

تکلیف ۱، ۲ و ۳

پارادکس B

مسئله ۱

$$1) f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \quad x \neq 1, x \neq 0 \quad \sqrt{\frac{(x-1)^2 - x^2}{x^2 - x}} \quad + \frac{0}{x} - \frac{1}{x} + \frac{1}{x} -$$

$$\sqrt{\frac{x^2 - 2x + 1 - x^2}{(x^2 - x)}}$$

$$\sqrt{\frac{-2x+1}{x(x-1)}} \quad \begin{matrix} -2x+1=0 \\ -2x=-1 \\ x=\frac{1}{2} \end{matrix}$$

$$Df = (-\infty, 0) \cup [\frac{1}{2}, 1)$$

$$2) f(x) = \frac{1}{x+1} - \frac{x}{x} \quad \begin{matrix} x \neq -1 \\ x \neq 0 \\ x \neq 1 \\ x \neq -2 \end{matrix}$$

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

$$x \neq -2 \Rightarrow x \neq -\frac{2}{x}$$

$$Df = \mathbb{R} - \{-1, 0, 1, -2, -\frac{2}{x}\}$$

$$3) f(x) = \sqrt{((\frac{1}{x})^2 - 9)(x^2 - 4)}$$

$$+ \frac{-9}{x^2} - \frac{4}{x^2} +$$

2)

$$\Rightarrow Df = (-\infty, -2] \cup [\frac{2}{x}, +\infty)$$

$$\textcircled{1} \sqrt{x-1} + \sqrt{y+1} = r \rightarrow$$

$$\sqrt{y+1} = r - \sqrt{x-1} \quad \textcircled{5} \text{ob } 5 \rightarrow$$

$$y+1 = r^2 - 2r\sqrt{x-1} + x-1$$

$$y = 1 + \sqrt{x-1} - 2r\sqrt{x-1} \geq 0$$

$$\textcircled{5} \sqrt{x-1} \leq r \xrightarrow{\text{ob } 5} x-1 \leq 1 \rightarrow x \leq 12$$

$$\left. \begin{array}{l} \textcircled{1} \text{ (F)} \\ D_y = [1, 12] \end{array} \right\}$$

← (12) 16

$$f(x) = \frac{\log(x^2 - x - 2)}{\sqrt{x^2 - 1} + 1} \quad x^2 - x - 2 > 0 \quad (x-2)(x+1) > 0 \quad (x < -1) \quad (x > 2)$$

$$Df = (-\infty, -1) \cup (2, +\infty)$$

$$\frac{-1}{+} \quad \frac{2}{-} \quad \frac{+}{+}$$

$$\sqrt{x^2 - 1} \Rightarrow x^2 \geq 1 \Rightarrow \frac{-1}{+} \quad \frac{1}{-} \quad \frac{+}{+} \quad (-\infty, -1] \cup [1, +\infty) \quad Df = (-\infty, -1) \cup (2, +\infty)$$

$$f(x) = \sqrt{x + ax - x^2} \quad [-1, b] \rightarrow ax^2 + bx + c \Rightarrow S = -\frac{b}{a}, P = \frac{c}{a}$$

$$\Rightarrow a = -1 \Rightarrow S = -b, P = -c$$

$$\Rightarrow b + (-1) = a, \quad 5b = -1 \Rightarrow b = -\frac{1}{5}, a = -\frac{1}{5} \Rightarrow -\frac{1}{5} + \frac{1}{5} = 0$$

$$\left. \begin{aligned} x^2 - 1 \geq x &\Rightarrow x^2 \geq x + 1 \Rightarrow x \geq 1 \\ x^2 + 1 \geq x &\Rightarrow x \leq -1 \Rightarrow -1 \leq x < 1 \end{aligned} \right\} \text{قبل} \quad Dg = [-1, +\infty)$$

$$f(x) \geq x$$

$$f(x) = x^2 - \epsilon x \Rightarrow f\left(\sin \frac{\pi}{2} + \cos 2\pi\right) = ? \quad (9)$$

$$\Rightarrow f\left(\frac{\sqrt{5}}{2} + 1\right) = \left(\frac{\sqrt{5}}{2} + 1\right)^2 - \epsilon\left(\frac{\sqrt{5}}{2} + 1\right) = \frac{5}{4} + \sqrt{5} + 1 - \frac{\epsilon\sqrt{5}}{2} - \epsilon = \frac{5}{4} + \sqrt{5} + 1 - \frac{\epsilon\sqrt{5}}{2} - \epsilon$$

$$f(x) = \frac{x+1}{x-1}, f(f(a)) = a \quad f\left(\frac{a+1}{a-1}\right) = a \quad (10)$$

$$\frac{a+1+a-1}{a-1} = a \Rightarrow \frac{2a}{a-1} = \frac{2a}{a-1} \Rightarrow a = a$$

هو مقدار a بجز 1 خارج

$$D_a = \mathbb{R} - \{1\}$$

$$f(g(a)) = -t \quad (11)$$

$$g(a) = \sqrt{a^2 - 1} \quad f(\sqrt{a^2 - 1}) = (\sqrt{a^2 - 1})^2 - \epsilon(\sqrt{a^2 - 1}) = -\epsilon \cdot \sqrt{a^2 - 1} = -t$$

$$t^2 - \epsilon t + \epsilon = 0 \Rightarrow (t - \epsilon)^2 = 0 \Rightarrow t = \epsilon$$

$$\Rightarrow \sqrt{a^2 - 1} = \epsilon \Rightarrow a^2 = \epsilon^2 + 1 \Rightarrow a = \pm \sqrt{\epsilon^2 + 1}$$

$$f(x+y) = x^2 - \Delta x + y \Rightarrow x+y = \epsilon \Rightarrow x = -y \Rightarrow f(-y) =$$

$$\epsilon y + \epsilon_0 + y = \sqrt{5} \quad f(x+y) = x^2 + \Delta x + y \Rightarrow x+y = \epsilon \Rightarrow x = 1$$

$$\Rightarrow f(\epsilon) = 1 - \Delta + y = \epsilon \quad f(\epsilon) \times f(-\epsilon) = \epsilon \times \sqrt{5} = 1 \epsilon \epsilon$$

$$\epsilon \cos^2 x + \Delta \cos x = \frac{\sqrt{5}}{\epsilon} \Rightarrow \cos x = \frac{1}{\epsilon} \Rightarrow \tan^2 x = \left(\sqrt{5}\right)^2 = 5 \quad (12)$$