

$$y = \sqrt{x^5 f(x+1)} \rightarrow x^5 f(x+1) \geq 0$$

$$\begin{cases} x \rightarrow 0 \\ f(x+1) = \left(\frac{1}{x}\right)^{x-1} - 1 \end{cases} \Rightarrow \frac{0}{-\frac{1}{0} + \frac{1}{0} - 1} \quad D_f = [0, 1] \quad \checkmark$$

$\left(\frac{1}{x}\right)^{x-1} \leq 1$
 $x \leq 1$

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

$$\begin{cases} x \geq 2 \rightarrow x - x - 2 = -2x \\ x < 2 \rightarrow -x - x + 2 = 2 - 2x \\ \Rightarrow 2 - 2x \geq 0 \\ x \leq 1 \end{cases} \Rightarrow D_f = (-\infty, 1] \quad \checkmark$$

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

$$D_f = (-\infty, 1] \cup (2, \infty) \quad \checkmark$$

$$y = \frac{1}{\sqrt{x^5 - \sqrt{x^5 - 2x - 5}}} = \frac{1}{-(x^5 + 2x + 5) + \sqrt{x^5 - 2x - 5}} = \frac{1}{(x^5 - 1)^2 - (x + 2)^2}$$

$$\Rightarrow (x^5 - 1)^2 - (x + 2)^2 \geq 0 \Rightarrow |x^5 - 1| \geq |x + 2| \quad \begin{cases} \frac{x^5 - 1}{x + 2} \geq 0 \\ \frac{x^5 - 1}{x + 2} \leq 0 \end{cases}$$

$$\rightarrow x = \frac{1 \pm \sqrt{4x^5 + 1}}{4} = \frac{-2 \pm \sqrt{4x^5 - 12x}}{4} \quad \begin{matrix} a = -1 \\ b = -5 \end{matrix} \Rightarrow \sqrt{-(-1-5)} = \sqrt{6} \quad \checkmark$$

باید روی ۲ را برابر با ۱ قرار دهیم تا ۱ را بدست آوریم

$$y = \sqrt{f(x) - f\left(\frac{x}{2}\right)} \xrightarrow{x \neq 0} x^5 + x - \frac{4x}{x^2} - \frac{2}{x} \geq 0 \Rightarrow (x - \frac{2}{x})(x^5 + x + \frac{14}{x^2}) + (x - \frac{2}{x}) \geq 0$$

فصل و فصلون

$$\Rightarrow (x - \frac{2}{x})(x^5 + x + 1 + \frac{14}{x^2}) \geq 0 \Rightarrow x - \frac{2}{x} \geq 0 \Rightarrow \frac{x^2 - 2}{x} \geq 0$$

ناقصه

$$\frac{(x-2)(x+2)}{x} \geq 0 \Rightarrow \frac{-2}{-1+0-1+0}$$

$$D_f = [-2, 0) \cup (2, +\infty) \quad \checkmark$$

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

$$f(\sqrt{x}+1) + f(\sqrt{x}+x) = (x-1) + (x-1) = \boxed{1} \checkmark$$

$$f(x) = x^5 - 4x^2 + 1 \Rightarrow (x-1)^5 + 1 \Rightarrow f(\sqrt{x}+1) = 10$$

$$g(x) = x^5 + 4x^2 + 1 \Rightarrow (x+1)^5 - 1 \Rightarrow g(\sqrt{x}-1) = -10$$

$$\Rightarrow \frac{-10}{10} = \boxed{-1} \checkmark$$

$$f(x) = \sqrt{(\sqrt{x-2}+1)^2} \Rightarrow |\sqrt{x-2}+1| \xrightarrow{x \geq 2} \sqrt{x-2}+1$$

$$g(x) = \sqrt{(\sqrt{x-2}-1)^2} \Rightarrow |\sqrt{x-2}-1|$$

$$\begin{cases} \sqrt{x-2}-1 > 0 \rightarrow \sqrt{x-2}+1 + \sqrt{x-2}-1 < \sqrt{x-2} \Rightarrow 1 + \sqrt{x-2} \rightarrow a=b=1 \\ \sqrt{x-2}-1 < 0 \rightarrow \sqrt{x-2}+1 + 1 - \sqrt{x-2} = 2 \end{cases}$$

$\Rightarrow \frac{1+1}{-1} = -\frac{1}{1} \checkmark$
 شش نفر!

$$\Rightarrow f(x) = \frac{x+1}{(x-1)(x-1)} \sim D_f: \mathbb{R} - \{1, 1\}$$

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

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

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

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

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

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

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