

$$f(x) = \left(\frac{1}{x}\right)^{x-2} - 1 \Rightarrow f(x+1) = \left(\frac{1}{x+1}\right)^{x-1} - 1$$

$y = \sqrt{x^3 f(x+1)} = ?$

$x > 0 \Rightarrow D_f = x > 0$

$D_f = x \geq 0$

$$f(x) = \sqrt{x + |x+2|}$$

$$f(-x) = \sqrt{-x + |-x+2|}$$

$D_f = -1 \leq x$

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

$f(x) \neq -1, 2, 3 \Rightarrow x-1 > 0 \Rightarrow x > 1$

$D_f = [1, 2) \cup (2, 3)$

$$y_1 = \frac{1}{9x^2 - 4x^2 - 4x - 3}$$

$$y_2 = \frac{1}{5x^2 + ax + b}$$

$D_{y_1} = D_{y_2}$

$\sqrt{-(a+b)} \Rightarrow \sqrt{-(-5)} = \sqrt{5}$

$$f(x) = x^2 + 9$$

$$f\left(\frac{x}{2}\right) = \left(\frac{x}{2}\right)^2 + \frac{9}{2}$$

$$y = \sqrt{f(x) - f\left(\frac{x}{2}\right)} = \sqrt{x^2 + x - \frac{4x}{2} - \frac{9}{2}} = \sqrt{\frac{x^2 - 4x}{2} + \frac{x^2 - 9}{2}}$$

$\frac{x^2 - 4x}{2} \geq 0 \Rightarrow x \geq 4$

$\frac{x^2 - 9}{2} \geq 0 \Rightarrow x \geq 3$

$D_f = [3, +\infty)$

$$f(x^2 + x) = 2x^2 - 1 \quad x^2 + x \geq 1, \Rightarrow x \geq 1$$

$$f(x) = f(1) = 1 \quad x^2 + x \geq 1 \Rightarrow x \geq 1$$

$$f(1) \xrightarrow{x=1} 1 - 1 = 0$$

$$f(x) \xrightarrow{x \geq 1} 0$$

$$f(x) + f(1) = 1$$

$$x^2 + 4x^2 + 4\sqrt{x+2} - 4\sqrt{x-1} = 0 \quad (x+2)^2 - 4\sqrt{x-1} \xrightarrow{\text{مشتق}} = -2$$

$$x^2 - 4x^2 + 4x + 1 - 1 = 0 \quad (x-2)^2 + 1 \xrightarrow{\text{مشتق}} = -10\sqrt{x-1} + 4\sqrt{x-1} - 10$$

$$\frac{g(x)}{f(x)} = \frac{g(\sqrt{x-1})}{g(\sqrt{x-1})} = \frac{-2}{-10\sqrt{x-1} + 4\sqrt{x-1} - 10}$$

$$f(x) = \sqrt{x+5} \sqrt{x-5} \quad g(x) = \sqrt{x-5} \sqrt{x-5}$$

$$\Rightarrow \sqrt{x+5} \sqrt{x-5} + \sqrt{x-5} \sqrt{x-5} \Rightarrow \sqrt{(x-5)(\sqrt{x-5} + 5)} + \sqrt{(x-5)(\sqrt{x-5} + 5)} + 5$$

$$\Rightarrow \sqrt{(\sqrt{x-5} + 2)^2} + (\sqrt{x-5} + 2)^2 \Rightarrow |\sqrt{x-5} + 2| + |\sqrt{x-5} + 2| + 5 \xrightarrow{x \geq 5}$$

$$2\sqrt{x-5} - 2 + 2 = \sqrt{x+5} \times a + b \Rightarrow a+b = 2 \quad \frac{a+b}{c} = -\frac{1}{c}$$

$$f(x) = \frac{x+2}{x^2-5x+3} \Rightarrow x = -2$$

$$x^2-5x+3 \quad x \geq 1, 3$$

$$g(x) = \{(2, 1), (1, 0), (3, 5), (0, 4)\} \Rightarrow Dg = \{0, 1, 2, 3\}$$

$$\text{مضروب بنابر ضرب} \quad Dg \cap Df = \frac{g}{f} \Rightarrow Dg \cap Df = \{x | f(x) \neq 0\} = \{0, 1, 2, 3\} - \{2, 1, 3\}$$

$$\Rightarrow Dg = \{0, 2\}$$

$$f(x) = \{(1, 2), (2, -1), (3, 2), (-1, 9)\} \quad g(x) = \{(-2, 3), (1, -1), (2, 2), (-1, 9)\}$$

$$\text{الف) } f(x) = \{(1, 2), (2, -1), (3, 2), (-1, 9)\}$$

$$\text{ب) } f(x) = \{(-1, 2), (1, 2), (\sqrt{3}, -1), (-\sqrt{3}, -1), (-2, 2), (2, 2)\}$$

$$\text{ج) } 2g(x) + 1 = \{(2, 19), (1, 2), (3, 9), (-1, 1)\}$$

$$\text{د) } \frac{f}{g} \Rightarrow Df - Dg = \{x | g(x) \neq 0\} = \{1, 2\}$$