

$$D_{g \circ f} = \{ x \in D_f \cap f(x) \in D_g \} \quad (1)$$

$$D_f = \frac{x-1}{x+1} > 0 \cap \log_r \frac{x-1}{x+1} \geq 0 \quad x-1 \geq 1 \quad x \geq 2 \Rightarrow D_f = [2, +\infty)$$

$$g(x, \sqrt{-(x^2 - 2x + 1)}) = \sqrt{-(x-1)^2} \geq 0 \Rightarrow -(x-1)^2 \geq 0 \Rightarrow D_g = \{1\}$$

$$\Rightarrow \sqrt{\log_r \frac{x-1}{x+1}} = 1 \quad || \log_r \frac{x-1}{x+1} || = 1 \Rightarrow x-1 = 14 \quad (x=15) \checkmark$$

در این مرحله $x-1 = \frac{1}{14} \quad x = \frac{15}{14}$ $\checkmark$

$$g \circ f(x) = (x^2 - 2x + 1)^2 - 2(x^2 - 2x + 1) + 1 = 4x^2 - 4x + 14 = g \circ f(x) \quad (2)$$

$$f \circ g(x) = 2(x^2 - 3x + 1) - 1 = 2x^2 - 6x + 14 - 1 = 2x^2 - 6x + 13$$

$$\Rightarrow g \circ f(x) = f \circ g(x) = 4x^2 - 4x + 14 = 2x^2 - 6x + 13$$

$$\Rightarrow 2x^2 - 4x + 13 = 0 \Rightarrow S = \frac{20}{2} = 10 \quad P = \frac{37}{2}$$

$$\Rightarrow x_1 + x_2 = S - P = 10 - \frac{37}{2} = 10 - 18.5 = -8.5 \quad (63) \checkmark$$

$$g(x) = 5x^2 + 11 \Rightarrow 2x = t \quad x = \frac{t}{2} \quad (3)$$

$$\Rightarrow g(t) = 5\left(\frac{t}{2}\right)^2 + 11 \Rightarrow g(x) = \frac{5x^2}{4} + 11 \Rightarrow \frac{5(x-1)^2}{4} + 11$$

چون تابع زوج است پس کمترین مقدار تابع min تابع است که 2.11 است پس

$$\hookrightarrow \frac{5(1-1)^2}{4} + 11 = (11) \checkmark$$

$$2g + 4 = 2x^2 - 6x - 1 \quad (4)$$

$$2g = 2x^2 - 6x - 1 + 4$$

$$g = \frac{2x^2 - 6x + 3}{2} \quad g(x) = x^2 - 3x + 1$$

$$g \circ f(x) = (x^2 - 3x + 1)^2 - 2(x^2 - 3x + 1) + 1$$

$$g \circ f(x) = 4x^2 - 4x + 14 - 4x + 14 + 1$$

$$4x^2 - 4x + 14 = g \circ f(x)$$

✓

$$\text{طبق سوال} \Rightarrow f(u) - g(u) = 0 \Rightarrow f(u) = g(u)$$

$$\Rightarrow 2g(u) = 3f(u) - 14 \Rightarrow 2g(u) = 3g(u) - 14 \Rightarrow \underline{g(u) = 14}$$

$$f(0) - g(0) = 0 \Rightarrow f(0) = 0 + g(0)$$

$$\Rightarrow 2g(0) = 3(0 + g(0)) - 14 \Rightarrow 2g(0) = 14 + 3g(0) - 14 \Rightarrow g(0) = -1$$

$$\Rightarrow (g(x)) = \left\{ \begin{matrix} (x, 14) \\ (0, -1) \end{matrix} \right\} \Rightarrow \left. \begin{matrix} \text{چون } x=0 \text{ می باشد} \\ \text{است پس } y \text{ را می یابیم} \end{matrix} \right\} \Rightarrow ax + b = g(x)$$

$$\Rightarrow \frac{(14+1)}{0-0} = \textcircled{3}$$

$$\underline{3x - 1 = g(x)}$$

$$\Rightarrow 2g(x) = 3f(x) - 14 = 3(3x - 1) - 14$$

$$\Rightarrow 6x - 2 = 3f(x) - 14$$

$$\Rightarrow 2(3x - 1) + 12 = 3f(x) \Rightarrow \frac{6x + 10}{3} = f(x)$$

$$\Rightarrow 6x - 2 + 12 = 6x + 10 = 3f(x) -$$

$$6x + 2 = 0 \Rightarrow 6x = -2 \Rightarrow x = -\frac{1}{3} \checkmark$$

$$f \circ g(x) = 9^{\log_3 x} \Rightarrow x^{\frac{\log_3 9}{\log_3 3}} = x^2 = f \circ g(x)$$

$$g \circ f(x) = \log_3 9^x = x \log_3 9 = 2x = g \circ f(x)$$

$$\Rightarrow x^2 \leq 2x$$



$$\Rightarrow x^2 = 2x$$

$$\textcircled{x = 2}$$

$$\textcircled{x = 0}$$

طبق شکل نمودار $x^2 \leq 2x$ در بازه $[0, 2]$ برابر و بزرگتر از 0 است $\Rightarrow$

(4)

$$\frac{x^2 - 2}{2} = + \quad x - \frac{2}{x} = +$$

$$\Rightarrow +^2 = x^2 - 4 + \frac{4}{x^2} \Rightarrow f\left(\frac{x^2 - 2}{2}\right) = x^2 - 4 + \frac{4}{x^2} + x - \frac{2}{x}$$

$$\Rightarrow f(+) = +^2 + + \Rightarrow f(x) = x^2 + x$$

$$D_{f \circ g} = \{x \in D_g \cap g(x) \in D_f\}$$

$$\Rightarrow \wedge x - x^2 > 0 \Rightarrow \frac{-1}{-1+1} \Rightarrow D_{f \circ g} = (0, 1) \checkmark$$

مأثر برد $g(x)$ در f قرار دهیم به ما برد تابع f را خواهد داد پس ما 2 سر برد $g(x)$ را خواهیم داد تا به 2 سر برد f را ببند

$$\Rightarrow R_{g(x)} \Rightarrow \frac{-1}{-2} = \frac{1}{2} \Rightarrow 32 - 16 = 16 \Rightarrow (-\infty, 16] = R_g$$

$$\Rightarrow \log_2 16 = 4 \quad \log_2^+ = \frac{-\infty}{\text{طبق شکل}} \Rightarrow R_{f \circ g} = (-\infty, 4]$$

$$\Rightarrow (0, 1) \cap (-\infty, 4] \Rightarrow (0, 1] \checkmark$$

$$f \circ f(x) = 1 - 3f(x) \Rightarrow f(+) = 1 - 3+^2 \Rightarrow f(x) = 1 - 3x^2$$

$$\Rightarrow h \circ g(x) = (x-1)^3 + 2(x-1) + 1 = x^3 - 3x^2 + 5x + 2$$

$$\Rightarrow h \circ g(x) \circ f(x) = x^3 - 3x^2 + 5x + 2 = 1 - 3x^2 \Rightarrow x^3 + 5x - 3 = 0$$

$$x^3 = -5x + 3 \Rightarrow$$

$$x - \frac{x}{2} = 3 \quad x^2 - x = 3x \quad x^2 - 4x - 6 = 0 \quad (x-6)(x+1) = 0$$

$$\begin{matrix} x=6 & x=-1 \\ \text{این مقادیر (3) می باشد} \end{matrix}$$

$$\Rightarrow g(f(6)) = g(3) = 4 \cdot 3 + 1$$

$$\Rightarrow 4 \cdot 3 + 1 = 13 \Rightarrow a = 13 \checkmark$$

$$g(f(-1)) \circ g(3) = -a - 2 = 1 \Rightarrow a = -1 \checkmark$$

کتاب ریاضی مسر دراز هم A