

با (قسم صغری)

محدود

زمره اولی

(سوال ۱)

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



$$\begin{aligned} x^3 - \epsilon x + 20 - 14x &\geq 0 \\ x^3 - 14x + 20 &\geq 0 \\ -14x + 20 &\geq 0 \end{aligned}$$

$$x(x^2 - 14) + \epsilon(x - a) \leftarrow$$

$$(x + \epsilon)(x - 2)^2 \geq 0$$

$$\begin{aligned} &\left\{ \begin{array}{c} -\epsilon \\ -1 \end{array} \right\} \rightarrow \left\{ \begin{array}{c} -1 \\ -1 \end{array} \right\} \rightarrow \left\{ \begin{array}{c} -1 \\ -1 \end{array} \right\} \rightarrow \left\{ \begin{array}{c} -1 \\ -1 \end{array} \right\} \\ &a \geq -1 \end{aligned}$$

$$(x + \epsilon)(x - 2)^2$$

$$(x - 2)^2$$

$$x^3 - \epsilon x + 20$$

$$\rightarrow (x + \epsilon)(x - 2)^2 \geq 0$$

$$f^{-1}(y) = \epsilon \quad f(x) = 3x + K$$

(سوال ۲)

$$f(y) = y - 1.211$$

$$3x + K = \epsilon$$

$$f(f(x)) = f(3x - 1) = 3(3x - 1) - 1 = 9x - 4$$

$$f^{-1}(y) = \epsilon$$

$$\begin{aligned} f(x) = 3x - 1 &\rightarrow 3x + K = 2 \\ K &= -10 \end{aligned}$$

(سوال ۳)

$$x_A \in D_{f^{-1}}$$

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

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

$$\begin{aligned} a^2 - 2a &= 2a - a^2 \leftarrow a^2 = 2a^2 - 2a \\ a(a-2) &\Rightarrow (a=0, a=2) \rightarrow \text{دارد جواب} \end{aligned}$$

$$f = \{(3,0), (4,1), (5,2), (6,3)\} \quad g = \{(3,2), (4,4), (5,6)\} \quad (\text{سوال ۴})$$

$$1) f \circ f^{-1} \Rightarrow \{(0,0), (1,1), (2,2), (3,3)\} \quad 2) f \circ g^{-1} \Rightarrow \{(3,0), (4,2)\}$$

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

(سوال ۵)

$$f = \{(1,4), (2,8), (3,12)\} \quad g = \{(1,1), (2,2), (3,3)\}$$

$$g^{-1} \rightarrow (1,1), (2,2), (3,3)$$

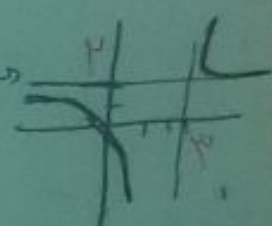
$$h = \{(1,2), (2,4), (3,6), (4,8)\}$$

$$\frac{h}{f \circ g^{-1}} = \frac{(1,2)}{(1,1)} = 2, \frac{(2,4)}{(2,2)} = 2, \frac{(3,6)}{(3,3)} = 2 \rightarrow \frac{y}{x} = \frac{1}{1} = 1$$

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



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



$$f(x) = |x-1| - |x-3| \quad [a, b] \text{ و این نیزه}$$



نقطه (1, 3) و معکوس نیزه

$$2x-5=y \quad y = \frac{x}{2} + 2$$

$$f^{-1}(a) = \frac{a+5}{2}$$

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

$$f(a) \rightarrow f^{-1}(a)$$

سوال 10
 $D_f = R_f$

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

$$x > 0 \rightarrow x^3 > 0 \rightarrow x' > 0$$

$$x \leq 0 \rightarrow x' \leq -1$$

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



$$f(x) = x^2 - \frac{(x+1)^2}{x+3} \rightarrow \frac{x^2 - \frac{(x+1)^2}{x+3}}{x+3} \rightarrow \frac{-5x-1}{x+3}$$

$$f^{-1}(a) = \frac{a+b}{c+d} \rightarrow \frac{-5x-1}{x+3} \rightarrow \frac{-4x-4}{x+3}$$

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

$$y = \frac{-5x-1}{x+3}$$

$$x = \frac{-5y-1}{y+5}$$

$$f(n) = \frac{n}{n^r + 1} \rightarrow y = \frac{n}{n^r + 1} \rightarrow n = \frac{y}{y^r + 1} \quad (1.0)_{12}$$

$$1 - \varepsilon n^r \geq 0 \rightarrow 1 \geq \varepsilon n^r$$

$$\frac{1}{\varepsilon} \geq n^r \quad -\frac{1}{\varepsilon} \leq n \leq \frac{1}{\varepsilon} \rightarrow n \neq 0$$

$$ny^r - y + n = 0$$

$$y = \frac{1 \pm \sqrt{1 - \varepsilon n^r}}{\varepsilon n} \quad y \leq 1 - \varepsilon n^r$$

$$f^{-1}(n) = \begin{cases} \frac{1 + \sqrt{1 - \varepsilon n^r}}{\varepsilon n} & 0 < n \leq \frac{1}{\varepsilon} \\ \frac{-1 - \sqrt{1 - \varepsilon n^r}}{\varepsilon n} & -\frac{1}{\varepsilon} \leq n < 0 \end{cases}$$