3n - 10) - 10 = 9n - 40$$

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$$y = \frac{an}{n-1} \rightarrow x = \frac{a}{y-a} \rightarrow f^{-1}(n) = \frac{a}{n-a}$$

$$\rightarrow A(2a, a) \rightarrow a = \frac{2a}{a} \rightarrow a^2 - 2a = 0 \rightarrow a = 0 \text{ یا } 2$$

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$$\text{الف)} f \circ f^{-1} = \{(0,0), (1,1), (2,2), (3,3)\}$$

$$\text{ب)} f^{-1} \circ f = \{(1,1), (2,2), (3,3), (4,4)\}$$

$$\text{ج)} f \circ g^{-1} = \{(1,0), (0,1)\}$$

$$\text{د)} g^{-1} \circ f = \{(1,1), (2,2), (3,3)\}$$

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$$f \circ g^{-1} = \{(1,4), (3,8), (0,0)\}$$

$$\frac{h}{f \circ g^{-1}} = \left\{ \left(1, \frac{1}{4}\right), \left(3, \frac{1}{8}\right) \right\}$$

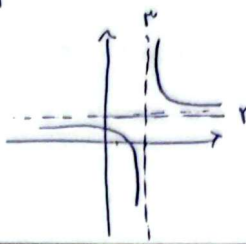
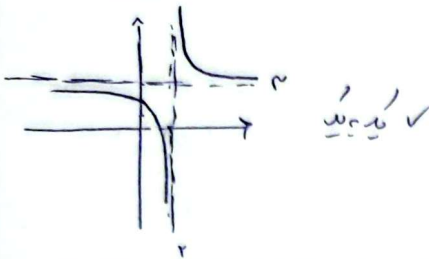
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$$y = \frac{r^{n+1}}{n-r} \rightarrow \text{یک طرفه} \Rightarrow \text{یک طرفه}$$

$$f(n) = r$$

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

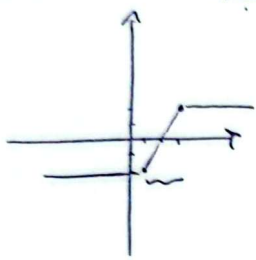
$$f(n) = r$$



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

در بازه

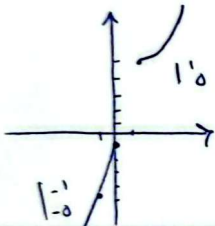


$$x = \frac{y+f}{r} \rightarrow f^{-1}(n) = \frac{n+r}{r}$$

$$y = n-1 - (r-n) = r-n - f \quad (D_{f^{-1}} = [-r, r])$$

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$$f(n) = \begin{cases} n^2 + 4 & ; n \geq 1 \\ f_{n-1} & ; n \leq 0 \end{cases}$$



$$f^{-1}(n) = \begin{cases} \sqrt{n-f} & ; n \geq 0 \\ \frac{n+1}{r} & ; n \leq -1 \end{cases}$$

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$$f^{-1}(n) = \frac{an+b}{rn+d} \rightarrow f(n) = \frac{-dn+b}{rn-a} = \frac{x^2 + rx - (x^2 + 1 + rx^2 + rn)}{n+r} = \frac{-rx-1}{n+r} = \frac{-4n-5}{rn+4}$$

$$\rightarrow a = -4 \quad b = -2 \quad d = 4$$

$$\rightarrow f^{-1}(-2) = \frac{-2(-4) - 2}{r(-2) + 4} = \frac{10}{r} = 0$$

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$$y = \frac{x}{n^2+1} \rightarrow y(n^2+1) = x \rightarrow yn^2 + y - x = 0 \rightarrow x = \frac{y \pm \sqrt{1-4yr}}{2y}$$

$$\rightarrow f^{-1}(n) = \frac{1 - \sqrt{1-4nr}}{rn} \quad (n \in [-\frac{1}{r}, \frac{1}{r}])$$

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$$f^{-1}(n) : \frac{1}{y} = \frac{n^2+1}{n} = n + \frac{1}{n} \rightarrow -r \leq n + \frac{1}{n} \leq r \rightarrow \frac{1}{r} \leq y \leq \frac{1}{r} \rightarrow \frac{1}{r} \leq D_{f^{-1}} \leq \frac{1}{r}$$

برای پیدا کردن مین و ماکس :
در این حالت
مقدار می تواند

فرد را قبول می کنند
پس جواب می تواند