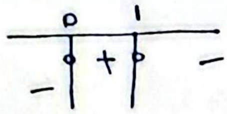
باران کاظمی   یازدهم C   تکلیف شماره ۵

۱-

$f(x) = (\frac{۱}{۲})^{x-۲} - ۱ \to x+۱-۲=x-۱$

$y=\sqrt{x^۳ f(x+۱)} \Rightarrow \sqrt{x^۳((\frac{۱}{۲})^{x-۱}-۱)}$

$\to$ ریشه $= (\frac{۱}{۲})^{x-۱}-۱=۰ \Rightarrow (\frac{۱}{۲})^{x-۱}=۱ \Rightarrow x-۱=۰ \Rightarrow x=۱$



$\to D_f=[۰,۱]$

۲-

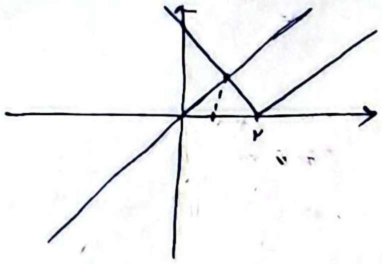
$f(x)=\sqrt{x+|x+۲|} \Rightarrow f(-x)=\sqrt{-x+|-x+۲|} \Rightarrow -x+|-x+۲|\geq ۰$

$|-x+۲|\geq x$

$-x+۲=x$

$۲x=۲$

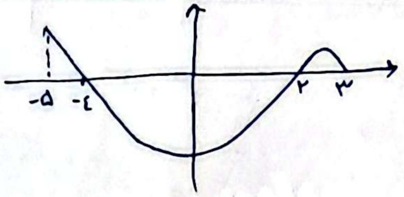
$x=۱$



$(-\infty,۱]$

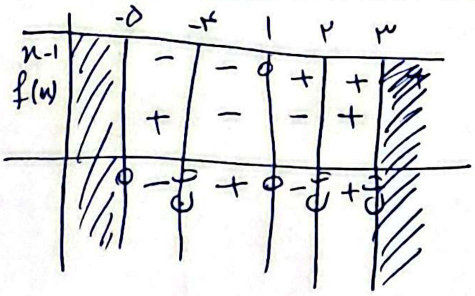
۳-

$y=\sqrt{\frac{x-۱}{f(x)}}$



$\frac{-۵-۱ \to \ominus}{f(-۵) \to \oplus} \to \ominus$ غقق

$D_y=(-۴,۱]\cup(۲,۳)$



۴-

$y_۲=\frac{۱}{(۳x^۲+ax+b)}$ $y_۱=\frac{۱}{۹x^۴-۷x^۲-۴x-۳}$

$$\begin{array}{l|l} ۹x^۴-۷x^۲-۴x-۳ & ۳x^۲+ax+b \\ \hline -۹x^۴\mp۳ax^۳\mp۳bx^۲ & ۳x^۲-ax+۱ \\ -۳ax^۳-x^۲(۳b+۷)-۴x-۳ & \\ +۳ax^۳+a^۲x^۲+abx & \\ x^۲(a^۲-۳b-۷)+x(ab-۴)-۳ & \\ -۳x^۲\mp ax\mp b & \\ ۰ & \end{array}$$

مورد آخر باقیمانده باید صفر شود

$a^۲-\overset{۹}{\cancel{۳}b}-۷=۳ \Rightarrow a^۲=۱ \begin{cases} a=۱ \text{ غقق} \\ \boxed{a=-۱} ✓ \end{cases}$

$ab-۴=a \Rightarrow -۳a-۴=a \Rightarrow a=-۱$

$\boxed{b=-۳}$

$\sqrt{-(a+b)}=\sqrt{-(-۴)}=\sqrt{۴}=②$

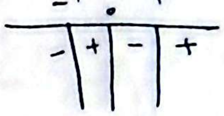
۵-

$f(x)=x^۳+x$

$y=\sqrt{f(x)-f(\frac{۴}{x})} \Rightarrow f(x)-f(\frac{۴}{x})\geq۰ \Rightarrow x^۳+x-\frac{۶۴}{x^۳}-\frac{۴}{x} \Rightarrow x^۳-\frac{۶۴}{x^۳}+x-\frac{۴}{x} \Rightarrow \frac{x^۶-۶۴}{x^۳}+\frac{x^۲-۴}{x}$

$\Rightarrow \frac{(x^۳-۸)(x^۳+۸)}{x^۳}+\frac{(x-۲)(x+۲)}{x}_{x^۲} \Rightarrow \frac{(x-۲)(x^۲+۴+۲x)(x+۲)(x^۲+۴-۲x)+x^۲(x-۲)(x+۲)}{x^۳}$

$\Rightarrow (x-۲)(x+۲)((\underbrace{x^۲+۲x+۴)(x^۲-۲x+۴)}_{x^۴-\cancel{۲x^۳}+\cancel{۴x^۲}+\cancel{۲x^۳}-\cancel{۴x^۲}+\cancel{۸x}+۴x^۲-\cancel{۸x}+۱۶}+x^۲) \xrightarrow{\text{[illegible]}} \frac{(x-۲)(x+۲)(x^۴+۵x^۲+۱۶)}{x^۳}\geq۰$



$\to D_f=[-۲,۰]\cup[۲,+\infty)$

-۶

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

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

$x^3+x=10 \Rightarrow x(x^2+1)=10 \Rightarrow x=2 \to f(10)=2(4)-1=7$

$f(2)+f(10) \Rightarrow 7+1=\textcircled{8}$

-۷

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

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

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

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

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

-۸

$$f(x)=\sqrt{x+4\sqrt{x-4}}\xrightarrow{-4+4}\sqrt{x-4+\underset{2(2)(\sqrt{x-4}}{4\sqrt{x-4}}+4}=\sqrt{(\sqrt{x-4}+2)^{\cancel{2}}}=\sqrt{x-4}+2$$

$$g(x)=\sqrt{x-4\sqrt{x-4}}\xrightarrow{-4+4}\sqrt{x-4-4\sqrt{x-4}+4}=\sqrt{(\sqrt{x-4}-2)^{\cancel{2}}}=|\sqrt{x-4}-2|$$

$|\sqrt{x-4}-2| \xrightarrow{\text{مطلق} \ge 0} \sqrt{x-4}-2\geq 0 \to x-4\geq 4 \to x\geq 8 \to \sqrt{x-4}\cancel{+2}+\sqrt{x-4}\cancel{-2}=2\sqrt{x-4}$

$\xrightarrow{\text{مطلق} < 0} \sqrt{x-4}-2<0 \to x-4<4 \to x<8 \to \cancel{\sqrt{x-4}}+2-\cancel{\sqrt{x-4}}+2=4$ غ ق ق

طبق صورت سوال

$2\sqrt{x-4}=a+b\sqrt{x+c}$

$c=-4$
$a=0$
$b=2$

$\frac{a+b}{c}=\frac{2}{-4}=\boxed{-\frac{1}{2}}$

-۹

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

$\frac{4}{4-8+3}=-4$

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

-۱۰

$f(x)=\{(1,2)(3,-1)(4,2)(-1,6)\}$

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

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

$2x=1\to x=\frac{1}{2}$ $\quad 2x=4\to x=2$

$2x=3\to x=\frac{3}{2}$

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

$x^2\neq -1$

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

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

$2f=\{(1,4)(3,-2)(4,4)(-1,12)\}$