

ملف 11 / يا رهم رضا / (C)

ب نام خدا

بسم الله الرحمن الرحيم

$$f(n) = \begin{cases} n^2 - \varepsilon & n > a \\ 12n - 6 & n \leq a \end{cases}$$

$$\begin{aligned} n^2 - \varepsilon &\geq 12n - 2 \\ n^2 - 12n + 12 &\geq 0 \\ n^2 - 12n + 2n + 12 &\geq 0 \\ n(n - 10) + 2(n + 6) &\geq 0 \\ n(n - 10) + 2(n + 6) &\geq 0 \\ (n + 2)(n - 8) + 2(n + 6) &\geq 0 \\ (n + 2)(n - 8) + 2(n + 6) &\geq 0 \\ (n + 2)(n - 8) + 2(n + 6) &\geq 0 \end{aligned}$$

$$\frac{-\varepsilon}{-1} + \frac{12}{1} \geq -\varepsilon$$

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الف) $f(n) = 3n + k$

$f(n) = 3n - 1$

$f(v) = 3v - 1 = 11$

$f(n) = 3n + k$

$f^{-1}(n) = 3y + k \rightarrow y = \frac{n - k}{3}$

$f^{-1}(v) = \varepsilon$

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ب) $f(f(n)) = 3(3n - 1) - 1 = 9n - 4$

$\frac{3k}{3} = f \rightarrow k = -1$

ج) $n = \frac{ay}{y - 1} \rightarrow ny - n = ay \rightarrow y(n - a) = n$

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$y = \frac{n}{n - a}$

$a = 2$

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

$f = \{(3, a), (4, v), (v, x), (9, 2)\}$

$g = \{(3, 2), (1, 2), (9, a)\}$

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$f^{-1} = \{(a, 3), (v, 4), (2, v), (2, 9)\}$

$g^{-1} = \{(3, 3), (4, 1), (a, 9)\}$

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

ب) $f^{-1} \circ f = \{(3, 3), (4, 4), (v, v), (9, 9)\}$

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

د) $g^{-1} \circ f = \{(3, 9), (v, 3), (9, 1)\}$

$$f = \{(2, 2) (3, 1) (4, 0)\}$$

$$g = \{(2, 1) (3, 3) (4, 2)\}$$

$$h = \{(1, 2) (3, 2) (4, 1) (5, 1)\}$$

$$g' = \{(1, 2) (3, 2) (5, 2)\}$$

$$f \circ g' = \{(1, 2) (3, 1) (5, 0)\}$$

$$\frac{h}{f \circ g'} = \left\{ \left(1, \frac{2}{2}\right) \left(3, \frac{1}{1}\right) \right\}$$

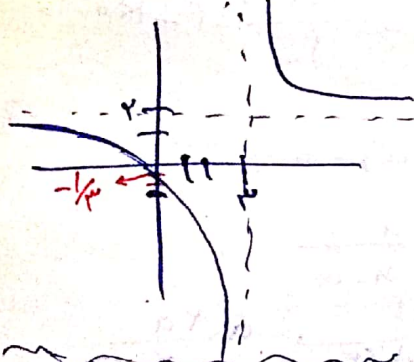
$\downarrow$
 $\frac{1}{x}$

:5

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

مجانبات نام $\rightarrow 2$
مجانبات افقی $= 3$

$$x=0 \rightarrow y = -1/2$$



مجانبات افقی $= 3$

مجانبات نام $= 2$

$$x=0 \rightarrow y = -1/2$$

نقطه

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

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

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

$$y(x-3) = 1+2x$$

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

$$f^{-1}(x) = \frac{1+2x}{x-3}$$

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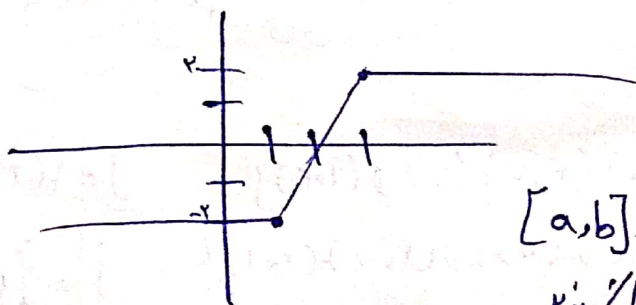
$$f(x) = |x-1| - |x-3|$$

$x \leq 1$ $x \geq 3$

$$f(x) = -x + 1 + x - 3 = -2 \quad x \leq 1$$

$$x - 1 + x - 3 = 2x - 4 \quad 1 \leq x \leq 3$$

$$x - 1 - x + 3 = 2 \quad x \geq 3$$



$$[a, b] = [1, 3]$$

نقطه ها و بازه ها

$$1 \leq x \leq 3$$

$$y = x - 1 + x - 3 = 2x - 4$$

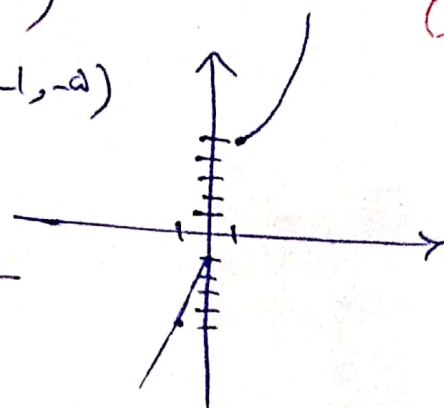
$$x = \frac{y+4}{2}$$

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

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$$f(n) = \begin{cases} n^3 + 2 & n \geq 1 \\ \varepsilon n - 1 & n \leq 0 \end{cases} \rightarrow \begin{matrix} (1, 2) & (2, 12) \\ (0, -1) & (-1, -2) \end{matrix}$$

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$$y = n^3 + 2 \rightarrow n = \sqrt[3]{y-2} \rightarrow y = \sqrt[3]{n-2}$$

$$y = \varepsilon n - 1 \rightarrow n = \frac{y+1}{\varepsilon} \rightarrow y = \frac{n+1}{\varepsilon}$$

$$f^{-1}(n) = \begin{cases} y = \sqrt[3]{n-2} & n \geq 2 \\ y = \frac{n+1}{\varepsilon} & n \leq -1 \end{cases}$$

$$R_f = D_{f^{-1}} = (-\infty, -1] \cup [2, +\infty)$$

$$f(n) = n^2 - \frac{(n+1)^2}{n+2} \rightarrow f(n) = \frac{n^2(n+2) - (n+1)^2}{n+2} = \frac{n^3 + 2n^2 - n^2 - 2n - 1}{n+2} = \frac{n^3 + n^2 - 2n - 1}{n+2}$$

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

$$y(n+2) = -1 - 2n$$

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

$$f^{-1}(-2) = \frac{-2(-2)-1}{-2+2} = \frac{1}{0} \rightarrow \boxed{\text{undefined}}$$

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

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

$$y = \frac{1 \pm \sqrt{1-8n^2}}{4n}$$

$$1-8n^2 \geq 0$$

$$n^2 \leq \frac{1}{8}$$

$$-\frac{1}{\sqrt{8}} \leq n \leq \frac{1}{\sqrt{8}}$$

$$n \neq 0$$

$$f^{-1}(n) = \begin{cases} \frac{1 + \sqrt{1-8n^2}}{4n} & 0 < n \leq \frac{1}{\sqrt{8}} \\ \frac{1 - \sqrt{1-8n^2}}{4n} & -\frac{1}{\sqrt{8}} \leq n < 0 \end{cases}$$

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