

الف) $2x^3 + 3x^2 - 8x + 3 \neq 0$ جمع ضرایب =
بخش پذیر بر
(x-1)

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

$\Delta = 25 - 4 \cdot 5 \cdot 3 = 25 - 60 = -35$

$x = \frac{-5 \pm \sqrt{-35}}{5} = -1 \pm \frac{\sqrt{35}}{5}$

$D_f \subset \mathbb{R} - \{1, -1 \pm \frac{\sqrt{35}}{5}\}$

ب) $2x^3 + 9x^2 + 10x + 3 \neq 0$ جمع ضرایب توانهای
خوب با جمع ضرایب
توانهای زوج برابر است
بخش پذیر بر (x+1)

$$\begin{array}{r} 2x^3 + 9x^2 + 10x + 3 \mid x+1 \\ -2x^3 - 2x^2 \\ \hline 11x^2 + 10x + 3 \\ -11x^2 - 11x \\ \hline x + 3 \\ -x - 1 \\ \hline 2 \end{array}$$

$\Delta = 100 - 4 \cdot 11 \cdot 2 = 100 - 88 = 12$

$x = \frac{-1 \pm \sqrt{12}}{2} = -\frac{1}{2} \pm \frac{\sqrt{3}}{2}$

$D_f \subset \mathbb{R} - \{-1, -\frac{1}{2} \pm \frac{\sqrt{3}}{2}\}$

الف) $x^3 - 2x^2 + 2x - 1 \neq 0$ بخش پذیر بر (x-1)

$$\begin{array}{r} x^3 - 2x^2 + 2x - 1 \mid x-1 \\ -x^3 + x^2 \\ \hline -x^2 + 2x - 1 \\ +x^2 - x \\ \hline x - 1 \\ -x + 1 \\ \hline 0 \end{array}$$

$\Delta < 0 \rightarrow \oplus$

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

ب) $x + 3 \neq 0 \rightarrow x \neq -3$

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

$$\begin{array}{r} -3 \quad 1 \\ + \quad - \quad + \quad + \end{array}$$

$D_f \subset \mathbb{R} - \{-3, 1\}$

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

$x \geq 1$

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$\rightarrow x^3 - 7x + 10 < 0 \rightarrow (x-5)(x-2) < 0 \rightarrow x < 2, x < 5$

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

$x < 1$

$\rightarrow x^3 + 3x < 0 \rightarrow x(x+3) < 0 \rightarrow x < 0, x < -3$

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

الف) $[-x] - 2 \geq 0 \rightarrow [-x] \geq 2 \rightarrow -x \geq 2 \rightarrow x \leq -2 \rightarrow D_f \subset (-\infty, -2]$

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ب) $[x]^2 - 2[x] - 3 \neq 0 \rightarrow t^2 - 2t - 3 \neq 0 \rightarrow (t-3)(t+1) \neq 0$

$\rightarrow [x] \neq -1, [x] \neq 3$

$D_f \subset \mathbb{R} - ([3, 4) \cup [-1, 0))$

الف) $[x - \frac{1}{x}] + [x + \frac{1}{x}] \geq 0 \rightarrow [x + \frac{1}{x} - 1] + [x + \frac{1}{x}] \geq 0$

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$[x + \frac{1}{x}] - 1 + [x + \frac{1}{x}] \geq 0 \rightarrow 2[x + \frac{1}{x}] \geq 1 \rightarrow [x + \frac{1}{x}] \geq \frac{1}{2} \rightarrow x + \frac{1}{x} \geq 1$

$x \geq \frac{1}{x} \rightarrow D_f \subset [\frac{1}{x}, +\infty)$

ب) $\sqrt{[x - \frac{1}{x}] + [-(x - \frac{1}{x})]} \rightarrow x - \frac{1}{x} \in \mathbb{Z} \rightarrow D_f \subset \{x \mid x = k + \frac{1}{x}, k \in \mathbb{Z}\}$

له آنجمله صواب است

الف) $\tan x + 1 \neq 0 \rightarrow \tan x \neq -1 \rightarrow x \neq k\pi - \frac{\pi}{4}$

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تعريف $\tan x \rightarrow x \neq k\pi + \frac{\pi}{2}$

تعريف $\cot x \rightarrow x \neq k\pi$

$D_f = \mathbb{R} - \left\{ k\pi, k\pi + \frac{\pi}{2}, k\pi - \frac{\pi}{4} \right\}$

ب) $1 - \sqrt{x} \sin^2 x \geq 0 \rightarrow -\sqrt{x} \sin^2 x \geq -1 \rightarrow \sqrt{x} \sin^2 x \leq 1 \rightarrow \sin^2 x \leq \frac{1}{\sqrt{x}} \rightarrow -\frac{1}{\sqrt{x}} \leq \sin x \leq \frac{1}{\sqrt{x}}$

$D_f = \mathbb{R} - \left\{ k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right\}$



الف) $\sqrt{x} \sin x - 1 \geq 0 \rightarrow \sqrt{x} \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{\sqrt{x}} \rightarrow$



$D_f = \left[\sqrt{k\pi + \frac{\pi}{4}}, \sqrt{k\pi + \frac{5\pi}{4}} \right]$

ب) $1 - \sqrt{x} \cos x \geq 0 \rightarrow 1 \geq \sqrt{x} \cos x \rightarrow \frac{1}{\sqrt{x}} \geq \cos x$



$D_f = \left[\sqrt{k\pi + \frac{\pi}{2}}, \sqrt{k\pi + \frac{3\pi}{2}} \right]$

الف) $-1 \leq x^2 + 3x + 1 \leq 1$

① $-1 \leq x^2 + 3x + 1 \rightarrow 0 \leq x^2 + 3x + 2 \rightarrow 0 \leq (x+2)(x+1) \rightarrow x \in (-\infty, -2] \cup [-1, +\infty)$

-A

② $x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow x(x+3) \leq 0 \rightarrow x \in [-3, 0]$

$D_f = [-3, -2] \cup [-1, 0]$

ب) $\Delta - 2x \geq 0 \rightarrow x \leq \frac{\Delta}{2}$

$-1 \leq \sqrt{\Delta - 2x} \leq 1 \rightarrow 0 \leq \Delta - 2x \leq 1 \rightarrow -\frac{\Delta}{2} \leq -x \leq -\frac{\Delta-1}{2} \rightarrow \frac{\Delta}{2} \leq x \leq \frac{\Delta-1}{2}$

$D_f = \left[\frac{\Delta}{2}, \frac{\Delta-1}{2} \right]$

الف) $1 - \log_{\frac{1}{x}} x > 0 \rightarrow 1 > \log_{\frac{1}{x}} x \rightarrow \frac{1}{x} > x \rightarrow$

$x > 0$

ب) $1 - \log_{\frac{1}{x}} \frac{1}{x} > 0 \rightarrow 1 > \log_{\frac{1}{x}} \frac{1}{x} \rightarrow \frac{1}{x} < x \rightarrow$

$x > 0$

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الف) $\sqrt[k]{x-x^k} - 1 \geq 0 \rightarrow \sqrt[k]{x-x^k} \geq 1 \rightarrow x-x^k \geq 1 \rightarrow x-x^k-1 \geq 0$

$\Delta < 14 - 12 < 2$

$x \in \frac{-k \pm \sqrt{k^2 - 4}}{-2}, 1$

$\rightarrow D_f = [1, \frac{1}{2}]$

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ب) $\left(\frac{kx+\Delta}{x+k} \right) \in W \rightarrow kx+\Delta = kwx+\Delta \rightarrow kx - kwx = k\Delta - \Delta$

$x(k - kw) = k\Delta - \Delta$

$x = \frac{k\Delta - \Delta}{k - kw}$

$D_f = \left\{ x \mid x = \frac{\Delta - k\Delta}{k - kw}, k \in W \right\}$