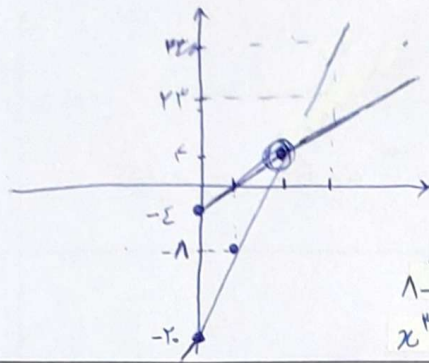
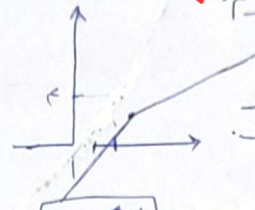




با توجه به



ابتدا در قسمت را بدون محاسبه رسم می کنیم:

خط افقی را به دوری که رسم کردیم در یک نقطه قطع می کنند پس تا آنجا که به یک است.

$$1 - 2 = 3x - 2 \Rightarrow x = 1$$

$$x^3 - 2 = 12x - 20 \Rightarrow x = 2 \text{ (هر دو یکسان)}$$

$$a = 42$$

$$x^3 - 2 = y$$

$$a \in [-f, +\infty) \quad 12x - 20 = y$$

$$f(x) = 3x + k \rightarrow 12 + k = 2 \rightarrow k = -10 \Rightarrow f(x) = 3x - 10 \rightarrow 3y - 10 = x$$

$$f^{-1}(2) = 4$$

$$3y = x + 10$$

$$f^{-1}(x) = y = \frac{x + 10}{3}$$

$$\text{پس } f(4) = 3 \cdot 4 - 10 = 2$$

$$\text{پس } f(f(x)) \Rightarrow 3(3x - 10) - 10 = 9x - 30 - 10 = 9x - 40$$

$$g = \{(3, 2), (1, 4), (9, 5)\}, f = \{(3, 5), (4, 7), (7, 2), (9, 4)\}$$

$$g^{-1} = \{(2, 3), (4, 1), (5, 9)\}, f^{-1} = \{(5, 3), (7, 4), (2, 7), (4, 9)\}$$

$$\text{پس } f \circ f^{-1} = \{(5, 5), (7, 7), (2, 2), (4, 4)\} \quad \text{ب) } f \circ g^{-1} = \{(3, 3), (4, 4), (7, 7), (9, 9)\}$$

$$\text{ج) } f \circ g^{-1} = \{(3, 5), (5, 4)\}$$

$$\text{د) } g^{-1} \circ f = \{(3, 9), (7, 3), (9, 1)\}$$

$$A(x, a)$$

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

$$y(x-a) = x$$

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

$$a = \frac{xa}{xa-a} \Rightarrow a = \frac{xa}{a} \Rightarrow a = x$$

$$f = \{(3, 5), (5, 1), (4, 0)\}$$

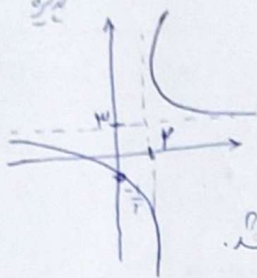
$$g = \{(3, 1), (5, 3), (4, 5)\} \rightarrow g^{-1} = \{(1, 3), (3, 5), (5, 4)\} \quad f \circ g^{-1} = \{(3, 1)\}$$

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

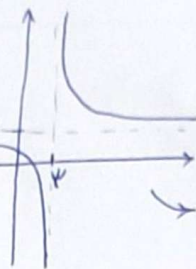
$$\frac{h}{f \circ g^{-1}} = \{(3, 2)\}$$

$$\{(1, \frac{1}{2}), (3, \frac{1}{2}), (5, \frac{1}{2})\}$$

$$\frac{3x+1}{x-2} \rightarrow \text{مقلوبه وارون}$$



مقلوبه وارون



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

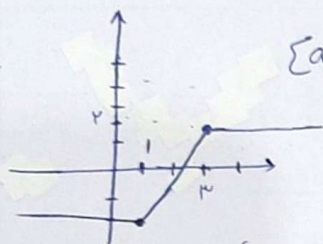
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مقلوبه وارون و لا جا رکوس له

۶

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

$$1-x$$



$$[a, b] \rightarrow [1, 3]$$

وارون ان قسمت

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

$$xy = x+1$$

$$b = -1 \quad (y = x-1)$$

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

$$(1, -1), (3, 1) \rightarrow \text{خط} = \frac{y}{x} = 2$$

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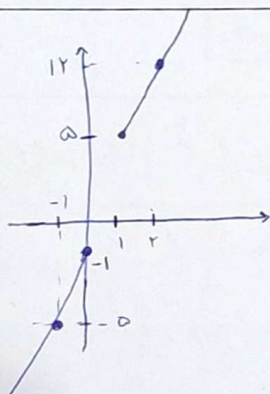
۷

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

$$R_{1,1} = [\infty, \infty)$$

$$R_{1,2} = (-\infty, -1]$$

سایه وارون (مقلوبه وارون)



$$x^2 + 1 = y \rightarrow y^2 + 1 = x \rightarrow y^2 = x - 1$$

$$D = [\infty, \infty) \leftarrow y = \sqrt{x-1}$$

$$x-1 = y \rightarrow xy-1 = x \rightarrow xy = x+1$$

$$D = (-\infty, -1] \leftarrow y = \frac{x+1}{x}$$

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

$$f^{-1}(x) = \frac{ax+b}{cx+d} = \frac{-2x-1}{x+3} \rightarrow d=4$$

$$a=-4$$

$$b=-2$$

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

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

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

۵

۹

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

$$S_c: f^{-1}(y) = \frac{1 \pm \sqrt{1-4y^2}}{2y}$$

$$D_{f^{-1}} = \left[-\frac{1}{2}, \frac{1}{2}\right]$$

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