ستایش منفرد — تکلیف ش ۳ ، یازدهم دهم (

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۲۹

سوال ۱)

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

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

$= \dfrac{x+3}{(x-1)(2x^2+5x-3)}$ → ① , (-3) , $(\frac{1}{2})$

$2x^2+5x-3=0 \Rightarrow x^2+5x-6=0$

$\Rightarrow (x+6)(x-1)=0 \Rightarrow x=-\frac{6}{2}=-3 , x=\frac{1}{2}$

$2x^3+3x^2-8x+3 \neq 0 \Rightarrow D_f = R - \{1 , -3 , \frac{1}{2}\}$

ب) $y = \dfrac{x+3}{2x^3+9x^2+10x+3}$

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

$= \dfrac{x+3}{(x+1)(2x^2+7x+3)}$ → (-1) , (-3) , $(\frac{-1}{2})$

$2x^2+7x+3=0 \quad \Delta = b^2-4ac = 49-24=25$

$x = \dfrac{-7 \pm \sqrt{25}}{4} = \dfrac{-7 \pm 5}{4}$ → $x=-3$, $x=\frac{-1}{2}$

$2x^3+9x^2+10x+3 \neq 0 \Rightarrow D_f = R - \{-1 , -3 , \frac{-1}{2}\}$

سوال ۲)

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

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

↳ $\Delta = b^2-4ac \Rightarrow 1-4 = -3$ جواب ندارد

$D_f = R - \{1\}$

د) $y=\sqrt{\frac{x+3}{x^3-2x^2+2x-1}} \rightarrow \frac{x+3}{x^3-2x^2+2x-1} \geq 0 \Rightarrow \frac{x+3}{(x-1)(x^2-x+1)} \geq 0$

	-3		1	
	$-$	$\not\exists$	$+$	$+$

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

۴- $y=\frac{2}{x^2-5|x-1|-2x+5}$ $\rightarrow x^2-5|x-1|-2x+5 \neq 0$

$x \geq 1 \rightarrow x^2-5x+5-2x+5 \neq 0 \Rightarrow x^2-7x+10 \neq 0 \Rightarrow (x-2)(x-5) \neq 0$

$\Rightarrow x \neq 2, x \neq 5$

$x<1 \rightarrow x^2+5x-5-2x+5 \neq 0 \Rightarrow x^2+3x \neq 0 \Rightarrow x(x+3) \neq 0 \Rightarrow x \neq 0, x \neq -3$

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

ه- ب) $y=\frac{x+3}{|2x+1|-|x+3|}$ $\rightarrow |2x+1|-|x+3| \neq 0$

$|2x+1| \neq |x+3| \rightarrow 2x+1 \neq x+3$

$\hookrightarrow 2x+1 \neq -x-3 \quad x \neq 2$

$\Rightarrow 3x \neq -4 \quad x \neq \frac{-4}{3}$

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

ج) $y=\sqrt{|2x+1|-|x+3|} \rightarrow |2x+1|-|x+3| \geq 0 \Rightarrow |2x+1| \geq |x+3|$

$\xrightarrow{\text{به توان ۲}} 4x^2+4x+1 \geq x^2+6x+9 \Rightarrow 3x^2-2x-8 \geq 0$

$3x^2-2x-8=0 \xrightarrow{\Delta} x^2-2x-24=0 \Rightarrow (x-6)(x+4)=0 \rightarrow x=\frac{6}{3}=2$

$\hookrightarrow x=\frac{-4}{3}$

	$-\frac{4}{3}$		2	
	$+$	$\not\exists$	$-$	$+$

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

و- ب) $y=\log_2^{(1-\log_2^x)}$ $\rightarrow 1-\log_2^x > 0 \Rightarrow \log_2^x < 1 \Rightarrow \begin{matrix} x<2 \\ x>0 \end{matrix}$

$D_f = (0, 2)$

د) $y=\log_2^{(1-\log_{\frac{1}{2}}^x)} \rightarrow 1-\log_{\frac{1}{2}}^x > 0 \Rightarrow \log_{\frac{1}{2}}^x < 1 \Rightarrow \begin{matrix} x>\frac{1}{2} \\ x>0 \end{matrix}$

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

حل

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

$4 - x^2 \geq 0 \Rightarrow x^2 \leq 4 \Rightarrow -2 \leq x \leq 2$ (1)

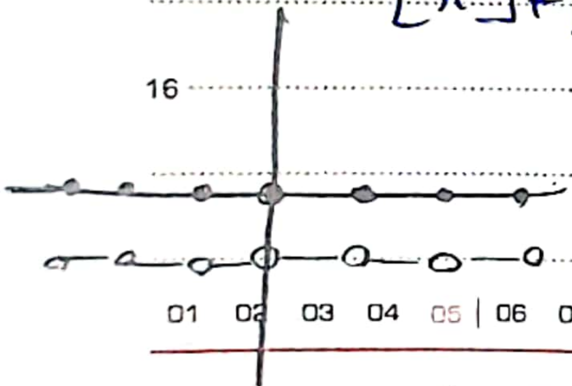
$[x] + [-x] + 1 \neq 0 \Rightarrow [x] + [-x] \neq 1$

$\Rightarrow x \in \mathbb{Z}$ (2)

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

−2

15



$y = [x] + [-x]$

01 02 03 04 05 | 06 07 08 09 10 11 12 | 13 14 15 16 17 18 19 | 20 21 22 23 24 25 26 | 27 28 29 30 31

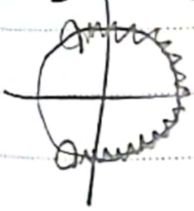
$f(x)=\frac{\log_5 (2x-1)}{\log_{0/5}} \to \log_{\frac{1}{4}}^{\log_5 (2x-1)} \geq 0 \Rightarrow$

$\log_5^{2x-1} \leq 1 \Rightarrow 2x-1 \leq 5 \Rightarrow 2x \leq 6 \Rightarrow x \leq 3$ (1) $\log_5^{(2x-1)} > 0 \Rightarrow 2x-1>1 \Rightarrow 2x>2 \Rightarrow x>1$ (2)

$2x-1>0 \Rightarrow 2x>1 \Rightarrow x>\frac{1}{2}$ (3) $\xrightarrow{(1)\cap(2)\cap(3)} D_f=(1,3]$

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

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



ب) $y=\sqrt{\log\frac{x-1}{x+1}} \to \log(\frac{x-1}{x+1}) \geq 0 \Rightarrow \frac{x-1}{x+1} \geq 1 \Rightarrow \frac{x-1}{x+1}-1 \geq 0$

$\Rightarrow \frac{x-1-x-1}{x+1} \geq 0 \Rightarrow \frac{-2}{x+1} \geq 0$ (جدول: -1 ؛ + ن‌ت −) $\Rightarrow (-\infty,-1)$ (1)

$\frac{x-1}{x+1}>0$ (جدول: -1 ، 1 ؛ + ن‌ت − 0 +) $\to (-\infty,-1)\cup(1,+\infty)$ (2) $\xrightarrow{(1)\cap(2)} D_f=(-\infty,-1)$

۸- $f(x)=\sqrt{(a+2)x^2+ax+b}$ $\quad D_f=(-\infty,3] \Rightarrow a=-2$ (عبارت زیر رادیکال درجه اول ... ضریب x^2 صفر)

$\hookrightarrow ax+b \geq 0$

$\Rightarrow -2x+b \geq 0 \to$ به ازای $x=3$ صفر $\Rightarrow b-6=0 \to b=6$

۹- $f(x)=\sqrt{x^2+2x+3-m^2} \to x^2+2x+3-m^2 \geq 0$

از آنجایی که $D_f=R$ ← یعنی همیشه برقرار است $\Delta \leq 0$ و $a>0$ عبارت ریشه مضاعف دارد

$\Delta=b^2-4ac=4-8+4m^2=0 \Rightarrow 4m^2=4 \Rightarrow m^2=1 \Rightarrow m=\pm 1$

اختلاف بزرگترین و کوچکترین مقدار $m=2$ (۲)