

Subject:

مدرسه

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$$f(x) = \sqrt{x+1} \sqrt{x-1} \rightarrow t = \sqrt{x-1} \rightarrow x = t^2 + 1$$

$$g(x) = \sqrt{x-1} \sqrt{x-1} \rightarrow \sqrt{t^2 \cdot t^2 + 1} \rightarrow \sqrt{(t^2)^2 + 1} \rightarrow t^2 + 1$$

$$f(x) = \sqrt{t^2 + 1} \sqrt{t^2 + 1} = t^2 + 1$$

$$f(x), g(x) \leq t^2 + 1 \leq t^2 + 1 \leq t^2 + 1 \rightarrow \sqrt{x-1} = a + b \sqrt{x-1} \rightarrow a = 1, b = 1, a = 0$$

$$\frac{a+b}{c} = \frac{0+1}{-1} = \left(-\frac{1}{1}\right) \checkmark$$

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

$$f(x) = \left[\left(\frac{1}{2}, -\frac{1}{2} \right) \left(0, \frac{1}{2} \right) \right]$$

$$\frac{g}{f} = \left[\left(\frac{1}{2}, -\frac{1}{2} \right) \left(0, \frac{1}{2} \right) \right] \checkmark$$

$$f(x), g(x) = \left[\left(\frac{1}{2}, \frac{1}{2} \right) \left(\frac{1}{2}, -\frac{1}{2} \right) \left(\frac{1}{2}, \frac{1}{2} \right) \left(-\frac{1}{2}, \frac{1}{2} \right) \right]$$

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$$f(x) = \left[\left(\frac{1}{2}, \frac{1}{2} \right) \left(\frac{1}{2}, -\frac{1}{2} \right) \left(\frac{1}{2}, \frac{1}{2} \right) \right]$$

$$g(x) = \left[\left(-\frac{1}{2}, \frac{1}{2} \right) \left(\frac{1}{2}, \frac{1}{2} \right) \left(\frac{1}{2}, \frac{1}{2} \right) \left(-\frac{1}{2}, \frac{1}{2} \right) \right]$$

$$2) \frac{f}{g} = \left[\left(\frac{1}{2}, -\frac{1}{2} \right) \left(\frac{1}{2}, -\frac{1}{2} \right) \right]$$

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$$f(x) = \left[\left(\frac{1}{2}, \frac{1}{2} \right) \left(\frac{1}{2}, \frac{1}{2} \right) \left(\frac{1}{2}, \frac{1}{2} \right) \left(-\frac{1}{2}, \frac{1}{2} \right) \right]$$

$$h(x) = f(x) = \left[\left(\frac{1}{2}, \frac{1}{2} \right) \left(\frac{1}{2}, \frac{1}{2} \right) \left(-\frac{1}{2}, \frac{1}{2} \right) \right]$$

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$$f(x) = \frac{\sqrt{x^2-1}}{x-1} \Rightarrow x-1 \neq 0 \rightarrow x \neq 1, \sqrt{x^2-1} \geq 0 \rightarrow x \geq 1$$

$$\sqrt{x^2-1} \geq 0 \rightarrow \sqrt{x^2-1} \geq x \rightarrow x^2-1 \geq x^2 \rightarrow x(x-1) \leq 0$$

$$D_f = [0, 1] \cup [1, \infty) = [0, \infty)$$

$$\left(\frac{f}{g+1} \right)(x) \rightarrow D_f = [0, 1, \infty) \checkmark$$

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

Arman

$$f(x) = \sqrt{-2x^2 + 4x - 5} \rightarrow x^2 - 2x + \frac{5}{2} \rightarrow (x-1)(x-5) \leq 0$$

$$h(x) = \frac{f(x)}{g(x)} = \left\{ (1, 0), \left(2, \frac{\sqrt{2}}{2}\right), (5, 0) \right\} \checkmark$$

$$\frac{1}{x-1} - \frac{1}{x-5} \quad D_f = [1, 5]$$

$$\text{الف) } y = x^2 - 2x^2 + 2x \rightarrow (x-1)^2 + 1 \leq y \rightarrow y-1 \leq (x-1)^2$$

$$\rightarrow \sqrt{y-1} + 1 \leq x \rightarrow R \leq \mathbb{R} \checkmark$$

$$\text{ب) } y = \frac{1}{x^2 - 2x} \rightarrow yx^2 - 2yx - 1 = 0 \rightarrow x = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y}$$

$$2y \neq 0 \rightarrow y \neq 0$$

$$4y^2 + 4y \geq 0 \rightarrow y(4y+4) \geq 0 \rightarrow \frac{-1}{4} \leq y \leq 0 \rightarrow R = (-\frac{1}{4}, 0] \cup (0, +\infty) \checkmark$$

ممنوع صفر

$$\text{الف) } y = x^2 - 2x + 1 \rightarrow \min \left| \frac{-b}{2a} = \frac{1}{1} = 1 \right| \quad R = [1, +\infty) \checkmark$$

$$\text{ب) } y = -x^2 + 2x + 1 \rightarrow \max \left| \frac{-b}{2a} = \frac{1}{-1} = -1 \right| \quad R = (-\infty, 1] \checkmark$$

$$\text{ج) } y = \sqrt{x^2 - 4x + 4} \rightarrow \min \left| \frac{-b}{2a} = \frac{2}{1} = 2 \right| \quad R = [2, +\infty) \rightarrow [0, +\infty) \checkmark$$

$$\text{د) } y = \sqrt{4x - x^2} \rightarrow \max \left| \frac{-b}{2a} = \frac{2}{-1} = -2 \right| \quad R = [-2, 2] \rightarrow [0, 2] \checkmark$$

$$\text{الف) } y = x^2 - 2x^2 + 2x + 1 \rightarrow R \leq \mathbb{R} \checkmark$$

$$\text{ب) } y = x^2 - 2x^2 + 2x + 2 \rightarrow R \leq \mathbb{R} \checkmark$$

$$\text{ج) } y = \sqrt{x^2 - 2x^2 + 2x + 1} \rightarrow R = \mathbb{R} \rightarrow [0, +\infty) \checkmark$$

$$\text{د) } y = (x^2 - 2x^2 + 2x + 1)^2 \rightarrow R \leq \mathbb{R}^+ \rightarrow \mathbb{R} \checkmark$$

$$\text{الف) } y = \frac{x+1}{x-2} \rightarrow R \leq \mathbb{R} - \{2\} \checkmark$$

$$\text{ب) } y = \frac{x+1}{x+1} \rightarrow R \leq \mathbb{R} - \{-1\} \checkmark$$