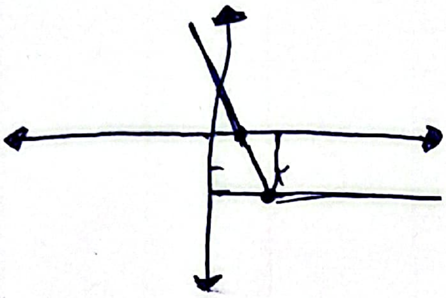
کیان جعفری

① $\sqrt{x^3\left(\left(\frac{1}{2}\right)^{x-1}-1\right)}$

Sign chart: 0, 1: $-\ \ +\ \ -$

$D_f=[0,1]$

② $\sqrt{-x+|2-x|}$



$\Rightarrow D_f=\mathbb{R}$

③ $\sqrt{\frac{x-1}{(x+4)(x-2)(x-3)}}$

Sign chart: -5, -4, 1, 2, 3: $+\ \ -\ \ +\ \ -\ \ +$

$D_f=[-5,-4)\cup[1,2),(3,+\infty)$

④ $9x^4-7x^2-4x-2=0 \Rightarrow x=\frac{1-\sqrt{37}}{6}\ ,\ \frac{\sqrt{37}+1}{6}$

$x^2+\frac{2x}{6}-1 \Rightarrow 3x^2+\frac{2x}{3}-3$

$\Rightarrow \sqrt{-\left(\frac{2}{3}-3\right)}=\sqrt{\frac{-(2-9)}{3}}$

$\boxed{\sqrt{\frac{7}{3}}}$

⑤ $\sqrt{x^3+x-\frac{64}{x^3}-\frac{4}{x}}=\sqrt{\left(x^3-\frac{64}{x}\right)+\left(x-\frac{4}{x}\right)}$

$\Rightarrow \sqrt{\left(x-\frac{4}{x}\right)\left(x^2+\frac{16}{x}+4\right)+\left(x-\frac{4}{x}\right)}=\sqrt{\left(x-\frac{4}{x}\right)\left(x^2+\frac{16}{x}+4+1\right)}$

ریشه ندارد

$\Rightarrow \frac{x^2-4}{x}=0 \Rightarrow x=\pm 2$

$x\neq 0$

Sign chart: -2, 0, 2: $-\ \ +\ \ -\ \ +$

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

⑥ $x^3+x=10 \Rightarrow x=②\ ,\ x^3+x=2 \Rightarrow x=1$

$7+1=⑧$

(٦) $x^3 - 6x^2 + 12x + 8 + 1 = (x-2)^3 + 8 \Rightarrow 2 + 8 = 10$

$x^3 + 9x^2 + 27x + 27 - 27 = (x+3)^3 - 27 \Rightarrow 27 - 27 = -20$

$\Rightarrow$ [redacted] $\frac{-20}{10} = -2$ (د)

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

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

$\Rightarrow a = 0, \quad b = 2, \quad c = -4 \Rightarrow \frac{2}{-4} = \frac{-1}{2}$

(٩) $\frac{g}{f} = \{(2,-1), (1, \frac{0}{0}), (3, \frac{0}{0}), (5, \frac{12}{4} = 3)\}$

(١٠) $f(x) = \{(1,2), (3,-1), (4,2), (-1,4)\}$

$g(x) = \{(-2,3), (1,-1), (3,2), (-1,0)\}$

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

ب) $f(x^2) = \{(1,2), (9,-1), (4,2), (1,4)\}$

ج) $2g^2(x) + 1 = \{(1,19), (0,33), (3,9), (-1,1)\}$

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