

$$x^2 f(x+1) \geq 0, \quad f(x) = \left(\frac{1}{x}\right)^{x-2} \xrightarrow{f(x+1)} \left(\frac{1}{x}\right)^{x-1} \geq 0 \Rightarrow x^2 \left(\frac{1}{x}\right)^{x-1} \geq 0$$

$$\Rightarrow \left(\frac{1}{x}\right)^{x-1} \Rightarrow \mathbb{R} \text{ همیشه مثبت} \quad \wedge \quad \Rightarrow D_f = x \geq 1 = [1, +\infty)$$

$$\Rightarrow x^2 \Rightarrow \mathbb{R}^+$$

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$$f(x) = \sqrt{x+|x+1|} \quad \xrightarrow{f(-x)} \quad f(-x) = \sqrt{-x+|-x+1|} \Rightarrow -x+|-x+1| \geq 0$$

$$\Rightarrow |x+1| \geq x \Rightarrow D_f = (-\infty, 1]$$

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$$\frac{x-1}{f(x)} \geq 0 \rightarrow \begin{matrix} \text{مخرج} & \text{مخرج} \\ \text{مخرج} & \text{مخرج} \\ + & - \end{matrix}$$

$$\textcircled{1} \Rightarrow [-1, 2] \cap [0, 1] = [-1, 1]$$

$$\textcircled{2} \Rightarrow (1, 2] \cap [-1, 1] \cup [2, 3] = [2, 3]$$

$$\Rightarrow D_f = [-1, 1] \cup [2, 3]$$

۱- بازه $[-1, 1]$ را می بینیم
۲- بازه $[-1, 0]$ را می بینیم

$$f(x) \text{ در بازه } [-1, 2] \text{ است}$$

$$f(x) \text{ در بازه } [1, 2] \text{ است}$$

$$\textcircled{1} \Rightarrow [0, 1] \text{ را می بینیم}$$

$$f(x) \text{ در بازه } [-1, 2] \cup [2, 3] \text{ است}$$

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$$y = \frac{1}{ax^2 - vx^2 - bx - c} \Rightarrow ax^2 - vx^2 - bx - c \neq 0$$

$$y = \frac{1}{ax^2 + bx + c} \Rightarrow ax^2 + bx + c \neq 0$$

$$\Delta = a^2 - 4(b)(c) = a^2 - 4bc \Rightarrow x \neq \frac{-a \pm \sqrt{a^2 - 4bc}}{2}$$

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$$f(x) - f\left(\frac{1}{x}\right) \geq 0 \Rightarrow f(x) - f\left(\frac{1}{x}\right) \geq 0 \Rightarrow f(x) \geq f\left(\frac{1}{x}\right), \quad f(x) = x^2 + x$$

$$\Rightarrow D_f = [1, +\infty)$$

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

$$f(-x) < f\left(\frac{1}{x}\right), \quad f(x) > f\left(\frac{1}{x}\right) \rightarrow \text{برای } x < 1$$

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$$f(x^2+x) = x^2-1 \rightarrow f(1^2+1) = (1 \times 1) - 1 \rightarrow f(2) = 1$$

$$f(x^2+y) = (x \times y) - 1 \rightarrow f(1 \cdot) = 0$$

$$f(x) + f(1) = 1 + 0 = 1$$

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$$g(x) = x^2 + 9x^2 \sqrt{x} \Rightarrow (x+3)^2 - 9 \Rightarrow g(\sqrt{3}-3) = (\sqrt{3}-3+3)^2 - 9 = 3 - 9 = -6$$

$$f(x) = x^2 - 4x^2 + 12x \Rightarrow (x-2)^2 + 8 \Rightarrow f(\sqrt{3}, 3) = (\sqrt{3}+3+3)^2 + 8 = 3+8 = 11$$

$$\frac{g(\sqrt{3}-3)}{f(\sqrt{3}, 3)} = \frac{-6}{11} = -\frac{6}{11}$$

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$$x = a \Rightarrow f(a) = 3$$

$$x = a \Rightarrow g(a) = 1 \Rightarrow g(a) + f(a) = 4$$

$$g(x) + f(x) = a + b\sqrt{c+x}$$

$$x = 1 \Rightarrow g(1) = 3$$

$$\Rightarrow g(1) + f(1) = 4$$

$$x = 1 \Rightarrow f(1) = 1$$

$$g(x) + f(x) = a + b\sqrt{c+x}$$

$$\Rightarrow \sqrt{x-1} = a + b\sqrt{c+1} \Rightarrow b = 1, c = -1, a = 0 \Rightarrow$$

$$\frac{a+b}{c} = \frac{1+0}{-1} = -1$$

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$$f(x) = \{(1, 1), (1, 0), (2, 0), (0, 2)\} \xrightarrow{f(x) \rightarrow y} f(x) = \{(1, -1), (1, \frac{1}{2}), (2, \frac{1}{2}), (0, \frac{1}{2})\}$$

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

$$\frac{f}{f} = \{(1, -\frac{1}{2}), (0, 2)\}$$

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$$f(x) = \{(1, 2), (\frac{1}{2}, -1), (2, 1), (-\frac{1}{2}, 2)\}$$

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

$$g(x) = \{(-2, 0), (1, 1)\}$$

$$\Rightarrow \frac{f}{g} = \{(1, \frac{1}{2}), (2, -\frac{1}{2}), (-1, \frac{1}{2})\} = \{(1, -1), (2, -1)\}$$

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$$g \rightarrow g(g(x)) \Rightarrow g(g(-1))x$$

$$g(g(x))x$$

$$g(g(1)) \rightarrow g(-1) = 0 \rightarrow x \cdot 0 + 1 = 1$$

$$g(g(x)) \rightarrow g(x) = x \rightarrow x \cdot x + 1 = 1$$