

$$f(x) = \begin{cases} x^3 - 4 & x > a \\ 12x - 20 & x \leq a \end{cases} \quad \text{نیاید} \quad x^3 - 4 \geq 12x - 20$$

$$x^3 - 12x + 16 \geq 0 \quad -4 \quad 2$$

$$x \in [-4, +\infty) \rightarrow a \in [-4, +\infty)$$

$$f(x) = 3x + K \rightarrow 2, 3x + K \rightarrow 3x, 2 - K \rightarrow 2, \frac{x - K}{3}$$

$$f'(x) = \frac{x - K}{3} \rightarrow x, 2, y, 4 \rightarrow 2 - K, 12 \rightarrow K, -10$$

الف) $f(7) = f(x) = 3x - 10 \rightarrow 21 - 10 = 11$

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

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

$$2 - \frac{x}{x-a} = f'(x) = \frac{x}{x-a} \xrightarrow{(2aa)} \frac{2a}{a} \cdot a \rightarrow a, 2$$

$$f: \{(3,5), (4,7), (7,2), (2,6)\} / 2: \{(3,2), (8,6), (9,5)\}$$

$$f^{-1}: \{(5,3), (7,4), (2,7), (6,9)\} / 2^{-1}: \{(2,3), (6,8), (5,9)\}$$

الف) $f \circ f^{-1}: \{(5,5), (7,7), (2,2), (6,6)\}$ ب) $f^{-1} \circ f: \{(3,3), (4,4), (7,7), (2,2)\}$

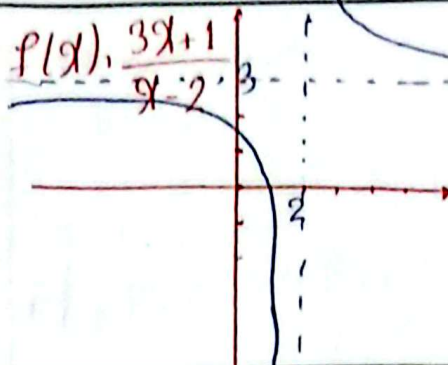
ج) $f \circ 2^{-1}: \{(2,5), (5,6)\}$ د) $2^{-1} \circ f: \{(3,9), (7,3), (9,8)\}$

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

$$h: \{(1,2), (3,4), (4,1), (5,1)\} \xrightarrow{f \circ 2^{-1}} \{(1, \frac{2}{4}), (3, \frac{4}{8}), (5, \frac{1}{6})\}$$

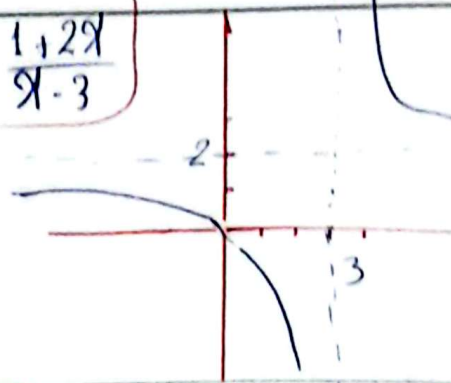
$$h \xrightarrow{f \circ 2^{-1}} \{(1, \frac{1}{2}), (3, \frac{1}{2})\}$$

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



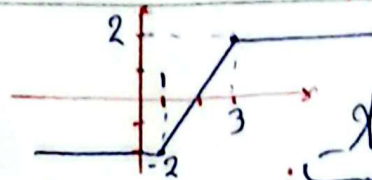
$$f'(x) = \frac{1+2x}{x-3}$$

بدست
است



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

تابع سربل



دایره $x \in [1, 3]$
بازن بدست است

$$x \in [1, 3] \rightarrow y \cdot x - 1 - (3 - x) - 2 \cdot 2x - 4 = y \cdot \frac{x+1}{2}$$

$$f(x) = \begin{cases} x^3 + 4 & x \geq 1 \\ 4x - 1 & x \leq 0 \end{cases}$$

بدست است

$$\begin{aligned} 2 \cdot x^3 + 4 - x^3 \cdot 2 - 4 - x \cdot \sqrt[3]{2-4} \\ 2 \cdot 4x - 1 - 4x \cdot 2 + 1 - x \cdot \frac{2+1}{4} \end{aligned}$$

$$f'(x) = \begin{cases} 2 \cdot \sqrt[3]{x-4} & x \geq 5 \\ 2 \cdot \frac{x+1}{4} & x \leq -1 \end{cases}$$

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

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

$$2 \cdot \frac{-3x-1}{x+3} \Rightarrow 2x + 3x + 3x + 1 - (2+3)x - 1 - 3x - x \cdot \frac{-1-3x}{2+3}$$

$$2 \cdot \frac{-2-6x}{2x+6} \rightarrow b_2 - 2 \cdot \frac{x-2}{-4+6} = \frac{-2+12}{-4+6} = \frac{10}{2} = 5$$

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

بیل
نصف

$$2 \cdot 0/4 \rightarrow 0/4 \cdot \frac{x}{x^2+1}$$

$$x_1 = 2, 0/5$$

فرض می کنیم فرضان درست است و x_1, x_2

برگرفته

$$\frac{x_1}{x_1^2+1} \cdot \frac{x_2}{x_2^2+1}$$

$$\rightarrow x_1(x_2^2+1) \cdot x_2(x_1^2+1) \rightarrow$$

$$x_2^2 = x_1^2$$

$$x_2 = \pm x_1$$