تکلیف ۳ / هستی جمالی / یازدهم A :

۱)

الف) $y=\dfrac{x+3}{2x^3+3x^2-8x+3}$:
$$\begin{array}{l|l} 2x^3+3x^2-8x+3 & x-1 \\ \underline{-2x^3+2x^2} & \overline{2x^2+5x-3} \\ 5x^2-8x+3 & \downarrow \\ \underline{-5x^2+5x} & (x-\frac{1}{2})(x+3) \\ -3x+3 & \\ \underline{+3x-3} & \\ 0 & \end{array}$$
: $\dfrac{(x+3)}{(x-1)(x-\frac{1}{2})(x+3)}$; $x+3 \to -3$; 1 , $\frac{1}{2}$, -3 :
$$\begin{array}{cccccccc} & -3 & & \frac{1}{2} & & 1 & \\ + & \| & + & \| & - & \| & + \end{array}$$

$\Rightarrow D_f=\mathbb{R}-\{-3,1,\frac{1}{2}\}$

ب) $y=\dfrac{x+3}{2x^3+9x^2+10x+3}$:
$$\begin{array}{l|l} 2x^3+9x^2+10x+3 & x+1 \\ \underline{-2x^3-2x^2} & \overline{2x^2+7x+3} \\ 7x^2+10x+3 & \downarrow \\ \underline{-7x^2-7x} & (x+3)(x+\frac{1}{2}) \\ 3x+3 & \\ \underline{-3x-3} & \\ 0 & \end{array}$$
: $\dfrac{(x+3)}{(x+1)(x+3)(x+\frac{1}{2})}$; $x+3 \to -3$; -1 , -3 , $-\frac{1}{2}$:
$$\begin{array}{cccccccc} & -3 & & -1 & & -\frac{1}{2} & \\ + & \| & + & \| & - & \| & + \end{array}$$

$\Rightarrow D_f=\mathbb{R}-\{-3,-1,-\frac{1}{2}\}$

۲)

الف) $y=\dfrac{x+3}{x^3-2x^2+2x-1}$:
$$\begin{array}{l|l} x^3-2x^2+2x-1 & x-1 \\ \underline{-x^3+x^2} & \overline{x^2-x+1} \\ -x^2+2x-1 & \\ \underline{+x^2-x} & \\ x-1 & \\ \underline{-x+1} & \\ 0 & \end{array}$$
: $\dfrac{(x+3)}{(x-1)(x^2-x+1)}$; $x+3 \to -3$; $x-1 \to 1$; x^2-x+1 : $\Delta<0$ ریشه ندارد :
$$\begin{array}{cccccc} & -3 & & 1 & \\ + & | & - & \| & + \end{array}$$

$\Rightarrow D_f=\mathbb{R}-\{1\}$

ب) $y=\sqrt{\dfrac{x+3}{x^3-2x^2+2x-1}}$: مثل سوال بالا $\Rightarrow$
$$\begin{array}{cccccc} & -3 & & 1 & \\ + & | & - & \| & + \end{array}$$
: $D_f=(-\infty,-3]\cup(1,+\infty)$

۳)

$y=\dfrac{2}{x^2-5|x-1|-2x+5}$; $x-1 \to 1$: $f(x)\begin{cases} x^2-7x+10 & : x\geq 1 \\ x^2+3x & : x<1 \end{cases}$

$x^2-7x+10 \to (x-2)(x-5)$; 2 , 5 $\Rightarrow$
$$\begin{array}{cccccc} & 2 & & 5 & \\ + & \| & - & \| & + \end{array}$$
: $\mathbb{R}-\{2,5\}$

$x^2+3x \to x(x+3)$; 0 , -3 $\Rightarrow$
$$\begin{array}{cccccc} & -3 & & 0 & \\ + & \| & - & \| & + \end{array}$$
: $\mathbb{R}-\{-3,0\}$

$\Rightarrow D_f=\mathbb{R}-\{-3,0,2,5\}$

۴)

الف) $y=\dfrac{x+3}{|2x+1|-|x+3|}$; $x+3 \to -3$; $-\frac{1}{2}$, -3 : $f(x):\begin{cases} x-2 \\ -3x-4 \\ -x+2 \end{cases}$

$x\geq -\frac{1}{2} \Rightarrow$ $\begin{array}{ccccc} & 2 & \\ - & \| & + \end{array}$

$-\frac{1}{2}>x\geq -3 \Rightarrow$ $\begin{array}{ccccc} & -\frac{4}{3} & \\ + & \| & - \end{array}$

$x<-3 \Rightarrow$ $\begin{array}{ccccc} & 2 & \\ + & \| & - \end{array}$

$\Rightarrow D_f=\mathbb{R}-\{-\frac{4}{3},2\}$

ب) $y=\sqrt{|2x+1|-|x+3|}$; $-\frac{1}{2}$, -3 : $f(x)=\begin{cases} x-2 \\ -3x-4 \\ -x+2 \end{cases}$

$x\geq -\frac{1}{2} \Rightarrow$ $\begin{array}{ccccc} & 2 & \\ - & | & + \end{array}$: $[2,+\infty)$

$-\frac{1}{2}>x\geq -3 \Rightarrow$ $\begin{array}{ccccc} & -\frac{4}{3} & \\ + & | & - \end{array}$: $(-\infty,-\frac{4}{3})$

$x<-3 \Rightarrow$ $\begin{array}{ccccc} & 2 & \\ + & | & - \end{array}$: $(-\infty,2]$

$\Rightarrow D_f=\phi$

۵)

الف) $y=\log_2^{(1-\log_3^x)}$; $x \to x>0$

$\Rightarrow 1-\log_3^x>0 \to \log_3^x<1 \Rightarrow \underline{x<3}$

$D_f=(0,3)$

ب) $y=\log_2^{(1-\log_{\frac{1}{2}}^x)}$; $x \to \underline{x>0}$

: $1-\log_{\frac{1}{2}}^x>0 \to \log_{\frac{1}{2}}^x<1 \to \underline{x<\frac{1}{2}}$

$\Rightarrow D_f=(0,\frac{1}{2})$

$f(x)=\sqrt{\log_{\frac{1}{2}}^{\log_5^{(2x-1)}}}$:

1) $2x-1>0 \to \underline{x>\frac{1}{2}}$

2) $\log_5^{(2x-1)}>0 \to 2x-1>1 \to 2x>2 \to \underline{x>1}$

3) $\log_{\frac{1}{2}}^{\log_5^{(2x-1)}} \geq 0 \to \log_5^{(2x-1)} \geq 1 \to 2x-1 \geq 5 \to 2x \geq 6 \to \underline{x \geq 3}$ ۶)

$\Rightarrow D_f = 1 \cap 2 \cap 3 : [3,+\infty)$

الف) $y=\log(2\cos x+1)$: $2\cos x+1>0 \to \cos x>\frac{-1}{2}$; ۷)

$\Rightarrow D_f=\mathbb{R}-[2k\pi+\frac{2\pi}{3}, 2k\pi-\frac{2\pi}{3}]$

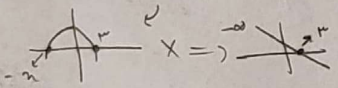
ب) $y=\sqrt{\log(\frac{x-1}{x+1})} \Rightarrow \frac{x-1}{x+1}>0$: $\frac{-1 \quad 1}{+ \nexists - 0 +}$: 1) $(-\infty,-1)\cup[1,+\infty)$

$\Rightarrow \log(\frac{x-1}{x+1})>0 \to \frac{x-1}{x+1}>1 \to \frac{\cancel{x}-1-\cancel{x}-1}{x+1}>0 : \frac{-2}{x+1}>0 : \frac{-1}{- \nexists +}$ 2) $\Rightarrow (-\infty,-1)$

$Gx^{\circ}=1 \Rightarrow$

$\Rightarrow D_f = 1\cap 2 : (-\infty,-1)$

$f(x)=\sqrt{(a+2)x^2+ax+b}$, $D_f=(-\infty,2]$, $b=?$ ۸)



$\Rightarrow \underline{\sqrt{-2x+b}=y}$

$\Rightarrow (a+2)=0 \to a=-2$

$\Rightarrow \begin{cases}x=2\\y=0\end{cases} : \sqrt{-4+b}=0 \to \boxed{b=4}$

$f(x)=\sqrt{x^2+2x+2-m^2}$, $D_f=\mathbb{R}$ ۹)

$\Rightarrow \begin{cases} a>0 \checkmark \\ \Delta<0 \Rightarrow 4-4(2-m^2)<0 : \cancel{4-8}^{-4}+4m^2<0 \to m^2-1<0 \to \frac{-1 \quad 1}{+ 0 - 0 +} : (-1,1) \\ c>0 \Rightarrow 2-m^2>0 : \frac{-\sqrt{2} \quad \sqrt{2}}{- 0 + 0 -} : (-\sqrt{2},\sqrt{2}) \end{cases}$

$\Rightarrow m=(-1,1)$: $1-(-1)=\underline{2}$: اختلاف

$f(x)=\frac{\sqrt{4-x^2}}{[x]+[-x]+1}$: $4-x^2 \geq 0$: $\frac{-2 \quad 2}{- 0 + 0 -}$: $[-2,2]$ ۱۰)

$\to [x]+[-x]+1 \neq 0$

$\to [x]+[-x] \neq -1 \to$ فقط اعداد صحیح $\to \mathbb{Z}$

$\Rightarrow : [-2,2] \in \mathbb{Z} : \{-2,-1,0,1,2\}$

۵ عدد!