

۲. آزمون خوب نوشتن

آزمون نرمیابی / یازم رشت B / تکلیف 5

$$1- \text{الف)} f(x), \sqrt{\frac{(x-1)^2 - x^2}{x(x-1)}} = \sqrt{\frac{x^2 + 1 - 2x - x^2}{x(x-1)}} = \sqrt{\frac{1-2x}{x(x-1)}} \quad \begin{matrix} + & - & + & - \\ + & - & + & - \end{matrix} \quad D_f = (-\infty, -\frac{1}{2}) \cup (\frac{1}{2}, 1)$$

$$\text{ب)} f(x), \frac{\frac{1}{x+1} - \frac{2}{x}}{\frac{3}{x-1} + \frac{1}{x+2}} \Rightarrow x \neq 0, x \neq -1, x \neq 1, x \neq -2$$

$$\frac{3}{x-1} + \frac{1}{x+2} \neq 0 \Rightarrow \frac{3x+6+x-1}{x^2+x-2} \neq 0 \Rightarrow 2x+5 \neq 0 \Rightarrow x \neq -\frac{5}{2} \quad D_f = \mathbb{R} - \{-\frac{5}{2}, -1, 0, 1\}$$

$$\text{الف)} f(x) = \sqrt{((\frac{1}{x})^2 - 4)(3x - x^2)} \quad ((\frac{1}{x})^2 - 4)(3x - x^2) \geq 0 \quad \begin{matrix} - & + & + \\ + & - & + \end{matrix} \quad D_f = (-\infty, -2] \cup [1, +\infty)$$

$$\text{ب)} \sqrt{x-1} + \sqrt{y+1} = 3 \Rightarrow \sqrt{y+1} = 3 - \sqrt{x-1} \quad \begin{matrix} x-1 \geq 0 \Rightarrow x \geq 1 \\ 3 - \sqrt{x-1} \geq 0 \Rightarrow \sqrt{x-1} \leq 3 \Rightarrow x \leq 10 \end{matrix} \quad D_f = [1, 10]$$

$$f(x), \frac{\log \frac{(x^2-x-2)}{\sqrt{x^2-1}+1}}{\sqrt{x^2-1}+1} \quad \begin{matrix} x^2-x-2 > 0 \Rightarrow (x-2)(x+1) > 0 \\ x^2-1 > 0 \Rightarrow x > 1, x < -1 \end{matrix} \quad \begin{matrix} - & + & + \\ + & - & + \end{matrix} \quad D_f = (-\infty, -1) \cup (2, +\infty)$$

$$f(x) = \sqrt{3+ax-x^2} \quad D_f = [-2, b] \quad \begin{matrix} x=-2 \Rightarrow 3-2a-\varepsilon = 0 \Rightarrow a = \frac{1}{2} \Rightarrow f(x) = \sqrt{3-\frac{x}{2}-x^2} - \varepsilon \\ a+b = -\frac{1}{2} + \frac{3}{2} = 1 \end{matrix} \quad \begin{matrix} \frac{3}{a} = -2b = -3 \Rightarrow b = \frac{3}{2} \end{matrix}$$

$$g(x) = \sqrt{f(x)} - x \quad \begin{cases} x \geq 1 \Rightarrow \sqrt{2x-2-x} = \sqrt{x-2} \Rightarrow 2x-2 \geq 0 \Rightarrow x \geq 1 \\ x < 1 \Rightarrow \sqrt{2x+3-x} = \sqrt{x+3} \Rightarrow x+3 \geq 0 \Rightarrow x \geq -3 \Rightarrow -3 \leq x < 1 \end{cases} \quad D_g = [-3, +\infty)$$

$$f(x), 2x^2 - \varepsilon x \quad f(\sin \frac{\pi}{6} + \cos \frac{\pi}{6}), f(\frac{\sqrt{3}}{2} + 1) = 2(\frac{\sqrt{3}}{2} + 1)^2 - \varepsilon(\frac{\sqrt{3}}{2} + 1) = 2(\frac{3}{4} + 1 + \sqrt{3}) - \varepsilon\sqrt{3} - \varepsilon = \frac{9}{2} + 2 + \sqrt{3} - \varepsilon\sqrt{3} - \varepsilon = -0.5$$

$$f(f(a)) = a \quad f(x), \frac{x+1}{x-1} \Rightarrow f(a), \frac{a+1}{a-1} \Rightarrow f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{a+1+a-1}{a-1} = \frac{2a}{a-1} \Rightarrow -7$$

برای اینکه خارج صفر نشود $a \neq 1$

$$f(x), x^2 - 2x \quad g(x) = \sqrt{x^2 - 1} \Rightarrow g(x), \sqrt{x^2 - 1} \Rightarrow f(g(x)) = (\sqrt{x^2 - 1})^2 - 2\sqrt{x^2 - 1} \Rightarrow -1$$

$$x^2 - 1 - 2\sqrt{x^2 - 1} = -2 \Rightarrow x^2 + 1 = 2\sqrt{x^2 - 1} \Rightarrow x^2 - 1 = \frac{x^2 + 1 - 2}{1} = \frac{x^2 - 1}{1}$$

$$14x^2 - 14 = x^2 + 1 + 9x^2 \Rightarrow x^2 - 1 = x^2 + 2 \Rightarrow x^2 = 3 \Rightarrow x = \pm\sqrt{3}$$

$$1 \pm \sqrt{1 - 1} = 2 \Rightarrow x^2 = 2 \Rightarrow x = \pm\sqrt{2}$$

$$f(x+3), x^2 - 2x + 4 \Rightarrow f(x), f(x+3), 1 - 2 + 4 = 3 \Rightarrow f(-3), f(-4+3) = 14 + 3 + 4 = 21$$

$$f(x), f(-3), 14 + 3 = 17$$

$$f(\cos x + \Delta \cos x), \tan x \Rightarrow 2 \cos x + \Delta \cos x - 1, \Delta \Rightarrow 2 \cos x + \Delta \cos x - 1, \Delta = 0$$

$$(2 \cos x + 1, \Delta)(2 \cos x - 1) = 0 \Rightarrow \cos x = \frac{1}{2} \sqrt{1} \quad \cos x = \frac{1}{2} x$$

$$\cos x = \frac{1}{2} \quad 1 + \tan x = \frac{1}{\cos x} \Rightarrow 1 + \tan x = 2 \Rightarrow \tan x = 1$$

$$\tan(x, \Delta), 1$$