

$$f(x) = \begin{cases} x^3 - 1 & x > a \\ 14x - 2 & x \leq a \end{cases}$$

عند $x = a$

↪ $x = a$

$$a^3 - 1 > 14a - 2 \Rightarrow a^3 \geq 14a + 1 > 0 \Rightarrow (a-1)(a^2+a-1)$$

$$\Rightarrow (a-1)(a-1)(a+1) \geq 0 \Rightarrow \begin{array}{c|c|c} - & 1 & + \\ \hline - & + & + \end{array} \Rightarrow [1, +\infty)$$

$$f^{-1}(1) \in \mathbb{R}, f(x) \in \mathbb{R}x + K \Rightarrow 1 + K = 1 \Rightarrow K = -1$$

$$\text{حيث } \rightarrow 14x - 1 \rightarrow 14(1) - 1 = 13$$

$$\text{ب) } f(f(x)) \rightarrow f(14x - 1) \rightarrow 14(14x - 1) - 1 = 196x - 15$$

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

$$\rightarrow xy - x = ay \rightarrow xy - ay = x \rightarrow y(x-a) = x \rightarrow y = \frac{x}{x-a}$$

$$(x, y) \rightarrow a = \frac{xa}{a} \Rightarrow a = x$$

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

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

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

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

Let $\{ (1, 2), (3, 4), (5, 6) \}$ and $\{ (1, 1), (2, 2), (3, 3) \}$ be two sets

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

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

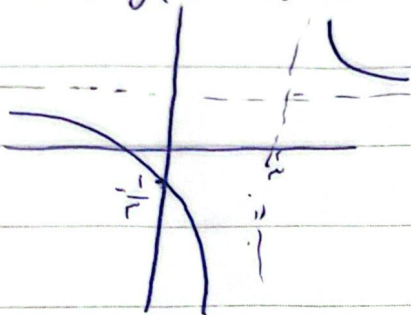
$$\frac{h}{f \circ g^{-1}} = \left(1, \frac{2}{1} \right), \left(3, \frac{4}{1} \right)$$

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


← سوال

$$x \leq \frac{2y+1}{y-2} \rightarrow xy - 2x \leq 2y + 1 \rightarrow xy - 2y \leq 2x + 1$$

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



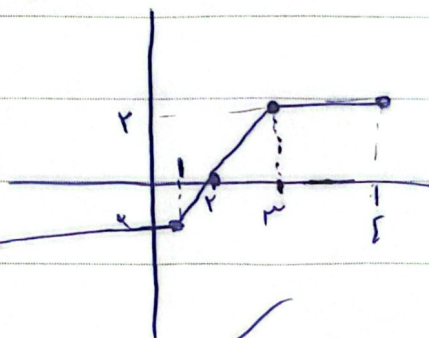
$$f(x) = |x-1| - |x-3|$$

← سوال

	1	3	
-2	$2x-2$	2	

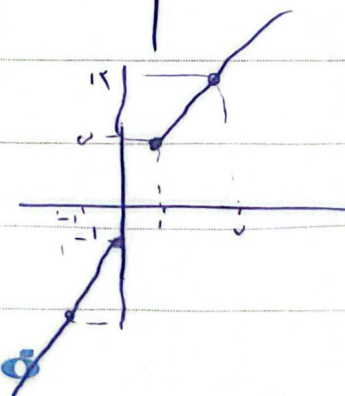
1. $\rightarrow \left(\frac{3}{2} \right) \left(-\frac{1}{2} \right) \rightarrow y = 3x - 2$

$$\rightarrow x \leq 2y - 2 \rightarrow y \geq \frac{x+2}{2}$$



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

$$f'(x) = \begin{cases} 2x & x \geq 1 \\ -1 & x \leq 0 \end{cases}$$



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

← 3b

$$= \frac{-rx-1}{x+1} = y \rightarrow yx + ry = -rx - 1$$

$$\rightarrow y(x+r), -rx-1 \rightarrow y(-\frac{rx-1}{x+r}) \times \frac{1}{x} \rightarrow -\frac{rx-1}{x(x+r)}$$

$$b = -r \rightarrow f(-r) = \frac{-r-1}{1} = -r-1$$

$$f(x) = \frac{x}{x^2+1} \quad x, \frac{y}{y^2+1} \rightarrow xy^r + x^r y \quad \leftarrow 3c$$

$$xy^r - y + x^r = y \frac{1 \pm \sqrt{-1 \mp r}}{x}$$