

$$n^3 - 4 \geq 12n - 2$$

بر درصودی ←

$$n=a \Rightarrow a^3 - 12a + 14 \geq 0 \rightarrow \underbrace{(a-2)(a+4)}_{\text{تعیین علامت}} \geq 0 \quad (a \geq -4)$$

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$$f^{-1}(2) = 4 \quad f(4) = 2 \rightarrow f(4) + k = 2 \quad \underline{k = -10}$$

$$\text{الف) } f(7) = f(7) - 10 = \underline{11}$$

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$$\text{ب) } f(9n-10) = 9n-10-10 = \underline{9n-20}$$

$(2a, a)$ روی تابع $\leftarrow$ $(a, 2a)$ روی فرد تابع وارون

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

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

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

$$a^2 - 2a = 0$$

$$\boxed{a \begin{matrix} < 0 \\ > 2 \end{matrix}}$$

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$$f = \{(5,0), (0,7), (7,2), (9,4)\} \rightarrow f^{-1} = \{(0,5), (7,0), (2,7), (4,9)\}$$

$$g = \{(3,2), (1,4), (9,8)\} \rightarrow g^{-1} = \{(2,3), (4,1), (8,9)\}$$

$$\text{الف) } f(f^{-1}(m)) \rightarrow \{(0,0), (7,7), (2,2), (4,4)\} \quad \text{ب) } \{(5,0), (0,5), (7,2), (2,7), (9,4), (4,9)\}$$

$$\text{ج) } f(g^{-1}(m)) = \{(5,0), (0,5)\} \quad \text{د) } g^{-1}(f(m)) = \{(5,9), (9,5), (4,1)\}$$

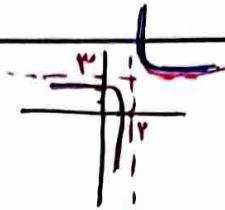
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$$f(g^{-1}(m)) = \{(1,4), (5,8), (0,0)\}$$

$$\xrightarrow{f \circ g^{-1}} \{(1,2), (5,4), (4,1), (0,0)\} \Rightarrow \{(1, \frac{1}{4}), (5, \frac{1}{4}), (0, \frac{1}{0})\}$$

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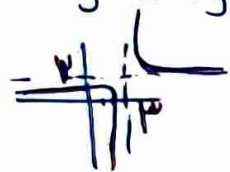
یک به یک بپسند ✓



$$y = \frac{3x+1}{x-2}$$

$\frac{c}{a} = 3$

$$n = \frac{3y+1}{y-2} \Rightarrow ny - 2n = 3y+1$$



$$y = \frac{3x+1}{x-2}$$

$\frac{c}{a} = 3$

محل

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$$f(n) = |n-1| - |n-2|$$

$$\begin{cases} 2 & n \geq 2 \\ 2n-5 & 1 \leq n \leq 2 \\ -2 & n \leq 1 \end{cases}$$

$$[a, b] \rightarrow [1, 3]$$

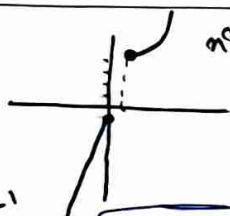
$$y = 2n-5$$

$$n = \frac{y+5}{2}$$

$$y = \frac{1}{2}n - 2$$

$$\frac{b}{a} = \frac{n-5}{2}$$

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$$n \geq 1$$

یک به یک و وارون پذیر

$$R_{f_1} = [0, +\infty)$$

$$R_{f_2} = (-\infty, -1]$$

$$\begin{cases} f_1^{-1}(n) = \sqrt{n-5} & n \geq 5 \\ f_2^{-1}(n) = \frac{n+1}{2} & n \leq -1 \end{cases}$$

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$$f(n) = n^2 - \frac{(n+1)^2}{n+2} = \frac{n^2(n+2) - (n+1)^2}{n+2} = \frac{-n-1}{n+2} \Rightarrow n = \frac{-2y-1}{y+2}$$

$$\frac{an+b}{2n+d} = \frac{2(-2n-1)}{2(n+2)} = \frac{-4n-2}{2n+4} \rightarrow b$$

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

$$f^{-1}(-2) = \frac{-2(-2)-1}{(-2)+2} = \boxed{8}$$

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

$$y = \frac{n}{n^2+1} \Rightarrow ny^2 + y = n$$

$$\Rightarrow ny^2 - y + n = 0$$

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

در هر دو که در داخل عبارت منفی یا مثبت منفی می باشد -
مثلا برای ۳ و ۱ و ۵ فقط ۱ و ۵

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