مسائل صفحه‌ی یازدهم تجربی A، شماره ۳

۲۰

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

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

* مجموع ضرایب = ۰

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

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

ب) $y=\dfrac{x+3}{2x^3+9x^2+10x+3}$ $\xrightarrow{*}$

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

* مجموع ضرایب توان زوج = مجموع ضرایب توان فرد

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

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

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۲) الف) $y=\dfrac{x+3}{x^3-2x^2+2x-1}$ $\xrightarrow{\text{۱ الف}}$

$$\begin{array}{l|l} x^3-2x^2+2x-1 & x-1 \\ -(x^3-x^2) & x^2-x+1 \\ \quad -x^2+2x & \\ -(-x^2+x) & \\ \quad x-1 & \\ -(x-1) & \\ \quad 0 & \end{array}$$

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

x^2-x+1: ریشه ندارد ، $x=1$

-3		1	
+	−		+

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

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ب) $y=\sqrt{\dfrac{x+3}{x^3-2x^2+2x-1}} \to \dfrac{x+3}{(x-1)(x^2-x+1)} \geq 0$

$x=-3$, $x=1$

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

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

۵)

الف) $y=\log_2 (1-\log_3 x)$

①: $\log_3 x \to x>0$

②: $\log_3 x<1 \to x<3$

$D_f=(0,3)$

ب) $y=\log_2 (1-\log_{1/2} x)$

①: $\log_{1/2} x \to x>0$

②: $\log_{1/2} x<1 \to x>1/2$

$D_f=(1/2,+\infty)$

۳) $y=\dfrac{2}{x^2-5|x-1|-2x+5} \to x^2-5|x-1|-2x+5\neq 0$

$x\geq 1 \to x^2-7x+10=(x-5)(x-2) \to x\neq 2,5$

$x<1 \to x^2+3x=x(x+3) \to x\neq -3,0$

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

۴) الف) $\dfrac{x+3}{|2x+1|-|x+3|} \to |2x+1|\neq|x+3| \to (\;)^2$

$4x^2+4x+1\neq x^2+6x+9$

$3x^2-2x-8\neq 0 \to x^2-2x-24\neq 0 \to (x-6)(x+4) \to \frac{-4}{3}, \frac{6}{3} \to D_f=\mathbb{R}-\{-\frac{4}{3}, 2\}$

۴- ب) $\sqrt{|2x+1| - |x+3|} \rightarrow |2x+1| \geq |x+3|$

$\rightarrow 3x^2 - 2x - 8 \geq 0$ $\quad$ $-\frac{4}{3} \quad 2$ $\quad$ $+ \quad - \quad +$

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

۶-

$y = \sqrt{\log_{1/2} \log_5 |2x-1|} \rightarrow$ ①: $2x - 1 > 0 \rightarrow x > \frac{1}{2}$

②: $\log_5^{2x-1} > 0 \rightarrow 2x-1 > 1 \rightarrow x > 1$

③: $\log_{1/2} \log_5^{2x-1} \geq 0 \rightarrow \log_5^{2x-1} \leq 1 \rightarrow 2x-1 \leq 5$

$\rightarrow x \leq 3$ $\quad$ $\frac{1}{2} \quad 1 \quad 3$ $\quad$ $D_f = (1, 3]$

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

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

ب) $\sqrt{\log \frac{x-1}{x+1}}$ ①: $\log \frac{x-1}{x+1} \geq 0 \rightarrow \frac{x-1}{x+1} \geq 1 \rightarrow \frac{x-1}{x+1} - 1 \geq 0$

$\frac{x-1-x-1}{x+1} = \frac{-2}{x+1} \geq 0$ $\quad$ -1 $\quad$ $+ \; ∄ \; -$ $\quad \rightarrow x < -1$

$\cap \rightarrow D_f = (-\infty, -1)$

②: $\frac{x-1}{x+1} > 0$ $\quad$ $-1 \quad 1$ $\quad$ $+ \; ∄ \; - \; 0 \; +$ $\quad$ $(-\infty, -1) \cup (1, +\infty)$

۸- از بازه‌ی [illegible] $f(x)$ [illegible] $a=-2$: $\quad f(x) = \sqrt{(a+2)x^2 + ax + b}$

$\rightarrow -2x + b \geq 0 \xrightarrow{x=3} -6 + b = 0 \rightarrow \boxed{b = 6}$

طبق $D_f = \mathbb{R}$

۹ـ $f(x) = \sqrt{x^2 + 2x + 2 - m^2} \rightarrow \Delta = 0 \quad 4 - (4 \times 1 \times (2 - m^2)) = 0$

$4 - 8 + 4m^2 = 0 \rightarrow 4m^2 = 4 \rightarrow m = \pm 1 \rightarrow 1 - (-1) = 2$

۱۰) $f(x) = \dfrac{\sqrt{4 - x^2}}{[x] + [-x] + 1} \rightarrow 4 - x^2 \geq 0 \rightarrow x^2 \leq 4 \rightarrow -2 \leq x \leq 2 \rightarrow [-2, 2]$

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

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