تکلیف شماره ۳

یازدهم تجربی — پارمیس عباسیان

①

الف) $y=\dfrac{x+3}{2x^3+3x^2-8x+3}$

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

$2x^2+5x-3 \to x^2+5x-6 \Rightarrow (x-1)(x+6)$

$1,\ -6 \xrightarrow{\div 2} \dfrac{1}{2},\ -3$

$\dfrac{x+3}{(x+1)(2x^2+5x-3)}$

1 ، $\dfrac{1}{2}$ و -3

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

ب) $y=\dfrac{x+3}{2x^3+9x^2+10x+3}$

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

$x^2+7x+6 \Rightarrow (x+1)(x+6)$

$-1,\ -6 \xrightarrow{\div 2} -\dfrac{1}{2},\ -3$

$(x+1)(2x^2+7x+3)$

-1 ، $-\dfrac{1}{2}$ و -3

$(x+3)(2x+1)$

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

②

الف) $y=\dfrac{x+3}{x^3-2x^2+2x-1}$

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

$(x-1)(x^2-x+1)$

1 ، $\Delta<0$

$\mathbb{R}-\{1\}$

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

$\dfrac{x+3}{x^3-2x^2+2x-1} \geq 0$

$\dfrac{x+3=0 \Rightarrow -3}{(x-1)(x^2-x+1)} \geq 0$

1

	-3		1	
$+$		$-$		$+$

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

$-2x-1+x+3 \Rightarrow -x+2 \geq 0 \quad x \leq 2$

$\frac{-4}{3} \quad 2$

$+ \quad - \quad +$

$D_f = (-\infty, -\frac{4}{3}] \cup [2, +\infty)$

جابجا نوشتم

۴

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

$x > 1 \xrightarrow{+} x^2 - 7x + 10 \Rightarrow (x-2)(x-5) \Rightarrow$ $\quad 2 \quad 5 \quad + \quad - \quad + \quad$ $x \neq 5, 2$

$x < 1 \xrightarrow{-} x^2 + 3x \Rightarrow x(x+3)$ $\quad -3 \quad 0 \quad + \quad - \quad + \quad$ $x \neq 0, -3$

$\xrightarrow{x=1} A = 4 - 20 = -16$

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

۵

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

$\log_3^x < 1 \quad 3 > x$

$D_f = (0, 3)$

(4)

الف) $\dfrac{x+3}{|2x+1|-|x+3|} \Rightarrow |2x+1| = |x+3|$

$2x+1 = x+3$

$\boxed{x=2}$

$2x+1 = -x-3$

$3x = -4 \qquad \boxed{x=-\frac{4}{3}}$

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

ب) $\sqrt{|2x+1|-|x+3|}$

$|2x+1| - |x+3| \geqslant 0$

$x \xrightarrow{+} 2x+1-x-3 \Rightarrow x-2 \geqslant 0 \qquad x \geqslant 2$

$x \xrightarrow{-} -2x-1+x+3 \Rightarrow -x+2 \geqslant 0 \qquad x \leqslant -2$

$x^2-2x-24=0 \to (x-6)(x+4)$

$2 \qquad -\frac{4}{3}$

$-\frac{4}{3}$		2	
$+$	$-$		$+$

$D_f = (-\infty, -\frac{4}{3}] \cup [2, +\infty)$

$\rightarrow x^2 + 3x \rightarrow x(x+3)$ $\quad + \;\; + \quad$

$\quad\quad 0 \quad -3$

$\xrightarrow{x=1} A = 4 - 20 = -16$ $\qquad D_f : \mathbb{R} - \{-3, 0, 2, 0\}$

5

الف) $y = \log_2 (1 - \log_3 x) \Rightarrow 1 - \log_3 x > 0 \quad x > 0$

$\log_3 x < 1 \quad 3 > x$

$D_f = (0, 3)$

ب) $\log_2 (1 - \log_{\frac{1}{2}} x) \Rightarrow 1 - \log_{\frac{1}{2}} x > 0 \quad \log_{\frac{1}{2}} x < 1 \quad x > 0$

$x > \frac{1}{2} \quad D_f \; (\frac{1}{2}, +\infty)$

$$\text{①}\quad ۲x-۱>۰ \qquad ۲x>۱ \qquad x>\frac{۱}{۲}$$

④

$$\text{②}\quad \log_{۵}^{۲x-۱}>۰ \qquad ۲x-۱>۱ \longrightarrow ۲x>۲ \qquad x>۱$$

$$\text{③}\quad \log_{۱۰}^{\log_{۵}^{۲x-۱}} \geqslant ۰ \qquad \log_{۵}^{۲x-۱} \leqslant ۱ \qquad ۲x-۱ \leqslant ۵ \qquad ۲x \leqslant ۶ \qquad x \leqslant ۳$$

$$\Rightarrow D_f = (۱, ۳]$$

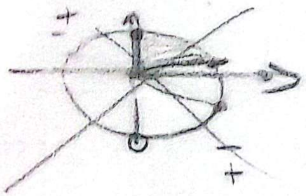
۸

۷

الف) $y = \log(2\cos x + 1)$

$2\cos x + 1 > 0$

$2\cos x > -1$ $\quad \cos x > -\frac{1}{2}$ $\quad D_f = \left(2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3}\right)$



ب) $y = \sqrt{\log \frac{x-1}{x+1}} \Rightarrow \log \frac{x-1}{x+1} \geq 0$ $\quad$ ① $\frac{x-1}{x+1} > 0$ $\quad$ $+ \;\; -1 \;\; - \;\; 1 \;\; +$

$(-\infty, -1) \cup (1, +\infty)$

② $\log_{10} \frac{x-1}{x+1} \geq 0$ $\quad \frac{x-1}{x+1} \geq 1$ $\quad \frac{x-1}{x+1} - 1 \geq 0 \rightsquigarrow \frac{x-1-x-1}{x+1} \geq 0$

$-1 \leftarrow x+1$

$D_f = (-\infty, -1)$ $\quad$ $- \;\; -1 \;\; +$

۸

$f(x) = \sqrt{(a+2)x^2 + ax + b}$

$a = -2 \longrightarrow \sqrt{-2x+b} \longrightarrow -2x + b \geq 0 \quad -2x \geq -b$

$D_f = (-\infty, 3] \qquad x \leq \frac{b}{2} \quad \frac{b}{2} = 3$

$b = 6$

۹

$f(x) = \sqrt{x^2 + 2x + 2 - m^2}$

$\Delta \leq 0 \longrightarrow b^2 - 4ac \leq 0 \qquad 4 - 4(2 - m^2) \leq 0 \qquad \underbrace{4 - 8}_{-4} + 4m^2 \leq 0$

$4m^2 \leq 4 \longrightarrow m^2 \leq 1$

$-1 \leq m \leq 1 \longrightarrow 1 - (-1) = 2$

۱۰

$f(x) = \frac{\sqrt{4 - x^2}}{[x] + [-x] + 1}$

$\longrightarrow 4 - x^2 \geq 0 \longrightarrow 4 \geq x^2 \qquad 2 \geq x \geq -2$

$[x] + [-x] = 0 \quad x \in \mathbb{Z} \checkmark$

$[x] + [-x] + 1 \neq 0 \qquad [x] + [-x] \neq -1 \qquad [x] + [-x] = -1 \quad x \notin \mathbb{Z}$

$\Rightarrow D_f = \{-2, -1, 0, 1, 2\} \longrightarrow$ ۵ تا

٨

ь = ٣

ь = ٢

٩