

$$2y = 3x - 1 \Rightarrow \frac{y+1}{3} = y \Rightarrow \begin{cases} x = -\frac{1}{2} & y = 0 \\ x = 0 & y = \frac{1}{3} \end{cases} \quad \text{①} \quad \frac{\frac{1}{3} \times \frac{1}{2}}{x} = \frac{1}{y}$$

۱

الف) $y = x^2 - 2x + 3 \Rightarrow \frac{b}{4a} = \Rightarrow \frac{2}{2} = 1 \Rightarrow \text{معمولی} \Rightarrow x^2 - 2x + 3 \Rightarrow (x-1)^2 + 2$
 $\Rightarrow \sqrt{y+2} + 1 \Rightarrow \sqrt{x-2} + 1 = y \quad x \in [2, +\infty)$

۲

ب) $x^2 - 2x + 3 \xrightarrow{x \in [2, +\infty)} \text{معمولی} \Rightarrow (x-1)^2 + 2 \Rightarrow y = 2 / \sqrt{x-2} + 1 = y \quad x \in [2, +\infty)$

$$2x - \sqrt{12 - 4x(x-2)} = 2x - \sqrt{12 - (2x-4x^2)} \Rightarrow 2x - \sqrt{4(x^2 - 2x + 3)} \Rightarrow 2x - 2|x-2| = 2(x-(x-2))$$

$$\xrightarrow{x \in [2, +\infty)} 2(2x-2) \Rightarrow 4x-4 = f(x) \xrightarrow{f^{-1}} \frac{x+2}{4} = y = f^{-1}(x) \Rightarrow \begin{cases} x=0 & y=1 \\ x=-4 & y=0 \end{cases} \Rightarrow \frac{1 \times 4}{4} = \frac{1}{1}$$

۳

$$\frac{x}{\sqrt{x^2-5}} = y \Rightarrow y^2 = \frac{x^2}{x^2-5} \xrightarrow{\text{استفاده کنیم}} \frac{x^2}{y^2-1} \xrightarrow{x>0} x = \frac{\sqrt{5}y}{\sqrt{y^2-1}} \Rightarrow y = \frac{\sqrt{5}x}{\sqrt{x^2-1}}$$

۴

$$x^2 - 2x + 3 \Rightarrow \left. \begin{array}{l} \text{صفر} \\ \text{خارج از پرانتز} \end{array} \right\} \Rightarrow x=2$$

$$-x^2 + 2x + 3/2 \Rightarrow \left. \begin{array}{l} \text{صفر} \\ \text{خارج از پرانتز} \end{array} \right\} \Rightarrow x < 2$$

$$-x^2 + 12 + 3/2 \leq -x^2 + 3 \Rightarrow 2x \leq -\frac{1}{2} \Rightarrow x \leq -\frac{1}{4}$$

۵

$$\forall x \in \mathbb{R} \quad \begin{cases} x \geq 0 & f(x) = \frac{x}{x+1} \\ x < 0 & f(x) = \frac{x}{x-1} \end{cases} \Rightarrow \begin{cases} a \cdot \frac{x}{x+1} + b \cdot \frac{x}{x-1} = \frac{1}{x} \\ a \cdot \frac{x}{x-1} - b \cdot \frac{x}{x+1} = \frac{1}{x} \end{cases}$$

$$b = \frac{1}{x} \Rightarrow b = \frac{1}{x} / a = \frac{x}{x+1} / a \cdot b = \frac{x}{x+1}$$

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

$$\frac{x+1}{x-1} = 0 \Rightarrow x = \frac{-1}{1}$$

$$x + f(x) = y \Rightarrow x + f(W) = y \Rightarrow y \in [W, W+1) \Rightarrow \frac{y}{W} \in [1, \frac{W+1}{W})$$

$$f(W) - y = x \Rightarrow f(W) - x' = y' \Rightarrow y' \in [-W, -W-1)$$

$$y' = x' - f\left(\frac{x}{W}\right) \Rightarrow x = y - f\left(\frac{y}{W}\right)$$

$$f \circ g(x) \Rightarrow x + f(x) - x + f\left(\frac{x}{W}\right) \Rightarrow f\left(\left[x\right] + \left[\frac{x}{W}\right]\right)$$

$$\frac{-Wx-1}{-x-1} \Rightarrow \frac{-W(x-1)-1}{-x-1} = \frac{-Wx+W-1}{-x-1} = y \Rightarrow \frac{-Wx+Wx-1-1}{-x+1}$$

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

$$f(x-1) \Rightarrow x-1 = V \Rightarrow \frac{V+1}{-1} = x \Rightarrow \frac{x}{1} = \frac{V+1}{-1}$$

$$f \circ g\left(\frac{V+1}{-1}\right) = f(V) \Rightarrow f \circ g\left(\frac{V+1}{-1}\right) = f = g\left(\frac{V+1}{-1}\right) \Rightarrow \frac{V+1}{-1}$$

$$f \circ g^{-1}(x) + f^{-1}(x) \Rightarrow V + \frac{V+1}{-1} \Rightarrow V - V - 1 = -1$$