

«نهال» «بازدهم دفتر»

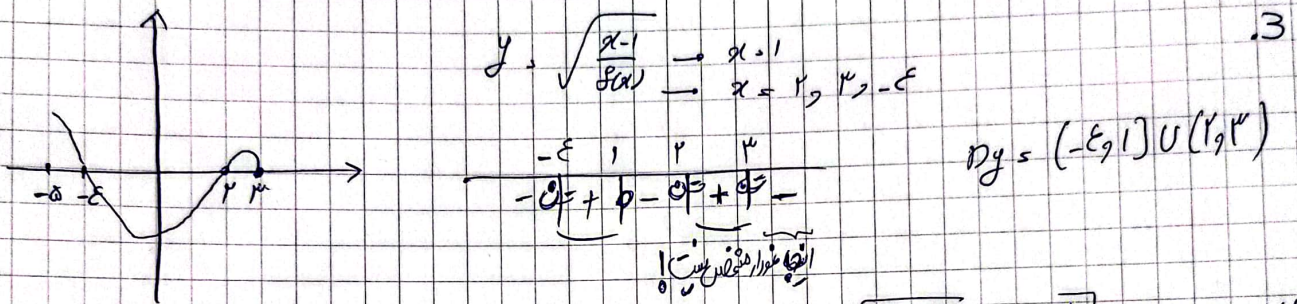
«بازدهم دفتر»

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1. $f(x) = \left(\frac{1}{x}\right)^{x-1} - 1$ $f(x+1) = \left(\frac{1}{x+1}\right)^{x-1} - 1$ $Df = [0, 1]$

$g = \sqrt{x^x f(x+1)}$ $\frac{x^x (x^{1-x} - 1)}{x=0} \geq 0$ $x^{1-x} \leq 1 \rightarrow 1-x \leq 0 \rightarrow x \geq 1$

2. $f(x) = \sqrt{x+|x+1|}$ $f(-x) = \sqrt{-x+1-|x+1|}$ $-2x+2 \geq 0 \rightarrow 2(-x+1) \geq 0 \rightarrow x \leq 1 \rightarrow \frac{1}{x+1}$



4. $g_1 = \frac{1}{9x^2 - \sqrt{x^2 - 2x - 3}}$ $9x^2 - 4x^2 - x^2 - 2x - 2 = 1$ $(9x^2 - 4x^2 + 1) - x^2 - 2x - 2 = 1$ $(x^2 - 1)^2 - (x+2)^2 = 0$ $Df = Dg_1$ $(x^2 - 1)^2 - (x+2)^2 \neq 0 \Rightarrow x^2 - 1 = x+2 \rightarrow x^2 - x - 3 = 0$

5. $f(x) = x^x + x$ $g = \sqrt{x^x + x - \frac{4x}{x^2} - \frac{x}{2}}$ $g = \sqrt{\frac{1}{x^2} (x^x - 4)(x^x + 4 + 2x^2) + \frac{1}{x} (x^x - 4)}$ $Df = [-1, 0) \cup [2, \infty)$

6. $f(x^x + x) = x^x - 1$ $x^x + x = 1 \rightarrow x=1$ $f(x) = 1$ $x^x + x \leq 1 \rightarrow x \leq 1$ $f(1) = 1$

7. $f(x) = x^x - 4x^x + 12x^x + 12 = (x-1)^x + 1$ $g(x) = x^x + 4x^x + 12x^x + 12 = (x+1)^x - 12$ $\frac{g(\sqrt{12})}{f(\sqrt{12})} = \frac{12-12}{1+1} = 0$



$$f(x) = \sqrt{x - \epsilon + \epsilon \sqrt{x - \epsilon} + \epsilon} = \sqrt{(\sqrt{x - \epsilon} + 1)^2} = \sqrt{x - \epsilon} + 1 \quad \frac{1 + 0}{- \epsilon} = \left[\frac{-1}{\epsilon} \right] \quad .8$$

$$g(x) = \sqrt{x - \epsilon - \epsilon \sqrt{x - \epsilon} + \epsilon} = \sqrt{(\sqrt{x - \epsilon} - 1)^2} = \sqrt{x - \epsilon} - 1$$

$$f(x) + g(x) = \sqrt{x - \epsilon} + 1 + \sqrt{x - \epsilon} - 1 = 2\sqrt{x - \epsilon} = a + b\sqrt{x + c}$$

$\downarrow \quad \quad \downarrow \quad \quad \downarrow$
 $a = 0 \quad b = 2 \quad c = -\epsilon$

$$D f(x) = \mathbb{R} - \{1, 3\}$$

$$D f(x) \cap g(x) = \{1, 3\} \Rightarrow \frac{g}{f} = \left\{ \left(1, -\frac{1}{\epsilon} \right), (0, 4) \right\} \quad .9$$

$$D f(x) \cap g(x) = \{1, 3, -1\}$$

.10

$$f(x) = \left\{ \left(\frac{1}{\epsilon}, 1 \right), \left(\frac{3}{\epsilon}, -1 \right), (1, 1), \left(-\frac{1}{\epsilon}, 4 \right) \right\}$$

$$f(x) = \left\{ (\pm 1, 1), (\pm \sqrt{3}, -1), (\pm 1, 1) \right\}$$

$$\# \quad 1g^r(x) + 1 = \left\{ (-1, 1), (1, 3), (1, 9), (-1, 1) \right\}$$

$$\frac{1g}{g} = \left\{ (1, -\epsilon), (3, -1), (-1, \frac{1}{\epsilon}) \right\}$$

$\checkmark \quad \quad \quad \times$