

$$f(x) = ax + b \Rightarrow f(f(x)) = a(ax + b) + b = a^2x + ab + b = \varepsilon x + 3$$

$$a = \pm 2 \begin{cases} \rightarrow a = 2 \Rightarrow 3b = 3 \Rightarrow b = 1 \Rightarrow f(x) = 2x + 1 & g(f(-1)) \quad g(-1) = \frac{-3 - 1^3}{2} = -1 \\ \rightarrow a = -2 \Rightarrow -b = 3 \Rightarrow b = -3 & f(-1) \xrightarrow{\text{تبدیل}} -1 \\ & f(x) = -2x - 3 \end{cases}$$

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

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

$$g \circ f \quad x \in \mathbb{R} \quad \text{I}$$

$$\sqrt{x+1} \neq \{0, \varepsilon\} \Rightarrow$$

$$x \notin (-\infty, 0] \quad \text{II}$$

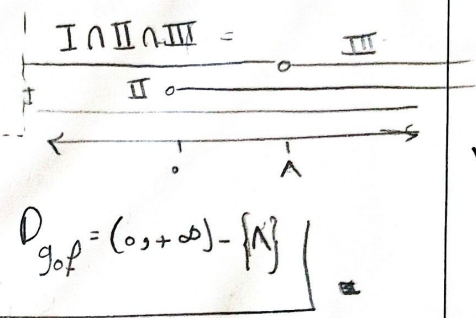
$$x \neq \infty \quad \text{III}$$

$$D_g = \mathbb{R} - \{0, \varepsilon\}$$

$$x^2 - \varepsilon x \neq 0$$

$$\begin{matrix} \text{+} \sqrt{} \\ \text{+} \sqrt{} \\ \text{-} \sqrt{} \end{matrix}$$

$$\Rightarrow D_f = \mathbb{R}$$



$$D_{g \circ f} = (0, +\infty) - \{\infty\}$$

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

$$\subseteq (-1, 2x \leq 1)$$

$$\subseteq \sqrt{1-x^2} \leq 1$$

$$\sqrt{1-x^2} \leq 1 \Rightarrow 1-x^2 \leq 1 \Rightarrow x^2 \geq 0 \Rightarrow x \in \mathbb{R} \quad \text{A}$$

$$\sqrt{1-x^2} \leq 1 \Rightarrow 0 \leq \sqrt{1-x^2} \Rightarrow 0 \leq 1-x^2 \Rightarrow x^2 \leq 1 \Rightarrow -1 \leq x \leq 1 \quad \text{B}$$

$$D_{f \circ g} = D_f \cap D_g = [-1, 1] \cap [0, +\infty) = [0, 1]$$

$$A \cap B = [-1, 1]$$

$$C \cap [-1, 1] = [-1, 1]$$

$$g(x) = \sqrt{x} \Rightarrow (D_g = x \geq 0) / f(x) = \sqrt{1-x^2} \Rightarrow 1-x^2 \geq 0 \Rightarrow |x| \leq 1 \Rightarrow (-1, 2x \leq 1) = D_f$$

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

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

$$f(x) = x^3 - 3x$$

$$f\left(\frac{3x+1}{x-2}\right) = \varepsilon x + 5$$

(الف)

$$\frac{3x+1}{x-2} = t \Rightarrow 3x+1 = tx-2t \Rightarrow 3x-tx = -2t-1 \Rightarrow x(3-t) = -2t-1 \Rightarrow x = \frac{-2t-1}{3-t}$$

$$f(t) = \frac{-1t - \varepsilon + 15 - 5t}{3-t} = \frac{-1^3 t + 11}{3-t}$$

$$g(1) = 0 \wedge g(2\sqrt{2}) = 0$$

* طبق داده سوال داریم:

$$f(x) = x\sqrt{x}$$

$$g(f(x)) = 0 \Rightarrow g(x\sqrt{x}) = 0$$

$$|x_2 - x_1| = 1$$

* حال سوال از ما می خواهد که بفهمیم عدد ها را معنی کنی است:

$$x\sqrt{x} = 2\sqrt{2} \Rightarrow (x_1 = 2) \wedge x\sqrt{x} = 1 \Rightarrow (x_2 = 1)$$