

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

a	0	$-\frac{1}{3}$
y	$\frac{1}{3}$	0

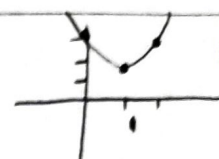
حیاتی - ۱۲ دفتر A

$\frac{1}{12} \leftarrow \frac{\frac{1}{3} \times \frac{1}{3}}{2} \leftarrow \frac{\text{ارتفاع} \times \text{مقاعد}}{2} \leftarrow \text{مساحت}$



$y = a^2 - 2a + 3 \quad a \in [1, +\infty)$

0	1	2
3	2	3



چون دامنه از یک به بعد است، در این باره تابع یک به یک است

$y = a^2 - 2a + 3 \rightarrow y = (a-1)^2 + 2 \xrightarrow{\text{مبادی}} a = (y-1)^2 + 1 \quad (y-1)^2 = a-2$

$y-1 = \sqrt{a-2} \quad y = \sqrt{a-2} + 1 \quad Df^{-1}(a) = [2, +\infty)$

$y = a^2 - 2a + 3 \quad a \in [2, +\infty) \xrightarrow{\text{مبادی}} \rightarrow$

$y = \sqrt{a-2} + 1 \quad Df^{-1}(a) = [4, +\infty)$

$y = \frac{a}{\sqrt{a^2+5}} \rightarrow y_1 = y_2 \rightarrow a_1 = a_2 \quad \frac{a_1}{\sqrt{a_1^2+5}} = \frac{a_2}{\sqrt{a_2^2+5}} \quad a_1 \sqrt{a_1^2+5} = a_2 \sqrt{a_2^2+5}$

$a_1^2 (a_1^2+5) = a_2^2 (a_2^2+5) \rightarrow a_1^4 + 5a_1^2 = a_2^4 + 5a_2^2 \rightarrow a_1^2 = a_2^2$

$a_1 = \pm a_2 \rightarrow$ (فرض شود) $a_1 = a_2 \rightarrow$ یک به یک است
 داشته باشد

$y = \frac{a}{\sqrt{a^2+5}} \rightarrow a = \frac{y}{\sqrt{y^2+5}} \rightarrow a^2 = \frac{y^2}{y^2+5} \rightarrow y^2 a^2 + 5a^2 = y^2 \quad y^2(a^2-1) = -5a^2$

$y^2 = \frac{-5a^2}{a^2-1} \Rightarrow y = \sqrt{\frac{-5a^2}{a^2-1}}$

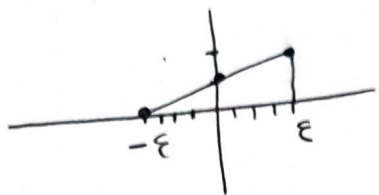
$g(a) = \begin{cases} a^2 - \varepsilon a + K & a \geq 2 \\ -a^2 + 4a + 3K & a < 2 \end{cases} \quad \lim_{a \rightarrow 1^-} f(a) \leq \lim_{a \rightarrow 1^+} f(a) \quad \varepsilon - 1 + K \leq -\varepsilon + 4 + 3K$

$-\varepsilon + K \leq 3K + 1 \quad 2K \leq -1 \quad (K \leq -\frac{1}{2})$

$$f(\alpha) = 2\alpha - \sqrt{14 - 4\alpha(\epsilon - \alpha)} \rightarrow 2\alpha - \sqrt{14 - 14\alpha + \epsilon\alpha^2} \rightarrow 2\alpha - \sqrt{(2\alpha - \epsilon)^2} \rightarrow 2\alpha - |2\alpha - \epsilon| \quad (3)$$

$$\begin{cases} -\epsilon & \alpha \geq 2 \rightarrow \text{غير ممكن} \\ \epsilon - 2\alpha & \alpha < 2 \end{cases} \rightarrow f(\alpha) = \epsilon - 2\alpha \quad f^{-1}(\alpha) \Rightarrow \alpha = \epsilon y - \epsilon \quad y = \frac{\alpha}{\epsilon} + 1 \quad \alpha < \epsilon$$

ϵ	0	$-\epsilon$
2	1	0



$$S = \frac{1 \times 2}{2} \rightarrow S = 1$$

$$f(\alpha) = 2\alpha + |\alpha| \rightarrow \begin{cases} \epsilon\alpha & \alpha \geq 0 \rightarrow \text{منه } y = \frac{\alpha}{\epsilon} \\ 2\alpha & \alpha < 0 \rightarrow \text{منه } y = \frac{\alpha}{2} \end{cases} \quad \begin{cases} \frac{\alpha}{\epsilon} & \alpha \geq 0 \\ \frac{\alpha}{2} & \alpha < 0 \end{cases} \quad (4)$$

$$\text{المعكوس} = \frac{\frac{\alpha}{\epsilon} + \frac{2\alpha}{2}}{2} \Rightarrow \frac{3\alpha}{4\epsilon} \quad \text{الضلع} = \frac{\alpha}{\lambda} \quad \text{منه } \frac{\alpha}{\lambda} + \frac{2\alpha}{\lambda} \quad ab = \frac{3}{4\epsilon} \quad (5)$$

$$f(\alpha) = \frac{2\alpha + \epsilon}{\alpha + 3} \rightarrow \begin{vmatrix} 2 & \epsilon \\ 1 & 3 \end{vmatrix} = 6 - \epsilon \quad m = -3 \quad f(\alpha) = \frac{2\alpha + \epsilon}{\alpha - 3} \quad (6)$$

$$f^{-1}(\alpha) \rightarrow y \alpha - 3y = 2\alpha + \epsilon \quad \alpha(y - 3) = 2\alpha + \epsilon \quad \alpha = \frac{2\alpha + \epsilon}{y - 3} \rightarrow y = \frac{2\alpha + \epsilon}{\alpha - 3}$$

$$f \circ f^{-1}(\alpha) = \alpha \quad \alpha + \frac{2\alpha + \epsilon}{\alpha - 3} = \alpha \frac{2 - 3\alpha + 2\alpha + \epsilon}{\alpha - 3} \rightarrow \frac{\alpha^2 + \epsilon}{\alpha - 3}$$

$$\frac{\alpha^2 + \epsilon}{\alpha - 3} = \alpha \quad \alpha^2 + \epsilon = \alpha^2 - 3\alpha \rightarrow \boxed{\alpha = -\frac{\epsilon}{3}}$$

$$f(3 - 2\alpha) = 2 - g\left(\frac{\alpha}{2}\right) \quad \epsilon g^{-1}(\epsilon) + f^{-1}(-2) \rightarrow g(?) = \epsilon \quad g(?) = -2 \quad (7)$$

$$\begin{aligned} f(?) = -2 &\rightarrow -2 = 2 - g\left(\frac{\alpha}{2}\right) \quad g\left(\frac{\alpha}{2}\right) = \epsilon \quad g(?) = \epsilon \quad ? = \frac{\alpha}{2} \rightarrow \epsilon\left(\frac{\alpha}{2}\right) + 2 - 2\alpha \\ g(?) = \epsilon &\rightarrow \epsilon = 2 - f(3 - 2\alpha) \quad f(3 - 2\alpha) = -2 \quad f(?) = -2 \quad ? = 3 - 2\alpha \end{aligned}$$

$$y = \frac{\omega\alpha - 13}{1 - \alpha} \rightarrow -y = \frac{-\omega\alpha + 13}{1 - \alpha} \quad y = \frac{\omega\alpha + 13}{1 + \alpha}$$

$$\frac{\omega(\alpha - 2) + 13}{1 + (\alpha - 2)} \rightarrow \frac{\omega\alpha + 13}{\alpha - 1} \quad \omega = \frac{\omega\alpha + 13}{\alpha - 1} - 13 \rightarrow \frac{2\alpha + 4}{\alpha - 1}$$

$$f^{-1}(\alpha) = y\alpha - y = 2\alpha + 4 \quad \alpha(y - 2) = 4 + y \quad \alpha = \frac{4 + y}{y - 2} \quad y = \frac{\alpha + 4}{\alpha - 2}$$

$$f^{-1}(\alpha) = f(\alpha) \quad \frac{\alpha + 4}{\alpha - 2} = \frac{2\alpha + 4}{\alpha - 1} \quad 2\alpha^2 + 4\alpha - \epsilon\alpha - 12 = \alpha^2 + 4\alpha - \alpha - 4$$

$$\alpha^2 - 2\alpha - 4 \rightarrow \frac{b}{a} = 2 \quad (8)$$

$$y = a + \varepsilon[a] \xrightarrow[\text{معكوس تا جمع است}]{\text{قرینه نسبت به } y=a} [y] = [a + \varepsilon[a]] \quad [y] = \omega[a] \quad (10)$$

$$\hookrightarrow \varepsilon[a] = a - y \quad [a] = \frac{a - y}{\varepsilon} \xrightarrow{\text{جایگذاری}} \frac{1}{\varepsilon} a - \frac{1}{\varepsilon} y = \frac{[y]}{\omega} \quad \frac{1}{\varepsilon} a = \frac{1}{\omega} [y] + \frac{1}{\varepsilon} y$$

$$\xrightarrow{\text{جایگذاری}} \frac{1}{\varepsilon} y = \frac{1}{\omega} [a] + \frac{1}{\varepsilon} a \quad \times \varepsilon \rightarrow y = \frac{\varepsilon}{\omega} [a] + a$$

$$f(a) - g(a) \rightarrow a + \varepsilon[a] - \frac{\varepsilon}{\omega} [a] - a \rightarrow \frac{1 - \varepsilon}{\omega} [a]$$