

$$y = \sqrt{x^r f(x+1)} = \sqrt{x^r \left(\left(\frac{1}{x}\right)^{x-1} - 1\right)} \geq 0$$

$$D_f = [0, 1]$$

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$$f(x) = \sqrt{x+|x+2|} \rightarrow \text{if } x = -x \rightarrow f(-x) = \sqrt{-x+|-x+2|}$$

$$\begin{array}{c} \frac{2}{x+2} \quad -2 \\ \downarrow \\ \frac{1}{+} \quad - \end{array}$$

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

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

$$\begin{array}{c} -4 \quad 1 \quad 2 \quad 3 \\ - \quad + \quad - \quad + \quad - \\ 0 \quad 0 \quad 0 \quad 0 \end{array}$$

$$D_f = (-4, 1] \cup (2, 3)$$

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$$y = \frac{1}{9x^6 - \sqrt{x^6 - 4x - 3}}$$

$$\rightarrow (3x^3 - 1)^2 - (x+2)^2 = (3x^3 - 1 - x - 2)(3x^3 - 1 + x + 2)$$

$$\downarrow \quad \rightarrow \text{ریشه ندارد}$$

$$3x^3 + ax + b = 3x^3 - x - 3$$

$$\left. \begin{array}{l} a = -1 \\ b = -3 \end{array} \right\} \sqrt{a^2 - 4b} = \sqrt{4} = 2$$

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$$f(x) - f\left(\frac{1}{x}\right) = x^r + x - \frac{4x}{x^r} + \frac{1}{x} = \frac{x^4 + x^6 - 4x^2 - 4x}{x^r} = \frac{x^4 + x^6 - 4x^2 - 4x}{x^r}$$

$$(x-4)(x^2 + 5x + 14)$$

$$\downarrow \quad \rightarrow \text{ریشه ندارد}$$

$$\begin{array}{c} -2 \quad 0 \quad 2 \\ - \quad + \quad - \quad + \\ 0 \quad 0 \quad 0 \end{array}$$

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

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$x'' + x = 1 \rightarrow x = 1$ $x'' + x = 10 \rightarrow x = 10$ $f(1) + f(10) = 1 + 10 = \boxed{11}$	6
$f(x) = x'' - 9x' + 12x = (x-1)'' + 1$ $g(x) = x'' + 9x' + 12x = (x+1)'' - 1$ $\frac{g(\sqrt{10}-1)}{f(\sqrt{10}+1)} = \frac{(\sqrt{10}-1)'' + 1}{(\sqrt{10}+1)'' - 1} = \frac{-10}{10} = \boxed{-1}$	7
$\sqrt{x+f}\sqrt{x-f} + \sqrt{x-f}\sqrt{x-f} = \sqrt{(\sqrt{x-f}+1)^2} + \sqrt{(\sqrt{x-f}-1)^2} = 1\sqrt{x-f}$ $a+b\sqrt{x+c} = 1\sqrt{x-f}$ $\left. \begin{matrix} a=0 \\ b=1 \\ c=-f \end{matrix} \right\} \frac{a+b}{c} = \boxed{-\frac{1}{1}}$	8
$f(x) = \{(1, -1), (0, \frac{1}{10})\}$ $\frac{g}{f} = \{(1, -\frac{1}{f}), (0, 10)\}$	9
$f(12) = \{(\frac{1}{12}, 12)(\frac{12}{1}, -1)(12, 1)(-\frac{1}{12}, 12)\}$ $f(x^2) = \{(\pm 1, 2)(\pm \sqrt{13}, -1)(\pm 12, 2)\}$ $12g'(x)+1 = \{(-2, 12)(1, 2)(12, 1)(-1, 1)\}$ $\frac{12}{g} = \{(1, -1)(12, -1)\}$	10