... سادات آل داود .

①

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

$|2-x| \geq x \longrightarrow \begin{cases} 2-x \geq x \to x \leq 1 \\ 2-x \leq -x \quad غ \end{cases}$

③
$\dfrac{x-1}{f(x)} \geq 0$

$f(x)$ ریشه $\rightarrow 3, 2, 4$

	1		2		3		4	
+	0	−	∄	+	∄	−	∄	+

$(-\infty, 1] \cup (2,3) \cup (4, +\infty)$

④
$9x^4 - 7x^2 - 4x - 3 = 3x^2 + ax + b$

$x^2(9x^2-7) - 4x - 3 = 3x^2 + ax + b$

$\sqrt{-(-4-3)} = \sqrt{7}$

⑤
$x^3 + x - \left(\frac{4}{x}\right)^3 - \frac{4}{x} = \left(x - \frac{4}{x}\right) - \left(x - \frac{4}{x}\right)\left(\left(x - \frac{4}{x}\right)^2 + 4\right)$

فاکتورگیری $\longrightarrow \left(x - \frac{4}{x}\right)\underbrace{\left(x^2 + \frac{16}{x^2} - 4 + 4 - 4\right)}_{\left(x - \frac{4}{x}\right)^2 + 4}$

$\left(x - \frac{4}{x}\right)^3$

$D = \mathbb{R}$

$\left(x - \frac{4}{x}\right)\left(x - \frac{4}{x}\right)^2 + 4 \geq 0$

$\left(x - \frac{4}{x}\right)^2 + 4 \geq 0$ $\quad \left(x - \frac{4}{x}\right)^2 \geq -4$

$\xrightarrow{x=1} f(2) = 2-1 = 1$ (۶)

$1 + 7 = 8$

$\xrightarrow{x=3} f(10) = 7$

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(۷)

$(\sqrt[3]{7}-3)^3 + 9(\sqrt[3]{7}-3)^2 + 27(\sqrt[3]{7}-3) =$

$7 - 27 - \cancel{9\sqrt[3]{7^2}} + \cancel{27\sqrt[3]{7}} + \cancel{27\sqrt[3]{7}} - \cancel{81} + \cancel{9\sqrt[3]{7^2}} + \cancel{81} - \cancel{54\sqrt[3]{7}} = -20$

$(\sqrt[3]{2}+2)^3 - 6(\sqrt[3]{2}+2)^2 + 12(\sqrt[3]{2}+2) =$

$2 + 8 + \cancel{6\sqrt[3]{4}} + \cancel{12\sqrt[3]{2}} - \cancel{6\sqrt[3]{4}} - \cancel{24} - \cancel{24\sqrt[3]{2}} + \cancel{12\sqrt[3]{2}} + \cancel{24} = 10$ $\boxed{\frac{-20}{10} = -2}$

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(۸)

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

$4x\sqrt{x-4} \Rightarrow \sqrt{4x\sqrt{x-4}} \longrightarrow$

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(۹)

$\frac{g}{f} = (0,6)(2,-\frac{1}{4})$ $\quad D_f = \mathbb{R} - \{1,3\}$

$f(x) = (2,-4)(0,\frac{1}{4})$ $\quad x^2 - 4x + 3 = 0$

$(x-1)(x-3) = 0 \quad x = 1,3$

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(۱۰)

$f(2x) = \{(2,2)(6,-1)(8,2)(-2,6)\}$

$f(x^2) = \{(1,2)(9,-1)(16,2)(1,6)\} \longrightarrow$ تابع نیست

$2g^2(x)+1 = \{(-2,19)(1,3)(3,9)(-1,1)\}$

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