

«فيلسوف» «مباركهم دفتوح»

«بنا»

5

«زهره» «ارانی»

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

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

$$Dy = \left[\frac{1}{x}, 1\right]$$

1. 5

$$g = \sqrt{x^x f(x+1)}$$

$$\frac{x^x}{x=0} (x^{1-x} - 1) \geq 0$$

$$x^{1-x} \leq 1 \rightarrow 1-x \leq 0 \rightarrow x \geq 1$$

$$f(x) = \sqrt{x+1} + x+1$$

$$f(-x) = \sqrt{-x+1} - x+1$$

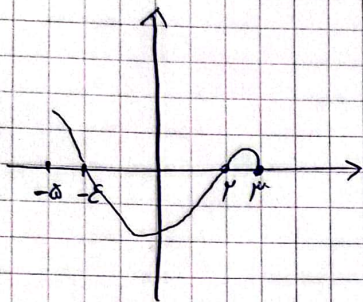
$$-2x+2 \geq 0 \rightarrow 2(-x+1) \geq 0 \rightarrow x \leq 1 \rightarrow \frac{1}{x+1}$$

$$Df = (-\infty, 1]$$

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

2. 5

خطی
در
رابطه



$$y = \sqrt{\frac{x-1}{2x}} \rightarrow x=1, x=2, x=3$$

$$\frac{-1}{-1/2+1} = \frac{2}{-1/2+1}$$

$$Dy = (-1, 1] \cup (2, 3)$$

3. 5

$$g_1 = \frac{1}{9x^2 - \sqrt{2x^2 - 2x - 3}}$$

$$g_2 = \frac{1}{2x^2 + ax + b}$$

$$\frac{9x^2 - 2x^2 - x^2 - 2x - 2 + 1}{(9x^2 - 2x^2 + 1) - x^2 - 2x - 2}$$

$$\sqrt{-(a+b)} = 2$$

4. 5

$$Dg_1 = Dg_2 \quad (2x^2 - 1)^2 - (x+2)^2 \neq 0 \Rightarrow 2x^2 - 1 = x+2 \rightarrow 2x^2 - x - 3 \geq 0$$

$$f(x) = x^x + x$$

$$g = \sqrt{f(x) - f\left(\frac{1}{x}\right)}$$

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

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

$$g = \sqrt{\frac{1}{x} (x^x - 1) \left(\frac{1}{x^x} (x^x + 1) + 1 \right)}$$

$$y = \sqrt{\frac{1}{x} (x^x - 1) \left(x^x + \frac{1}{x^x} + 1 \right)}$$

$$\frac{-1}{-1/2+1} = \frac{2}{-1/2+1}$$

$$Dy = [-1, 0) \cup [2, +\infty)$$

5. 5

$$f(x^x + x) = 2x^x - 1$$

$$x^x + x \leq 1 \rightarrow x=1$$

$$f(x) \leq 1$$

$$x^x + x \leq 1 \rightarrow x=2$$

$$f(1) = 1$$

6. 5

$$f(x) = x^x - 9x^x + 12x + 1 - 1 = (x-2)^x + 1$$

$$g(x) = x^x + 9x^x + 12x + 1 - 12 = (x+2)^x - 12$$

$$\frac{g(\sqrt{2}-1)}{f(\sqrt{2}+1)} = \frac{1-12}{1+1} = -11$$



$$f(x) = \sqrt{x - \varepsilon + \varepsilon \sqrt{x - \varepsilon} + \varepsilon} = \sqrt{(\sqrt{x - \varepsilon} + 1)^2} = \sqrt{x - \varepsilon} + 1 \quad \frac{1 + 0}{- \varepsilon} = \frac{-1}{\varepsilon} \quad (5) \cdot 8$$

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

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

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

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

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

$$\Rightarrow \frac{g}{f} = \left\{ \left(1, -\frac{1}{\varepsilon} \right), (3, 4) \right\}$$

(5) · 9

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

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

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

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

$$\frac{1 \cdot f}{g} = \left\{ (1, -\varepsilon), (3, -1), (-1, \frac{1}{\varepsilon}) \right\}$$

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