

$$f(x) = \begin{cases} x^3 - x; & x > a \\ 12x - 20; & x \leq a \end{cases}$$

$$x^3 - x = 12x - 20$$

$$x^3 - 12x + 14 = 0$$

$$(x-2)^2(x+4) \geq 0$$

$$x \geq -4$$

$$\frac{-2}{-1+2+1}$$

$$f^{-1}(x) = x, f(x) = 3x + k \rightarrow Df^{-1} + Rf, Rf^{-1} + Df \Rightarrow x(x) + k = x \rightarrow$$

$$f(v) = 3(v) - 1 = 11 \quad k = -1 \quad f(x) = 3x - 1$$

$$f(f(x)) = 3(3x - 1) - 1 = 9x - 4$$

$$f(x) = \frac{ax}{x-1}, A(2a, a)$$

$$Df^{-1} = Rf, Rf^{-1} = Df$$

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

$$a^2 - 2a = 0 \rightarrow a = 0 \rightarrow \text{GGE}$$

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

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

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

$$4 \rightarrow 5 \rightarrow x$$

$$g^{-1} \circ f = \{(3,9), (9,3), (6,1)\}$$

$$3 \rightarrow 9 \rightarrow x$$

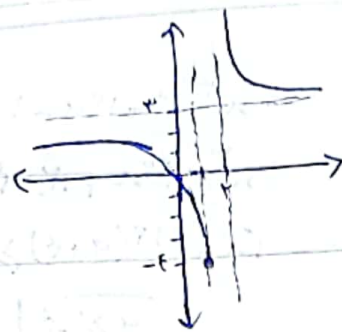
$$g^{-1} = \{(1,2), (2,4), (5,4)\}$$

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

$$Dh \cap f \circ g^{-1} = \{1, 2, 5\}$$

$$\frac{h}{f \circ g^{-1}} = \left\{ \left(1, \frac{1}{2}\right), \left(2, \frac{1}{4}\right), \left(5, \frac{1}{4}\right) \right\} = \left\{ \left(1, \frac{1}{2}\right), \left(2, \frac{1}{4}\right) \right\}$$

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



تابع معكبره اوليه

مسئله ۱:

در این تابع از جانب قائم

$$x = 1 \Rightarrow y = -4$$

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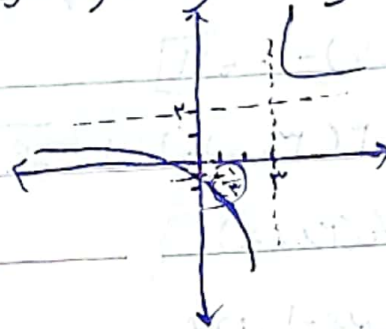
$$\rightarrow f(x) = \frac{2x+1}{x-2}$$

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

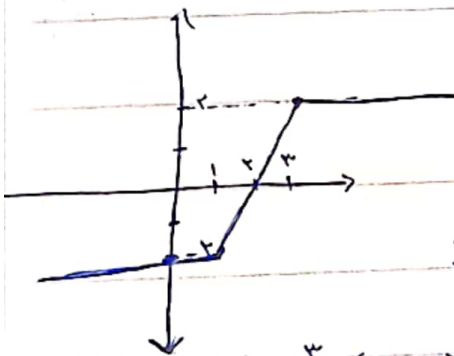
تابع معكبره اوليه

تابع معكبره اوليه

$$x = 0 \Rightarrow y = -\frac{1}{2}$$



مسئله ۲:



دامنه [0, 3] داشته باشد

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

$$f(x) = \begin{cases} x+1; x \leq 0 \\ x^2+1; x > 0 \end{cases} \rightarrow R = [0, +\infty)$$

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

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

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

$$\frac{-3x-1}{x+3} = \frac{ax+b}{cx+d} \rightarrow \begin{cases} a = -3 \\ b = -1 \\ c = 1 \\ d = 3 \end{cases} \rightarrow f^{-1}(x) = \frac{-3(-2)-1}{(-2)+3} = \frac{5}{1} = 5$$

$$f(x) = \frac{x}{x^2+1} \rightarrow y = \frac{x}{x^2+1} \rightarrow yx^2 - x + y = 0 \rightarrow [-\frac{1}{y}, \frac{1}{y}] \rightarrow [-1, 1] \rightarrow f^{-1}(x) = [-1, 1]$$

$$yx^2 - x + y = 0 \rightarrow \Delta = 1 - 4y^2 \rightarrow \frac{1 \pm \sqrt{1-4y^2}}{2y} \rightarrow g^{-1} = \frac{1 \pm \sqrt{1-4y^2}}{2y} \rightarrow f^{-1}(y) = \frac{1 \pm \sqrt{1-4y^2}}{2y}$$