

الف) $\frac{n+3}{(n-1)(n-1)(n+2)}$

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

ب) $\frac{n+3}{(n-1)(2n^2+7n+2)}$

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

الف) $\frac{n+3}{(n-1)(n^2-n+1)}$ $\Delta < 0 \Rightarrow$ همیشه مثبت

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

ب) $\sqrt{\frac{n+3}{(n-1)(n^2-n+1)}} - \frac{1}{n+2}$ $\Delta < 0 \Rightarrow$ همیشه مثبت

$D_f = (1, +\infty)$

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$\begin{cases} |n-1| \xrightarrow{n \rightarrow \infty} n^2 - 2n + 1 - 2n + 1 \neq 0 \Rightarrow n^2 - 4n + 2 \neq 0 \Rightarrow (n-2)(n-1) \neq 0 \\ \rightarrow D = \mathbb{R} - \{2, 0\} \quad (1) \\ |n-1| \xrightarrow{n \rightarrow \infty} n^2 + 2n - 1 - 2n - 1 \neq 0 \Rightarrow n^2 + 4n \neq 0 \Rightarrow n(n+4) \neq 0 \\ \rightarrow D = \mathbb{R} - \{0, -4\} \quad (2) \end{cases}$

$(1) \cap (2) \rightarrow \mathbb{R} - \{0, 2, -4\}$

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الف) $[n] - 2 \geq 0 \Rightarrow [n] \geq 2 \Rightarrow -n \geq 2 \Rightarrow n \leq -2 \Rightarrow D_f = (-\infty, -2]$

ب) $[n] = t \Rightarrow t^2 - 2t - 3 \Rightarrow (t+1)(t-3) \neq 0 \Rightarrow t \neq -1, 3$
 $\Rightarrow [n] \neq -1, 3 \Rightarrow n \neq -1, 3 \Rightarrow D = \mathbb{R} - \{-1, 3\}$

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الف) $[n - \frac{1}{3}] + [n + \frac{2}{3}] \geq 0 \rightarrow [n - \frac{1}{3}] + [n - \frac{1}{3} + 1] \geq 0 \Rightarrow$
 $[n - \frac{1}{3}] + 1 + [n - \frac{1}{3}] \geq 0 \Rightarrow 2[n - \frac{1}{3}] \geq -1 \Rightarrow [n - \frac{1}{3}] \geq -\frac{1}{2}$
 $\Rightarrow n - \frac{1}{3} \geq -\frac{1}{2} \Rightarrow n \geq \frac{1}{6} \Rightarrow D_f = [\frac{1}{6}, +\infty)$

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ب) $a = n - \frac{1}{3} \Rightarrow [a] + [-a] \geq 0 \Rightarrow \begin{cases} a \in \mathbb{Z} \Rightarrow [a] + [-a] = 0 \checkmark \\ a \notin \mathbb{Z} \Rightarrow [a] + [-a] = -1 \times \end{cases} \Rightarrow$
 $y = \sqrt{[n - \frac{1}{3}] + [-(n - \frac{1}{3})]}$
 $a \in \mathbb{Z} \Rightarrow n - \frac{1}{3} \in \mathbb{Z} \Rightarrow n \in \mathbb{Z} + \frac{1}{3} \rightarrow D_f = \{n \mid n = k + \frac{1}{3}, k \in \mathbb{Z}\}$

الف) $\begin{cases} \tan x + 1 \neq 0 \Rightarrow \tan x \neq -1 \Rightarrow x \neq k\pi - \frac{\pi}{4} \\ \cos x \neq 0 \Rightarrow x \neq k\pi + \frac{\pi}{2} \end{cases} \Rightarrow D = \mathbb{R} - \left\{ k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{2} \right\}$

ب) $1 - \sqrt{\sin x} \geq 0 \Rightarrow \sqrt{\sin x} \leq 1 \Rightarrow \sin x \leq \frac{1}{4} \Rightarrow \frac{1}{4} \leq \sin x \leq \frac{1}{4} \dots$

$D_f = \left\{ k\pi + \frac{\pi}{4} \right\}$

الف) $\sqrt{\sin x} - 1 \geq 0 \Rightarrow \sqrt{\sin x} \geq 1 \Rightarrow \sin x \geq \frac{1}{4} \Rightarrow D = \left[k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4} \right]$

ب) $1 - \sqrt{\cos x} \geq 0 \Rightarrow \sqrt{\cos x} \leq 1 \Rightarrow \cos x \leq \frac{1}{4} \Rightarrow$

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

الف) $-1 \leq x^2 + \sqrt{x} + 1 \leq 1 \Rightarrow \begin{cases} -1 \leq x^2 + \sqrt{x} + 1 \Rightarrow x^2 + \sqrt{x} + 2 \geq 0 \Rightarrow (x+1)(x+2) \geq 0 \quad (1) \\ x^2 + \sqrt{x} + 1 \leq 1 \Rightarrow x^2 + \sqrt{x} \leq 0 \Rightarrow x(x + \sqrt{x}) \leq 0 \quad (2) \end{cases}$

$(1) \cap (2) \Rightarrow [-1, -2] \cup [-1, 0] = D$

ب) $\begin{cases} a - \sqrt{x} \geq 0 \Rightarrow \sqrt{x} \leq a \Rightarrow x \leq \frac{a^2}{4} \\ -1 \leq \sqrt{a - \sqrt{x}} \leq 1 \Rightarrow a - \sqrt{x} \leq 1 \Rightarrow \sqrt{x} \geq a - 1 \Rightarrow x \geq \frac{(a-1)^2}{4} \end{cases} \Rightarrow D = \left[\frac{(a-1)^2}{4}, \frac{a^2}{4} \right]$

الف) $\begin{cases} x > 0 \\ 1 - \log_{\frac{1}{x}} x > 0 \Rightarrow \log_{\frac{1}{x}} x < 1 \Rightarrow x > \frac{1}{x} \end{cases} \Rightarrow D_f = \left(\frac{1}{x}, +\infty \right)$

ب) $\begin{cases} x > 0 \\ 1 - \log_{\frac{1}{x}} \frac{1}{x} > 0 \Rightarrow \log_{\frac{1}{x}} \frac{1}{x} < 1 \Rightarrow x < \frac{1}{x} \end{cases} \Rightarrow D = \left(0, \frac{1}{x} \right)$

الف) $\sqrt{x^2 - n^2} - n \geq 0 \Rightarrow \sqrt{x^2 - n^2} \geq n \Rightarrow \sqrt{x^2 - n^2} \geq \sqrt{n^2} \Rightarrow x^2 - n^2 \geq n^2 \Rightarrow x^2 - 2n^2 \leq 0 \Rightarrow (x-n)(x+n) \leq 0 \Rightarrow D_f = [n, n]$

ب) $\frac{x^2 + a}{x^2 + b} \in \mathbb{W} \Rightarrow x = -\frac{bx - a}{x^2 - b} \Rightarrow x = \frac{-bx + a}{x^2 - b} \Rightarrow$

$D = \left\{ x \mid x = \frac{-bx + a}{x^2 - b}, k \in \mathbb{W} \right\}$