

$$\sqrt{x+\sqrt{x-4}+4} + \sqrt{x-\sqrt{x-4}+4} = \sqrt{(\sqrt{x-4}+2)^2} + \sqrt{(\sqrt{x-4}-2)^2} =$$

$$|\sqrt{x-4}+2| + |\sqrt{x-4}-2| = \sqrt{x-4}+2 + \sqrt{x-4}-2 = 2\sqrt{x-4}$$

$$\begin{cases} a=0 \\ b=2 \\ c=-4 \end{cases}$$

$$\frac{a+b}{c} = \frac{-1}{2}$$

$$= a+b\sqrt{x+c}$$

$$f(x) = \frac{x+2}{(x-3)(x-1)} \rightarrow D_f = \mathbb{R} - \{1, 3\} \quad D_{\frac{f}{g}} = \{0\}$$

$$f = \{(2, -4), (0, \frac{2}{3})\}$$

$$\frac{g}{f} = \{(2, \frac{-1}{4}), (0, \frac{\frac{4}{3}}{\frac{2}{3}})\}$$

$$f(2x) = \{(1, 2), (\frac{3}{2}, -1), (2, 2), (\frac{1}{2}, 4)\}$$

$$\begin{matrix} 2x=1 \\ x=\frac{1}{2} \end{matrix}$$

$$\begin{matrix} 2x=\frac{3}{2} \\ x=\frac{3}{4} \end{matrix}$$

$$\begin{matrix} 2x=2 \\ x=1 \end{matrix}$$

$$\begin{matrix} 2x=-1 \\ x=-\frac{1}{2} \end{matrix}$$

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

$$\begin{matrix} x^2=1 \\ x=\pm 1 \end{matrix}$$

$$\begin{matrix} x^2=3 \\ x=\pm\sqrt{3} \end{matrix}$$

$$\begin{matrix} x^2=4 \\ x=\pm 2 \end{matrix}$$

$$\begin{matrix} x^2=-1 \\ \text{no real solution} \end{matrix}$$

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

$$2xg^2(x) = \{(-2, 4), (1, 1), (3, 4), (-1, 1)\}$$

$$\frac{2f}{g} = \{(3, -1), (1, -4)\}$$

$$2f(x) = \{(1, 4), (3, -2), (5, 4), (-1, 2)\}$$

$$D_{\frac{2f}{g}} = \{1, 3\}$$

مخرج را صفر نکند

مؤلفه های اولی که در صورت تابع قرار می دهند

$$D_{f+g} = \{2, 3, -2\}$$

$$h(x) = \{(2, 0), (3, 0), (-2, 4)\}$$

$$\begin{matrix} 2+3 \\ 5 \end{matrix}$$

$$\begin{matrix} 3+3 \\ 6 \end{matrix}$$

$$\begin{matrix} -2+4 \\ 2 \end{matrix}$$

$$f(x) = \frac{\sqrt{3x} - x}{x-2} \quad x > 0 \quad \sqrt{3x} - x > 0 \quad x \neq 2 \quad (2)$$

$$g(x) = \{x\} + \{-x\}$$

$$\begin{aligned} x \in \mathbb{Z} &\rightarrow g(x) = 0 \\ x \notin \mathbb{Z} &\rightarrow g(x) = -1 \end{aligned}$$



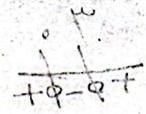
$$\sqrt{3x} \geq x$$

$$3x \geq x^2$$

$$x^2 - 3x \leq 0$$

$$x(x-3) \leq 0$$

$$0 \leq x \leq 3$$



$$\begin{aligned} g+1 &\neq 0 \\ g &\neq -1 \rightarrow x \in \mathbb{Z} \end{aligned}$$

$$D_{\frac{f}{g+1}} = \{0, 1, 3\}$$

$$f(x) = \sqrt{-x^2 + 8x - 4}$$

$$-(x^2 - 8x + 4) \geq 0$$

$$-(x-4)(x-1) \geq 0$$

$$1 \leq x \leq 4$$



(3)

$$D_{\frac{f(x)}{g(x)}} = \{1, 2, 4\}$$

$$h(x) = \{(1, 0), (2, 1), (4, 0)\}$$

$$f(x) = \{(1, 0), (2, 2), (4, 0)\}$$

$$\text{الف) } y = \frac{x^3 - 3x^2 + 3x - 1}{(x-1)^3} + 1 \rightarrow \sqrt[3]{y-1} + 1 = x \quad R_f = \mathbb{R}$$

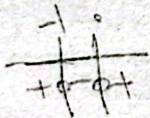
(4)

$$\text{ب) } yx^2 - 2yx - 1 = 0$$

$$x = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y}$$

$$4y(y+1) \geq 0$$

$$y \neq 0$$



$$R_g = (-\infty, -1] \cup (0, +\infty)$$

$$\text{الف) } \min \left| \frac{b}{a} \right| = \frac{5}{2} = 2.5 \quad R = [2.5, +\infty)$$

(5)

$$\text{ب) } \max \left| \frac{b}{a} \right| = \frac{-4}{-1} = 4 \quad R = (-\infty, 4]$$

$$\text{ج) } \max \left| \frac{b}{a} \right| = \frac{-6}{-2} = 3 \quad R = [3, +\infty)$$

$$\text{د) } \min \left| \frac{b}{a} \right| = \frac{4}{1} = 4 \quad R = [4, +\infty)$$

$$R = [0, 4]$$

$$\underbrace{\mathbb{R} \text{ الف } \quad \mathbb{R} \text{ ب }}_{\text{طبقه}}$$

$$\text{ج) } R = [0 + \infty)$$

$$\text{د) } R = [0 + \infty)$$

④

چون عبارت به توان x میوه
مقدار منفی دارد

$$\text{الف) } R = \mathbb{R} - \{3\}$$

$$\text{ب) } R = \mathbb{R} - \{2\}$$

⑤

$$x = + \frac{+2y+1}{y-3}$$

$$x = - \frac{y-1}{y-2}$$