* نام و نام خانوادگی: نرگس [illegible]

Subject:
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① $y=\sqrt{x^3 f(x+1)}$; $x=0$, $x=1$; $f(x)=(\frac{1}{2})^{x-2}-1$

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

$(\frac{1}{2})^{x-1}=(\frac{1}{2})^0 \Rightarrow x-1=0 \Rightarrow x=1 \Rightarrow$

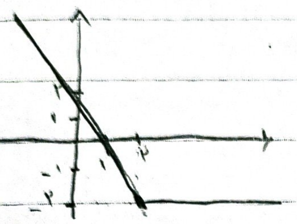
	0		1	
−	0	+	0	−

$\Rightarrow D_y=[0,1]$

② $f(x)=\sqrt{x+|x+2|}$

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

$$\begin{cases} -2 & x\geq 2 \\ -2x+2 & x<2 \end{cases}$$



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

③ $y=\sqrt{\dfrac{x-1}{f(x)}}$

$x-1=0 \Rightarrow x=1$, $f(x)=0 \Rightarrow$

$x=3, x=2, x=-4 \longrightarrow$

	−4		1		2		3	
−		+	0	−		+		−

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

④ $9x^4-7x^2-4x-3\neq 0 \Rightarrow (9x^4-6x^2+1)-x^2-4x-4\neq 0 \Rightarrow$

$(3x^2-1)^2-(x+2)^2\neq 0 \Rightarrow 3x^2-1\neq x+2 \Rightarrow 3x^2-x-3\neq 0$

$, 3x^2+ax+b\neq 0 \Rightarrow a=-1 , b=-3 \Rightarrow \sqrt{-(-4)}=\sqrt{4}=2$

⑤ $y=\sqrt{f(x)-f(\frac{4}{x})} \Rightarrow x^3+x-((\frac{4}{x})^3+\frac{4}{x})\geq 0 \Rightarrow x^3+x\geq (\frac{4}{x})^3+\frac{4}{x}$

$\Rightarrow x^3-(\frac{4}{x})^3\geq \frac{4}{x}-x \Rightarrow (x-\frac{4}{x})(x^2+\frac{16}{x^2}+4)+x-\frac{4}{x}\geq 0$

$x-\frac{4}{x}(x^2+\frac{16}{x^2}+4+1)\geq 0 \Rightarrow (x-\frac{4}{x})(z^{-1}+16z+5)\geq 0$

$\frac{1}{x^2}=z$; $\dfrac{16z^2+1+5z}{z}$ همواره + , $z\neq 0$

$\Rightarrow \frac{1}{x^2}\neq 0 \Rightarrow x^2\neq 0$, $x-\frac{4}{x}\neq 0 \Rightarrow x\neq \pm 2 \Rightarrow$

	−2		0		2	
−	0	+		−	0	+

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

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$x^3+x=2 \Rightarrow x=1 \;,\; x^3+x=10 \Rightarrow x=2$ (9)

$\xrightarrow{x=1} 2x^2-1=1 \;,\; \xrightarrow{x=2} 2x^2-1=7 \Rightarrow f(2)+f(10)=1+7=\underline{8}$

$g(\sqrt[3]{7}-3)=(7-27-\cancel{9\sqrt[3]{49}}+\underbrace{27\sqrt[3]{7}})+9(\cancel{\sqrt[3]{49}}-\underbrace{6\sqrt[3]{7}}_{-54\sqrt[3]{7}}+9)$ (11)

$+\underbrace{27(\sqrt[3]{7}-3)}_{+54\sqrt[3]{7}}$

$\Rightarrow g(\sqrt[3]{7}-3)=7-27=-20$

$f(\sqrt[3]{4}+2)=(2+8+\cancel{6\sqrt[3]{16}}+12\sqrt[3]{4})-6(\cancel{\sqrt[3]{16}}+\underbrace{4\sqrt[3]{4}}_{-24\sqrt[3]{4}}+4)$

$+\underbrace{12(\sqrt[3]{4}+2)}_{24\sqrt[3]{4}}$

$\Rightarrow 2+8-24+24=10$

$\Rightarrow \dfrac{g(\sqrt[3]{7}-3)}{f(\sqrt[3]{4}+2)}=\dfrac{-20}{10}=-2$

$f(x)=\sqrt{\underbrace{(x-4)+4}_{\text{اضافه و کم ۴}}+4\sqrt{x-4}} \Rightarrow f(x)=\sqrt{(\sqrt{x-4}+2)^2} \Rightarrow f(x)=|\sqrt{x-4}+2|$ (8)

$g(x)=\sqrt{(\sqrt{x-4}-2)^2} \Rightarrow g(x)=|\sqrt{x-4}-2| \quad \xrightarrow{4\leq x<8}$

$g(x)+f(x)=\sqrt{x-4}+2+2-\sqrt{x-4}=4 \;,\; \xrightarrow{x\geq 8} \sqrt{x-4}+2+\sqrt{x-4}-2=2\sqrt{x-4}=\underbrace{a}_{\text{صفر}}+\underbrace{b}_{\text{۲ است}}\sqrt{x+\underbrace{c}_{\text{۴- است}}}$

$\Rightarrow \dfrac{a+b}{c}=\dfrac{2}{-4}=-\dfrac{1}{2}$

$g(x)=\{(2,1),(1,0),(3,5),(0,4)\}$ (9)

$x=2 \rightarrow f(2)=\dfrac{4}{4-8+3}=-4 \;,\; x=1 \rightarrow f(1)=\dfrac{3}{1-4+3}=$ ت.ن

$x=3 \rightarrow f(3)=\dfrac{5}{9-12+3}=$ ت.ن $\;,\; x=0 \Rightarrow f(0)=\dfrac{3}{3}$

$\dfrac{g}{f}=\{(2,-\frac{1}{4}),(0,4)\}$

$f(2x)=\{(\frac{1}{2},2),(\frac{3}{2},-1),(2,2),(-\frac{1}{2},4)\}$ (10)

$f(x^2)=\{(1,2),(\sqrt{3},-1),(2,2)\}$

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

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