

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

$$x^2 \geq 0 \rightarrow x \geq 0 \Rightarrow \frac{0}{-1+1-1} \Rightarrow D = [0, 1]$$

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

$$\begin{array}{r|l} 2 & -x-2+2 \\ \hline & = -x \leftarrow \text{عبارت منفی} \end{array}$$

$$\rightarrow -2x+2 \geq 0, -2x \geq -2 \Rightarrow x \leq 1]$$

$$\Rightarrow D_f = (-\infty, 1]$$

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

$$x-1 \leq 0 \Rightarrow x \leq 1$$

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

x	-1	1	2	3
f(x)	+	0	-	-
x-1	-	-	0	+
y	-	+	-	+

همین قبل از ۵- f(x)

تغییر شده است

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$$y_1 = \frac{1}{(9x^2 - v)x^2 - 6x - \frac{v}{9}}$$

$\underbrace{\hspace{1.5cm}}_r \quad \underbrace{\hspace{1.5cm}}_a \quad \underbrace{\hspace{1.5cm}}_b$

$$y_1 = \frac{1}{cx^2 + ax + b}$$

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

د

$$y = \sqrt{x^2 + x - \left(\frac{r}{2}\right)^2 - \frac{r}{2}} \geq 0 \rightarrow \left(x - \frac{r}{2}\right)\left(x^2 + \left(\frac{r}{2}\right)^2 + r\right) + x - \frac{r}{2} \geq 0$$

$$\star x - \frac{r}{2} \geq 0 \rightarrow \frac{-r}{2} \leq x \leq \frac{r}{2}$$

$\star \underbrace{\left(x - \frac{r}{2}\right)\left(x^2 + \left(\frac{r}{2}\right)^2 + r\right)}_{\substack{\text{مربع است} \\ x \neq 0 \text{ فقط}}}$

$$\Rightarrow D = \mathbb{R} - (-r, r)$$

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$$x^2 + x = x(x+1) \begin{cases} \rightarrow = r \rightarrow x = 1 \\ \rightarrow = 1 \rightarrow x = r \end{cases}$$

$$\Rightarrow f(r) + f(1) = r(1) - 1 + r(r) - 1 = 1 + r = 1$$

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$$g(x) = x^2 + 9x^2 + 12x + 12 - 12 = (x+3)^2 - 12$$

$$f(x) = x^2 - 4x^2 + 12x - 1 + 1 = (x-2)^2 + 1$$

$$\Rightarrow \frac{g(\sqrt{12} - 2)}{f(\sqrt{12} + 2)} = \frac{12 - 12}{12 + 1} = \frac{-12}{13} = -\frac{12}{13}$$

$$f(x) + g(x) = \sqrt{x + \epsilon\sqrt{x-c}} + \sqrt{x - \epsilon\sqrt{x-c}} = \sqrt{(x-\epsilon) + \epsilon\sqrt{x-c} + \epsilon} + \sqrt{(x-\epsilon) - \epsilon\sqrt{x-c} + \epsilon}$$

$$\Rightarrow \sqrt{(\sqrt{x-c} + \epsilon)^2} + \sqrt{(\sqrt{x-c} - \epsilon)^2} = |\sqrt{x-c} + \epsilon| + |\sqrt{x-c} - \epsilon|$$

$$\xrightarrow{x \geq \epsilon} f(x) + g(x) = 2\sqrt{x-c} = \underbrace{a+b\sqrt{x+c}}_{\substack{a=0 \\ b=2}} \rightarrow c = -\epsilon \Rightarrow \frac{a+b}{c} = \frac{2}{-\epsilon} = -\frac{2}{\epsilon}$$

$$f(x) = \frac{x+2}{(x-2)(x-1)} \rightarrow D_f \subset \mathbb{R} - \{2, 1\}$$

$$\text{نقطة: } 2, 0 \Rightarrow \frac{g(0)}{f(0)}, \frac{g(2)}{f(2)} \rightarrow \left\{ 4, -\frac{1}{2} \right\}$$

$$\text{ا) } \begin{aligned} & 2x=1 \rightarrow x=\frac{1}{2}, \quad 2x=2 \rightarrow x=1 \\ & 2x=2 \rightarrow x=1, \quad 2x=-1 \rightarrow x=-\frac{1}{2} \end{aligned} \rightarrow f(2x) = \left\{ \left(\frac{1}{2}, 2\right), \left(\frac{2}{2}, -1\right), \left(1, 2\right), \left(-\frac{1}{2}, 2\right) \right\}$$

$$\text{ب) } \begin{aligned} & x^2=1 \rightarrow x=\pm 1, \quad x^2=2 \rightarrow x=\pm\sqrt{2} \\ & x^2=2 \rightarrow x=\pm\sqrt{2}, \quad x^2=-1 \rightarrow \emptyset \end{aligned} \Rightarrow f(x^2) = \left\{ \begin{aligned} & (1, 2), (-1, 2), (\sqrt{2}, -1), (-\sqrt{2}, -1) \\ & (2, 2), (-2, 2) \end{aligned} \right\}$$

$$\text{ج) } 2g^2(x)+1 = \left\{ (-2, 19), (1, 5), (9, 9), (-1, 1) \right\}$$

$$\text{د) } \text{نقطة: } 1, 3, -1 \rightarrow \frac{2f(1)}{g(1)}, \frac{2f(3)}{g(3)}, \frac{2f(-1)}{g(-1)} = \left\{ (1, -4), (9, -1) \right\}$$

= تعريف