حسابان، یازدهم ریاضی A، شماره ۳.

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

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

* مجموع ضرایب $=0$

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

$\frac{1}{2}$ ، -3 ، 1

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

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

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

* مجموع ضرایب توان زوج $=$ مجموع ضرایب توان فرد

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

$-\frac{1}{2}$ ، -3

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

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

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

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

x^2-x+1: ریشه ندارد ، $x-1$: 1

$$\begin{array}{c|c|c|c} & -3 & & 1 \\ + & 0 & - & \nexists & + \end{array}$$

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

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

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

۵)

الف) $y=\log_2^{(1-\log_3^x)}$

① : $\log_3^x \to x>0$

$D_f=(0,3)$

② : $\log_3^x<1 \to x<3$

ب) $y=\log_2^{(1-\log_{1/2}^x)}$

① : $\log_{1/2}^x \to x>0$

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

② : $\log_{1/2}^x<1 \to x>1/2$

۳)

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

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

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

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

۴)

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

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

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

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

۴-

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

$3x^2-2x-8 \geq 0$

$-4/3$		2
+	−	+

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

۶-

$y=\sqrt{\log_{1/2}^{\log_5^{|2x-1|}}} \longrightarrow$ ① : $2x-1>0 \to x>1/2$

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

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

$\to x \leq 3$ $\quad D_f=(1,3]$

۷-

الف) $y=\log(2\cos x+1) \to 2\cos x>-1 \to \cos x>-1/2$

$\to D_f=(2k\pi-2\pi/3, 2k\pi+2\pi/3)$

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

$\frac{x-1-x-1}{x+1}=\frac{-2}{x+1} \geq 0$ $\quad$ $\begin{array}{c} -1 \\ + \;\; - \end{array}$ $\to x<-1$

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

② : $\frac{x-1}{x+1}>0$ $\quad$ $\begin{array}{ccc} -1 & & 1 \\ + & - & + \end{array}$ $\quad (-\infty,-1) \cup (1,+\infty)$

$f(x)=\sqrt{(a+2)x^2+ax+b}$ $\quad$ ۸- از بازه می‌فهمیم $f(x)$ درجه اول است: $a=-2$

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

$D_f = \mathbb{R}$

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

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

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

$\rightarrow [-2, 2]$

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

$1 \cap 1$

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