شایان رومی زاده

۱) الف)

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

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

$$\frac{-5\pm\sqrt{25+24}}{4}=\frac{-5\pm7}{4} \begin{cases} -3 \\ \frac{1}{2} \end{cases}$$

$-3 \quad \frac{1}{2} \quad 1$

$+ \quad + \quad - \quad +$

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

$$=(-\infty,-3)\cup(-3,\tfrac{1}{2})\cup(\tfrac{1}{2},1)$$

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۱) ب)

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

ریشه‌های مخرج $(-1, -3, -\frac{1}{2})$

$2x^2+7x+3$

$$x=\frac{-7\pm\sqrt{49-24}}{4}=\frac{-7\pm5}{4} \begin{cases} -3 \\ -\frac{1}{2} \end{cases}$$

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

$$=(-\infty,-3)\cup(-3,-1)\cup(-1,-\tfrac{1}{2})\cup(-\tfrac{1}{2},+\infty)$$

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۲) الف)

$$x^3-2x^2+2x-1 \neq 0$$

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

$x^2-x+1 \rightarrow \Delta<0$

۱ ریشه مخرج

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

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

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۲) ب)

ریشه‌ها $= -3$ و $+1$

$-3 \quad 1$

$+ \quad - \quad +$

ج غ ج

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

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۳)

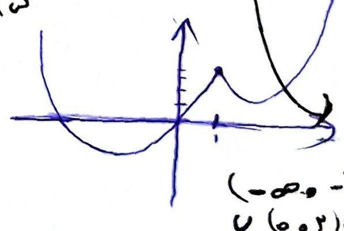
$$D_f = R-\{-3, 0, 5, 2\}$$

$$x^2-5|x-1|-2x+5 \neq 0$$

$x-1>0 \longrightarrow x^2-5x-2x+10 = x^2-7x+10 \rightarrow x=\frac{7\pm3}{2} \begin{cases} 5 \\ 2 \end{cases}$

$x-1<0 \longrightarrow x^2+5x-5-2x+5 = x^2+3x \longrightarrow (x+3)(x)$

$-\frac{9}{4}$



$$(-\infty,-3)\cup(-3,0)\cup(0,2)\cup(2,5)$$

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۴) الف)

$-3 \quad -\frac{1}{2}$

$3-x \;|\; -3x-4 \;|\; x-3$

$x-3=2$ ✓

$-2x-1-x-3$

$\frac{3}{2}$ غ ق ق ✗

$-\frac{4}{3}$ ✓

ریشه‌ها 2 و $-\frac{4}{3}$

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

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۴) ب)

$-3 \quad -\frac{1}{2}$

$3-x \;|\; -3x-4 \;|\; x-3$

$$|2x+1|-|x+3|\geq 0 \rightarrow |2x+1|\geq|x+3|$$

$$4x^2+4x+1\geq x^2+6x+9 \rightarrow 3x^2-2x-8\geq 0$$

$$\rightarrow D_f=(-\infty,-\tfrac{4}{3}]\cup[2,+\infty) \text{ یا } R-(-\tfrac{4}{3},2)$$

۵)

$1-\log_3^x>0$ ، $\log_3^x<1 \to x<3$ ، $x>0$ $\xrightarrow{\cap} 0<x<3 \to D_f=(0,3)$

$1-\log_{\frac{1}{2}}^x>0$ ، $\log_{\frac{1}{2}}^x<1 \to x<\frac{1}{2}$ ، $x>0$ $\xrightarrow{\cap} D_f=(0,\frac{1}{2})$

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۶)

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

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

$\log_{0.5}^{\log_5^{2x-1}} \geq 0 \to \log_5^{2x-1} \leq 1 \to 2x-1 \leq 5 \to x \leq 3$

$\xrightarrow{\cap} D_f=(1,3]$

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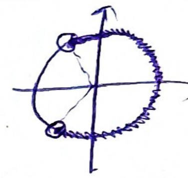
۷)

الف) $2\cos x+1>0 \to \cos x>-\frac{1}{2}$, $\cos x \geq -1$ ، $-\frac{1}{2}<\cos x \leq 1$ $\to D_f=(2k\pi-\frac{2\pi}{3}, 2k\pi+\frac{2\pi}{3})$



ب) $\frac{x-1}{x+1}>0$ / $\log\frac{x-1}{x+1} \geq 0 \to \frac{x-1}{x+1} \geq 1 \to \frac{-2}{x+1} \geq 0 \to D_f=(-\infty,-1)$

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۸)

$x=3 \to 9a+18+3a+b=0$

$x=0 \to b>0$

$\Delta=0$ ، ضریب $x^2=0 \to a=-2$

$f=\sqrt{-2x+b} \to x \leq \frac{b}{2}$ ، $x \leq 3 \to b=6$

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۹)

$\Delta \leq 0 \to 4-8+4m^2 \leq 0 \to m^2 \leq 1 \to -1 \leq m \leq 1$

$c \geq 0 \to 2-m^2 \geq 0 \to m^2 \leq 2 \to -\sqrt{2} \leq m \leq \sqrt{2}$

$\xrightarrow{\cap} -1 \leq m \leq 1$

$1-(-1)=2$

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۱۰)

$4-x^2 \geq 0 \to x^2 \leq 4 \to -2 \leq x \leq 2$

مخرج: اعداد صحیح → ۱ ✓ ، اعداد دیگر → ۰ ✗

$\xrightarrow{\cap} D_f=\{-2,-1,0,1,2\} \to$ (ت)