

$$f(x) = \begin{cases} x^2 - \varepsilon & , x > a \\ 12x - 2 & , x \leq a \end{cases}$$

$$x^2 - \varepsilon = 12x - 2 \Rightarrow x^2 - 12x + 14 = 0 \Rightarrow a^2 - 12a + 14 = 0 \rightarrow (a-2)(a-7)(a+2) = 0$$

$$\frac{-\varepsilon}{-} \quad \frac{2^*}{+} \quad \frac{+}{+}$$

$$\boxed{a > -\varepsilon}$$

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$$f^{-1}(r) = \varepsilon \Rightarrow f(\varepsilon) = 2$$

$$f(x) = 3x + k \xrightarrow{x=\varepsilon} f(\varepsilon) = 3(\varepsilon) + k = 2 \Rightarrow k = -10$$

$$f(v) = 3(v) - 10 = 11$$

$$f(An) = 3(3n-10) - 10 = 9n - 30 - 10 = 9n - 40$$

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$$A(2a, a)$$

$$f(x) = \frac{ax}{x-1} \rightarrow f^{-1}(y) = \frac{ay}{y-1} \rightarrow ya = \frac{ay}{y-1} \Rightarrow y ay - ya = ay$$

$$ya = ay \rightarrow y = 2 \Rightarrow \boxed{a = 2}$$

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$$f: \{(3,5)(4,6)(5,7)(6,8)\} \rightarrow f^{-1}: \{(5,3)(6,4)(7,5)(8,6)\} / g: \{(3,2)(4,3)(5,4)\} \rightarrow g^{-1}: \{(2,3)(3,4)(4,5)\}$$

$$الف) f \circ f^{-1}: \{(5,5)(6,6)(7,7)(8,8)\}$$

$$ب) f^{-1} \circ f: \{(3,3)(4,4)(5,5)(6,6)\}$$

$$ج) f \circ g^{-1}: \{(2,5)(3,6)\}$$

$$د) g^{-1} \circ f: \{(3,9)(4,8)(5,7)\}$$

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$$f: \{(2,3)(3,4)(4,5)\} \quad g: \{(2,1)(3,2)(4,3)\} \Rightarrow g^{-1}: \{(1,2)(2,3)(3,4)\}$$

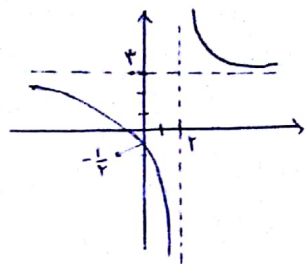
$$f \circ g^{-1}: \{(1,3)(2,4)(3,5)\}$$

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$$\frac{h}{f \circ g^{-1}}: \{(1, \frac{1}{2})(2, \frac{1}{3})(3, \frac{1}{4})\} \Rightarrow \boxed{\{(1, \frac{1}{2})(2, \frac{1}{3})\}}$$

$$g = \frac{2x+1}{x-2} \rightarrow \text{مقلوبه } -2, \text{ مقلوبه } = 2$$



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

مقلوبه

$$xy-2y=2x+1 \Rightarrow y(x-2)=2x+1 \Rightarrow y = \frac{2x+1}{x-2}$$



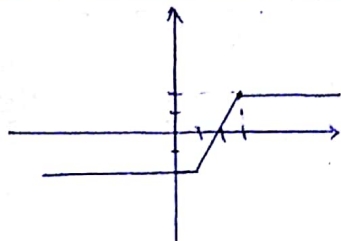
مقلوبه 2
مقلوبه -2

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

$$f(n) = \begin{cases} 2 & x \geq 2 \\ n-2 & 1 \leq n \leq 2 \\ -2 & n \leq 1 \end{cases}$$



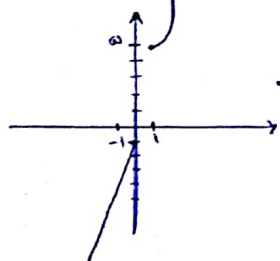
مقلوبه
[1,2]

$$[a,b] = [1,2]$$

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



مقلوبه

$$y = x^2+2 \xrightarrow{\text{مقلوبه}} x = y^2+2 \Rightarrow y^2 = x-2 \Rightarrow y = \sqrt{x-2}$$

$$y = 2n-1 \xrightarrow{\text{مقلوبه}} x = 2y-1 \Rightarrow 2y = x+1 \Rightarrow y = \frac{x+1}{2}$$

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

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$$f(n) = \frac{n^2}{n+2} = \frac{(n+1)^2}{n+2} = \frac{n^2+2n+1}{n+2} = \frac{-n-1}{n+2} \xrightarrow{\text{مقلوبه}} x = \frac{-2y-1}{y+2} \Rightarrow xy+2n = -2y-1$$

$$\rightarrow xy+2y = -2x-1 - y(n+2) = -2x-1 \Rightarrow y = \frac{-2x-1}{x+2} \xrightarrow{\frac{x}{y}} \frac{-2x-1}{2x+4} \Rightarrow a = -4, b = -2, d = 4$$

$$f^{-1}(-2) = \frac{-2(-2)-2}{2(-2)+4} = \frac{10}{2} = 5$$

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$$f(n) = \frac{x}{x^2+1} \begin{cases} f(x) = \frac{x}{x^2+1} \\ f(\frac{1}{x}) = \frac{x}{x^2+1} \end{cases} \Rightarrow \text{مقلوبه}$$

$$y = \frac{x}{x^2+1} \xrightarrow{\text{مقلوبه}} x = \frac{y}{y^2+1} \rightarrow xy^2+n=y - xy^2-y+x = \Rightarrow f^{-1}(n) = \frac{1 \pm \sqrt{1-4n}}{2n}$$

$$x \in [-\frac{1}{2}, \frac{1}{2}] - \{0\}$$

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