باران کاظمی — یازدهم C — تکلیف شماره ۳

۱-

الف) $y = \dfrac{x+3}{2x^3+3x^2-8x+3}$

$$\begin{array}{l|l} 2x^3+3x^2-8x+3 & x-1 \\ \cancel{-2x^3}+2x^2 & 2x^2+5x-3 \\ \hline \cancel{5x^2}-8x+3 & \\ \cancel{-5x^2}+5x & \\ \hline \cancel{-3x+3} & \\ \cancel{3x-3} & \\ \hline 0 & \end{array}$$

$\xrightarrow{\text{فرمول}} \dfrac{-5 \pm \sqrt{25+24}}{4}$ ، $\sqrt{49} = 7$

$\dfrac{-5-7}{4} = -3$ ، $\dfrac{-5+7}{4} = \dfrac{1}{2}$

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

$D_y = R - \{1, \frac{1}{2}, -3\}$

ب) $y = \dfrac{x+3}{2x^3+9x^2+10x+3}$

$$\begin{array}{l|l} 2x^3+9x^2+10x+3 & x+1 \\ \cancel{-2x^3}-2x^2 & 2x^2+7x+3 \\ \hline \cancel{7x^2}+10x+3 & \\ \cancel{-7x^2}-7x & \\ \hline \cancel{3x+3} & \\ \cancel{-3x-3} & \\ \hline 0 & \end{array}$$

$\to \dfrac{-7 \pm \sqrt{49-24}}{4}$ ، $\sqrt{25} = 5$

$\dfrac{-7+5}{4} = \dfrac{-1}{2}$ ، $\dfrac{-7-5}{4} = -3$

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

$D_y = R - \{-1, -3, -\frac{1}{2}\}$

۲-

الف) $y = \dfrac{x+3}{x^3-2x^2+2x-1}$

$$\begin{array}{l|l} x^3-2x^2+2x-1 & x-1 \\ \cancel{-x^3}+x^2 & x^2-x+1 \\ \hline \cancel{-x^2}+2x-1 & \\ \cancel{+x^2}-x & \\ \hline \cancel{x-1} & \\ \cancel{-x+1} & \\ \hline 0 & \end{array}$$

$$\frac{x+3}{(x-1)\underbrace{(x^2-x+1)}_{\Delta<0 \text{ همواره مثبت}}}$$

$D_y = R - \{1\}$

ب) $y = \sqrt{\dfrac{x+3}{x^3-2x^2+2x-1}} = \sqrt{\dfrac{(x+3)}{(x-1)(x^2-x+1)}}$

	-3		1	
$+$	0	$-$	∄	$+$

$\to D_y = (-\infty, -3] \cup (1, +\infty)$

۳-

$y = \dfrac{2}{x^2-5|x-1|-2x+5}$

	1
$x^2+5x-5-2x+5$	$x^2-5x+5-2x+5$
x^2+3x	$x^2-7x+10$
$x(x+3)$	$\to (x-2)(x-5)$

	-3		0	
$+$	∄	$-$	∄	$+$

	2		5	
$+$	∄	$-$	∄	$+$

$R - \{0, -3, 2, 5\}$

۴-

الف) $y = \dfrac{x+3}{|2x+1|-|x+3|}$ ، $|2x+1|-|x+3| \neq 0$

$|2x+1|-|x+3| = 0 \Rightarrow |2x+1| = |x+3| = 4x^2+4x+1 = x^2+6x+9$

$\Rightarrow 3x^2-2x-8 = 0 \xrightarrow{\text{دلتا}} \dfrac{2 \pm \sqrt{4+96}}{6}$ ، $\sqrt{100} = 10$

$\dfrac{2+10}{6} = 2 \checkmark \to |5|-|5| = 0 \checkmark$

$\dfrac{2-10}{6} = \dfrac{-8}{6} = -\dfrac{4}{3} \checkmark \to \left|\cancel{-\tfrac{8}{3}}+1\right| - \left|\cancel{-\tfrac{4}{3}}+3\right| = \dfrac{5}{3} - \dfrac{5}{3} = 0 \checkmark$

مخرج نباید صفر باشد $\Rightarrow D_y = R - \{-\frac{4}{3}, 2\}$

ب) $y=\sqrt{|2x+1|-|x+3|}$

$|2x+1|-|x+3|\ge 0 \Rightarrow |2x+1|\ge |x+3|$

$4x^2+4x+1\ge x^2+6x+9 \Rightarrow 3x^2-2x-8\ge 0$ $\qquad \frac{2\pm\sqrt{4+96}}{6}$ $\quad 10$ $\quad 2,\ -\frac{4}{3}$

$\begin{array}{c|c|c} & -\frac{4}{3} & 2 \\ + & - & + \end{array} \rightarrow D_y=(-\infty,-\frac{4}{3}]\cup[2,+\infty)$

-۵ الف) $y=\log_2(1-\log_3 x)$

$x>0$

$1-\log_3 x>0 \Rightarrow \log_3 x<1 \rightarrow x<3$

$D_y=(0,3)$

ب) $y=\log_2(1-\log_{\frac{1}{2}} x)$

$x>0$

$1-\log_{\frac{1}{2}} x>0 \qquad \log_{\frac{1}{2}} x<1 \rightarrow x>\frac{1}{2}$

$D_y=(\frac{1}{2},+\infty)$

-۶ $f(x)=\sqrt{\log_{0.5}\log_5(2x-1)}$

$2x-1>0 \Rightarrow x>\frac{1}{2}$

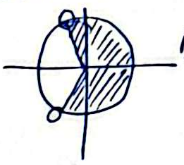
$\log_5(2x-1)>0 \Rightarrow 2x-1>1 \Rightarrow x>1$

$\log_{0.5}\log_5(2x-1)\ge 0 \qquad \log_5(2x-1)\le 1 \rightarrow 2x-1\le 5 \Rightarrow x\le 3$

$D_f=(1,3]$

-۷ الف) $y=\log(2\cos x+1)$

$2\cos x+1>0 \Rightarrow 2\cos x>-1 \Rightarrow \cos x>-\frac{1}{2}$



$D_y=(2k\pi-\frac{2\pi}{3},\ 2k\pi+\frac{2\pi}{3})$

ب) $y=\sqrt{\log\frac{x-1}{x+1}}$

$\frac{x-1}{x+1}>0 \qquad \begin{array}{c|c|c} & -1 & 1 \\ + & - & + \end{array} \quad (-\infty,-1)\cup(1,+\infty)$

$\log\frac{x-1}{x+1}\ge 0 \Rightarrow \frac{x-1}{x+1}\ge 1 \rightarrow \frac{x-1-x-1}{x+1} \Rightarrow \frac{-2}{x+1}\ge 0 \qquad \begin{array}{c|c} -1 & \\ + & - \end{array}$

$(-\infty,-1)$

$\xrightarrow{\cap} (-\infty,-1)$

-۸ $f(x)=\sqrt{(a+2)x^2+ax+b}$

اگر سهمی باشد و ریشه مضاعف داشته باشد دو طرف یا باید تعریفش یا نه X

اگر سهمی باشد ریشه مضاعف نباشد + - + یا - + - X

پس سهمی نیست

$a+2=0 \Rightarrow a=-2$

$\xrightarrow{\cap}$ ۳ $\quad ax+b=-2x+b \Rightarrow -6+b=0 \Rightarrow b=6$

$f(x) = \sqrt{x^2 + 2x + 2 - m^2} \xrightarrow[\text{همواره مثبت}]{} \Delta \leq 0 \Rightarrow 4 - 4(2 - m^2) \leq 0$ -۹

$4 - 8 + 4m^2 \leq 0 \Rightarrow 4m^2 - 4 \leq 0$

$4(m^2 - 1) \leq 0 \Rightarrow (m-1)(m+1) \leq 0$

$\begin{array}{c|c|c|c|c} & -1 & & 1 & \\ \hline + & \phi & - & \phi & + \end{array} \quad [-1, 1]$

$1 - (-1) = 2$

$f(x) = \dfrac{\sqrt{4 - x^2}}{[x] + [-x] + 1} \longrightarrow (2-x)(2+x) \quad \begin{array}{c|c|c|c|c} & -2 & & 2 & \\ \hline - & \phi & + & \phi & - \end{array} \quad [-2, 2]$ -۱۰

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

$[x] + [-x] \neq -1 \rightarrow x \in \mathbb{Z}$

$\rightarrow D_f = \{-2, -1, 0, 1, 2\} \rightarrow$ صحیح