نام و نام خانوادگی ....[illegible]....   پاسخنامه تشریحی تکلیف شماره ..۵.. کلاس ..یازدهم [illegible]..

۱

$f(x)=(\frac{1}{2})^{x-2}-1 \to f(x+1)=(\frac{1}{2})^{x+1-2}-1=(\frac{1}{2})^{x-1}-1$

$y=\sqrt{x^3\times f(x+1)}=\sqrt{x^3((\frac{1}{2})^{x-1}-1)} \to x^3((\frac{1}{2})^{x-1}-1)\geq 0$

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

	0		1	
$-$		$+$		$-$

$\to \boxed{D_f=[0,1]}$

۲

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

$\to 2-x\geq x \to 1\geq x$

$\to 2-x\leq -x \to 2\leq 0 \to$ غیرممکن

$\Rightarrow \boxed{D_f=(-\infty,1]}$

۳

$y=\sqrt{\frac{x-1}{f(x)}} \to \frac{x-1}{f(x)}\geq 0$; $x=1$; $x=-4,2,3$

	-4		1		2		3	
$-$		$+$		$-$		$+$		$-$

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

۴

$y=\frac{1}{9x^4-7x^2-4x-3} \to 9x^4-7x^2-4x-3\neq 0 \to 9x^4-6x^2-x^2-4x-4+1\neq 0$

مخرج در دامنه نباید صفر شود.

$\underbrace{(9x^4-6x^2+1)}_{(3x^2-1)^2}\underbrace{-x^2-4x-4}_{-(x+2)^2}\neq 0$

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

$3x^2-x=3 \to 3x^2-x-3=0$

ریشه دو معادله با هم برابر است.

$3x^2-x-3=3x^2+ax+b \Rightarrow a=-1, b=-3$

$\sqrt{-(a+b)}=\sqrt{-(-1-3)}=2$

۵

$y=\sqrt{f(x)-f(\frac{4}{x})}=\sqrt{x^3+x-\frac{64}{x^3}-\frac{4}{x}} \to x^3+x-\frac{64}{x^3}-\frac{4}{x}\geq 0 \Rightarrow \frac{x^6+x^4-4x^2-64}{x^3}\geq 0$

$x^6+x^4-4x^2-64 \xrightarrow{x^2=t} t^3+t^2-4t-64=t^3-64+t^2-4t=(t-4)(t^2+4t+16)+t(t-4)$

$\to (t-4)(t^2+4t+16+t)=(t-4)(t^2+5t+16)$

$t=4\Rightarrow x^2=4$; $x=\pm 2$; $\Delta=25-64<0$

	-2		0		2	
$-$		$+$		$-$		$+$

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

۶

$f(x^3+x)=2x^2-1$

$f(2)=f(x^3+x)\to x=1 \rightsquigarrow 2(1)^2-1=1$

$f(10)=f(x^3+x)\to x=2 \rightsquigarrow 2(2)^2-1=7$

$\Big\}\ f(2)+f(10)=1+7=8$

۷

$f(x)=x^3-6x^2+12x-8+8=(x-2)^3+8$

$g(x)=x^3+9x^2+27x+27-27=(x+3)^3-27$

$$\frac{g(\sqrt[3]{7}-3)}{f(\sqrt[3]{2}+2)}=\frac{(\sqrt[3]{7}\cancel{-3+3})^3-27}{(\sqrt[3]{2}\cancel{+2-2})^3+8}=\frac{7-27}{2+8}=\frac{-20}{10}=-2$$

۸

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

$g(x)=\sqrt{(x-4)-4\sqrt{x-4}+4}\to g(x)=|\sqrt{x-4}-2|$

$f(x)+g(x)=a+b\sqrt{x+c}\to$

$\xrightarrow{4\le x<8}\ \sqrt{x-4}+2-\sqrt{x-4}+2=4$

$\xrightarrow{x\geq 8}\ \sqrt{x-4}+2+\sqrt{x-4}-2=2\sqrt{x-4} \to 2\sqrt{x-4}=a+b\sqrt{x+c}\Rightarrow a=0,\ b=2,\ c=-4$

$\to \dfrac{a+b}{c}=\boxed{-\dfrac{1}{2}}$

۹

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

$f(x)=\dfrac{x+2}{x^2-4x+3}\to f(2)=\dfrac{2+2}{2^2-8+3}=\dfrac{4}{-1}=-4 \qquad f(1)=\dfrac{1+2}{1-4+3}=\dfrac{3}{0}$ ن.ت

$f(3)=\dfrac{3+2}{9-12+3}=\dfrac{5}{0}$ ن.ت $\qquad f(0)=\dfrac{0+2}{0-0+3}=\dfrac{2}{3}$

$$\frac{g}{f}=\{(2,-\tfrac{1}{4}),\cancel{(1,\tfrac{0}{3/0})},\cancel{(3,\tfrac{5}{5/0})},(0,\tfrac{4}{2/3})\}=\boxed{\{(2,-\tfrac{1}{4}),(0,6)\}}$$

۱۰

الف) $f(2x)=\{(\frac{1}{2},2),(\frac{3}{2},-1),(2,2),(-\frac{1}{2},6)\}$

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

ج) $2g^2(x+1)=\{(-2,2\times9+1)(1,2\times1+1)(3,2\times4+1)(-1,2\times0+1)\}=\{(-2,19),(1,3),(3,9),(-1,1)\}$

د) $\dfrac{2f}{g}=\{(1,\frac{4}{-1}),\cancel{(-1,\frac{12}{0})},(3,\frac{-2}{2})\}=\{(1,-4),(3,-1)\}$