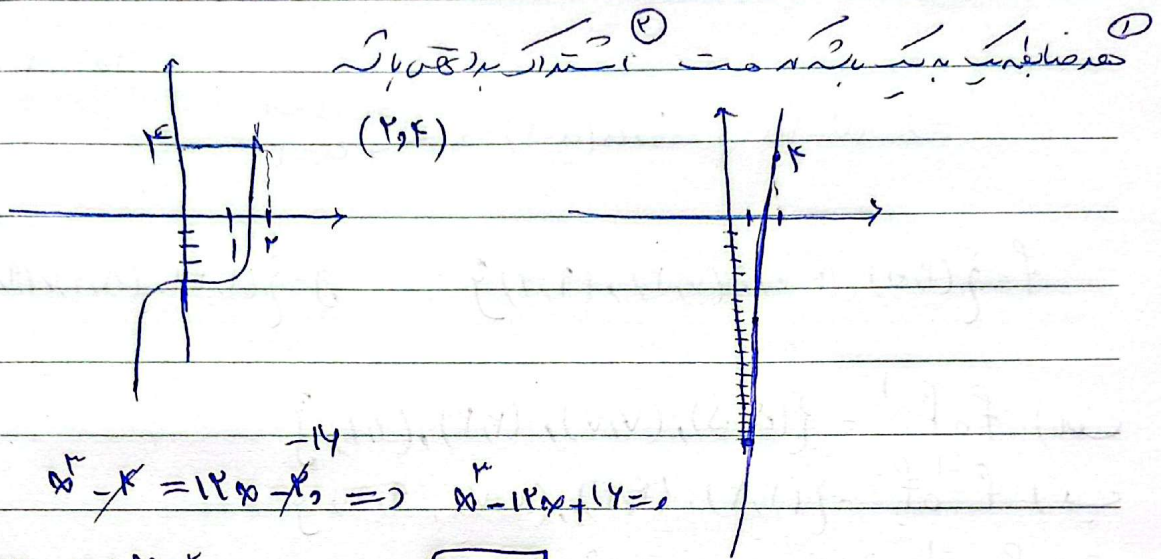


$$f(x) = \begin{cases} x^3 - x & x > a \\ 12x - 2, & x \leq a \end{cases}$$

$$a = -\varepsilon, 2$$

①



$$x^3 - x = 12x - 2 \Rightarrow x^3 - 12x + 2 = 0$$

$$\begin{array}{r} x^3 - 12x + 2 \quad | \quad x - 2 \\ x^3 - 2x^2 \\ \hline 2x^2 - 12x + 2 \end{array}$$

$$\begin{array}{r} 2x^2 - 12x + 2 \\ -12x + 24 \\ \hline -12x + 24 \end{array}$$

$$\boxed{x = 2}$$

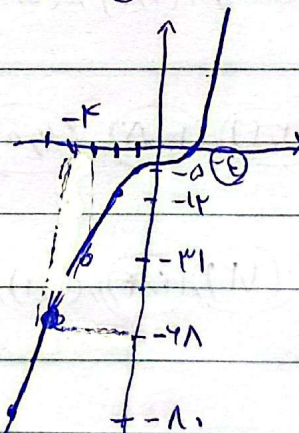
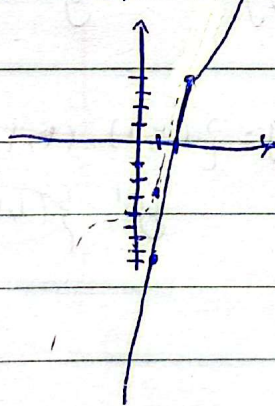
$$\Rightarrow (x-2)(x+2)(x-1)$$

$$x = 2, -\varepsilon$$

$$x^3 - \varepsilon$$

$$a = -\varepsilon \Rightarrow -\varepsilon^3 - \varepsilon = -\varepsilon$$

$$a = 2$$



$$f(x) = 3x + k \Rightarrow f(2) = 2 - \frac{3 \times 2 + k}{12} = 2 \Rightarrow k = -10$$

$$f^{-1}(2) = x$$

$$f(x) = 3x - 10$$

②

$$f(1) = 3 \times 1 - 10 = -7$$

$$f(f(x)) = 3(3x - 10) - 10 = 9x - 30 - 10 = 9x - 40$$

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

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

$$\Rightarrow a^2 - 2a = 0 \Rightarrow a(a-2) = 0 \Rightarrow \begin{cases} a=0 \\ a=2 \end{cases}$$

(۴)

$$f = \{(3, 5), (4, 7), (5, 9), (6, 11)\} \quad g = \{(2, 3), (4, 5), (6, 7)\}$$

$$الف) f \circ f^{-1} = \{(5, 5), (7, 7), (9, 9), (11, 11)\}$$

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

$$ج) f \circ g^{-1} = \{(2, 5), (4, 7)\}$$

$$د) g^{-1} \circ f = \{(3, 4), (5, 6), (7, 8)\}$$

$$f^{-1} = \{(5, 3), (7, 4), (9, 5), (11, 6)\}$$

$$g^{-1} = \{(3, 2), (5, 4), (7, 6)\}$$

$$f = \{(2, 4), (4, 8), (6, 12)\}$$

$$g = \{(2, 1), (4, 3), (6, 5)\}$$

(۵)

$$g^{-1} = \{(1, 2), (3, 4), (5, 6)\}$$

$$h = \{(1, 2), (3, 4), (5, 6), (7, 8)\}$$

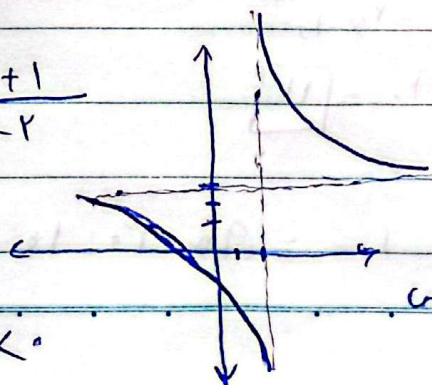
$$\left\{ \left(1, \frac{2}{1} = \frac{1}{2} \right), \left(3, \frac{4}{1} = \frac{1}{3} \right), \left(5, \frac{1}{0} \right) \right\} \quad \text{تقریب شده} \quad \frac{h}{f \circ g^{-1}} \quad \text{حاصل}$$

← معادله افق = ۲

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

← معادله عمودی قائم

$$= 2$$



(۶) برای معادله سهمی

ضابطه ی محور

غیر از محور

تابع یک به یک است پس معکوس
دارد

NOTEBOOK

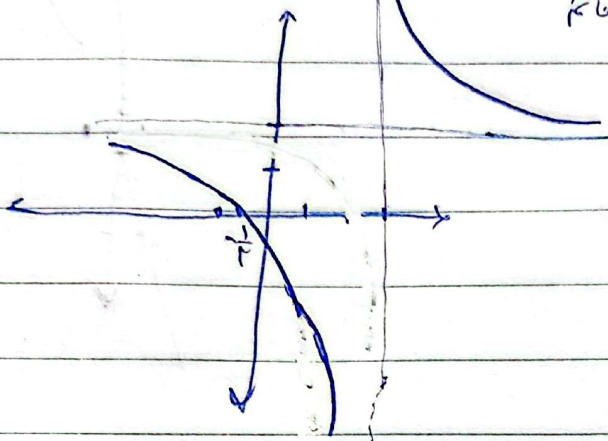
$$2x(-2) - (1 \times 1) < 0$$

$$-4 - 1$$

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

$x-2$ ← ۲ سمت راست
 $y-2$ ← ۲ سمت چپ

$$2(-3) - (1 \times 1) = -4 - 1 < 0$$



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

① در بازه $[a, b]$ داریم:

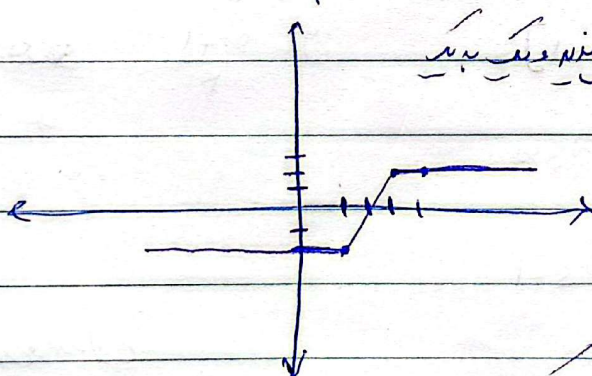
کسر طول بازه صاف

ضابطه‌های ممکن است در این بازه

$$\begin{array}{c|c|c} -x+1+x-3 & x-1+x-3 & x-1-x+3 \\ \hline = -2 & 2x-4 & = 2 \end{array}$$

در بازه $[1, 3]$ داریم:

صاف است



$$y = 2x - 4 \quad D: 1 \leq x \leq 3$$

$$R: [-2, 2]$$

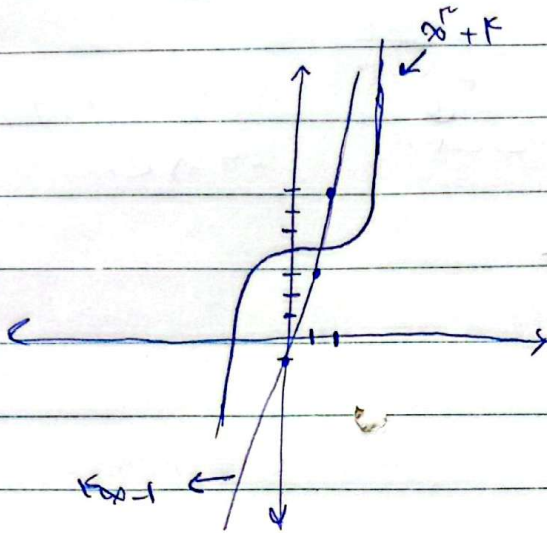
$$x = 2y - 4 \Rightarrow 2y = x + 4 \Rightarrow y = \frac{x+4}{2}$$

$$y = \frac{x+4}{2} \quad 1 \leq x \leq 3$$

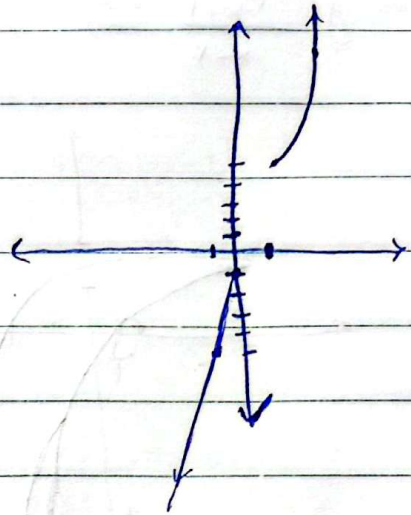
② در بازه $[a, b]$

در صورت امکان ضابطه‌های اول

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



عکس
 $\Rightarrow$



تابع معکوس = معکوس تابع

$$y = x^3 + 2 \quad x \geq 1$$

$$R_f: [1, +\infty)$$

$$x = y^3 + 2 \Rightarrow$$

$$y = \sqrt[3]{x-2} \quad x \geq 3$$

$$x \geq 1$$

$$y = 2x - 1 \quad x \leq 0$$

$$R_f: (-\infty, -1]$$

دارد

$$x = 2y - 1 \Rightarrow x + 1 = 2y$$

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

$$x \leq 0$$

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

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

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

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

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

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

$$b < .$$

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

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

$$y = \frac{-3x-1}{x+2} = \frac{-4x-2}{2x+4} \quad f^{-1}(-2) = ?$$

$$f(x) = \frac{x}{x^r + 1}$$

ماتریکس (1)

$$y = \frac{x}{x^r + 1} \xrightarrow{\text{در دو طرف ضرب}} x = \frac{y}{y^r + 1} \rightarrow y^r x + x = y$$

$$y^r x - y + x = 0$$

$$y = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-(-1) \pm \sqrt{1 - 4y^r y}}{2y^r} = \frac{1 \pm \sqrt{1 - 4y^{r+1}}}{2y^r}$$

$$\text{ماتریکس } y = \frac{1 \pm \sqrt{1 - 4y^{r+1}}}{2y^r}$$

$$1 - 4y^{r+1} \geq 0 \Rightarrow (1 + 2y^r)(1 - 2y^r) \geq 0$$

$$\text{نی} \quad \boxed{\begin{array}{l} x \neq 0 \\ -\frac{1}{r} \leq x \leq \frac{1}{r} \end{array}}$$

$$\begin{array}{c|c|c} - & + & - \\ \hline -\frac{1}{r} & 0 & \frac{1}{r} \end{array}$$