

$$y = \sqrt{x^p \left(\frac{1}{p}\right)^{p-1} - 1} \Rightarrow x^p \left(\frac{1}{p}\right)^{p-1} - 1 \geq 0 \quad \frac{x}{p} \mid -1 + \frac{1}{p} \quad D_f = [0, 1]$$

$$f(-x) = \sqrt{-x + |p-x|} \quad \begin{array}{c|c} & p \\ \hline -x+p-x & -x-p+x \\ \downarrow & \downarrow \\ -x+p & -p \\ \downarrow & \downarrow \\ (-\infty, +1] & \end{array} \quad D_f = (-\infty, 1]$$

$$\frac{x-1}{f(x)} \geq 0 \quad \frac{x}{p} \mid -\frac{1}{p} + \frac{1}{p} - \frac{p}{p} + \frac{p}{p} \quad D_f = (-1, 1) \cup (p, p)$$

$$y_1 = \frac{1}{9x^p - 14x^p - 4x - p} \rightarrow (9x^p - 14x^p + 1) - (x^p + 4x + 4) = 0 \rightarrow (p x^p - 1)^p - (x+p)^p = 0$$

$$(p x^p - 1 - x - p)(p x^p - 1 + x + p) = 0 \rightarrow \underbrace{(p x^p - x - p)}_{\text{دارای ریشه است}} \underbrace{(p x^p + x + 1)}_{\Delta < 0} = 0 \Rightarrow p x^p - x - p = p x^p + a x + b$$

$$\Rightarrow \begin{matrix} a = -1 \\ b = -p \end{matrix} \rightarrow \sqrt{-(-1)} = \boxed{1}$$

$$x^p + x - \frac{4p}{x^p} - \frac{p}{x} \geq 0 \rightarrow x^p - \frac{4p}{x^p} + x - \frac{p}{x} \geq 0 \rightarrow \left(x - \frac{p}{x}\right) \left(x^p + \frac{14}{x^p} + p + 1\right) \geq 0$$

$$\rightarrow \left(x - \frac{p}{x}\right) \left(x^p + \frac{14}{x^p} + p + 1\right) \geq 0 \quad \begin{array}{c|c} & -p & p \\ \hline + & - & + \end{array} \quad D_f = (-\infty, -p] \cup [p, +\infty)$$

$$f(p) = f((1)^p + 1) = p - 1 = 1$$

$$f(10) = f((1)^p + 1) = 1 - 1 = 0 \rightarrow f(p) + f(10) = 1$$

$$g(x) = (x+3)^3 - 2V \neq (x-2)^3 + 1 \rightarrow \frac{g(\sqrt[3]{V}-2)}{f(\sqrt[3]{V}+2)} = \frac{(\sqrt[3]{V}+3-2)^3 - 2V}{(\sqrt[3]{V}+2-2)^3 + 1} = \frac{V-2V}{2+1} = \frac{-V}{3} = \frac{-10}{3} = \boxed{-\frac{10}{3}}$$

$$\sqrt{x-4}\sqrt{x-4} + 4-4 = \sqrt{(x-4-2)^2} = |\sqrt{x-4} - 2| \quad \left| \sqrt{x-4} - 2 \right| + \left| \sqrt{x-4} + 2 \right| = 4 \quad (1)$$

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

$$4 < x < 12 \rightarrow -\sqrt{x-4} + 2 + \sqrt{x-4} + 2 = \frac{4}{a} + \frac{0}{b} \sqrt{\frac{x-4}{c}} \quad \frac{a+b}{c} = \frac{4}{-4} = \boxed{-1}$$

$$x > 12 \rightarrow \sqrt{x-4} - 2 + \sqrt{x-4} + 2 = \frac{0}{a} + \frac{2}{b} \sqrt{\frac{x-4}{c}} \quad \frac{a+b}{c} = \frac{2}{-4} = \boxed{-\frac{1}{2}}$$

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$$f(x) = \frac{x+2}{(x-3)(x-1)} \Rightarrow \left\{ \left(2, -\frac{1}{4} \right), (0, 4) \right\}$$

$$\text{الف) } \left\{ \left(\frac{1}{4}, 2 \right), \left(\frac{3}{4}, -1 \right), (2, 2), \left(-\frac{1}{4}, 4 \right) \right\}$$

$$\text{ب) } \left\{ (-1, 2), (1, 2), (\sqrt{3}, -1), (-\sqrt{3}, -1), (-2, 2), (2, 2) \right\}$$

$$\text{ج) } \left\{ (-4, 1), (1, 3), (3, 9), (-1, 1) \right\}$$

$$\text{د) } \left\{ (3, -1), (1, -4) \right\}$$

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