

الف) $2n^3 + 3n^2 - 8n + 3 = (n+3)(n-1)(2n-1) \rightarrow (n+3)(n-1)(2n-1) \neq 0$

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

ب) $2n^3 + 9n^2 + 10n + 3 = (n+3)(2n+1)(n+1) \neq 0$

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

۱

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

$D = R - \{1\}$

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

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

۲

حالت اول $\rightarrow x \geq 1: |x-1| = x-1$ $x^2 - \Delta(x-1) - 2x + \Delta = x^2 - \Delta x + \Delta - 2x + \Delta$

$= x^2 - 7x + 2\Delta$
 $= (x-2)(x-\Delta)$

حالت دوم $\rightarrow x < 1: |x-1| = 1-x$ $x^2 - \Delta(1-x) - 2x + \Delta = x^2 - \Delta + \Delta x - 2x + \Delta$

$= x^2 + 3x$
 $= x(x+3)$

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

۳

الف) $[-x] - 2 \geq 0 \rightarrow [-x] \geq 2 \rightarrow -x \geq 2 \rightarrow x \leq -2 \quad D = (-\infty, -2]$

ب) $[x]^2 - 2[x] - 3 \neq 0 \quad [x] \neq 3, [x] \neq -1 \quad -3 \leq x < 4 \quad [3, 4)$

$-1 \leq x < 0 \quad [-1, 0) \quad D = R - ([-1, 0) \cup [3, 4)) \rightarrow D = (-\infty, -1) \cup [0, 3) \cup [4, +\infty)$

۴

الف) $[n - \frac{1}{3}] + [n + \frac{2}{3}] \geq 0 \quad t = n - \frac{1}{3} \quad n + \frac{2}{3} = t + 1 \rightarrow [t] + [t+1] \geq 0$

$D: [\frac{1}{3}, +\infty) \leftarrow n \geq \frac{1}{3} \quad \leftarrow t \geq 0$

ب) $t = n - \frac{1}{3} \quad \frac{1}{3} - n = -t \quad [t] + [-t] \geq 0 \rightarrow [t] + [-t] = t - t = 0$

$[t] + [-t] = -1 \quad t \in \mathbb{Z} \quad n - \frac{1}{3} \in \mathbb{Z} \quad n = \frac{1}{3} + n \quad (n \in \mathbb{Z}) \quad D: \{\frac{1}{3} + n | n \in \mathbb{Z}\}$

۵

الف) $\tan x \rightarrow x \neq \frac{\pi}{2} + k\pi$ $\cot x \rightarrow x \neq k\pi$ $\rightarrow x \in \frac{k\pi}{2}$ $\tan x + 1 \neq 0$ $\tan x \neq -1$ $x \neq -\frac{\pi}{4} + k\pi$ $D = \mathbb{R} - \left\{ \frac{k\pi}{2}, -\frac{\pi}{4}, k\pi \mid k \in \mathbb{Z} \right\}$ ← جواب ب) $1 - \sqrt{\sin^2 x} > 0$ $\sqrt{\sin^2 x} \leq 1$ $\sin x \leq \frac{1}{\sqrt{2}}$ $D = \bigcup_{k \in \mathbb{Z}} \left[k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right]$ ← جواب	4
الف) $\sqrt{\sin x} - 1 \geq 0 \rightarrow \sin x \geq \frac{1}{4}$ $\frac{\pi}{4} \leq x \leq \frac{3\pi}{4}$ $D = \left[\frac{\pi}{4} + 2k\pi, \frac{3\pi}{4} + 2k\pi \right] \mid k \in \mathbb{Z}$ ب) $1 - \sqrt{\cos x} > 0$ $\sqrt{\cos x} \leq 1$ $\cos x \leq \frac{1}{4}$ $\frac{\pi}{4} \leq x \leq \frac{7\pi}{4}$ $D = \left[\frac{\pi}{4} + 2k\pi, \frac{3\pi}{4} + 2k\pi \right] \mid k \in \mathbb{Z}$	5
الف) $x^2 + 3x + 1 \geq -1 \rightarrow (x+1)(x+2) \geq 0$ $x^2 + 3x + 1 \leq 1 \rightarrow x(x+3) \leq 0$ $x \leq -2$ $x \geq -1$ $-3 \leq x \leq 0$ $[-2, -1] \cup [-1, 0]$ ب) $0 \leq 5 - 3x \leq 1 \rightarrow 5 - 3x \geq 0$ $5 - 3x \leq 1 \rightarrow -3x \leq -4$ $x \leq \frac{5}{3}$ $x \geq \frac{4}{3}$ $\left[\frac{4}{3}, \frac{5}{3} \right]$	6
الف) $\log_r(-\log_r x) \rightarrow x > 0$ $-\log_r x > 0$ $\log_r x < 0$ $0 < x < 1$ $D = (0, 1)$ ← جواب ب) $\frac{1 - \log_r x}{r} > 0$ $1 - \log_r x > 0 \rightarrow \log_r x < 1$ $0 < x < r$ $D = (0, r)$ ← جواب	7
الف) $\sqrt{x - x^2 - 1} \geq 0 \rightarrow (x-2)^2 + 5 \geq 0$ $-((x-2)^2 + 5) < 0$ $D = \emptyset$ ب) $r_{n+5} = n(r_n + 5)$ $r_{n+5} = 5n + r_n$ $n(5 - r_n) = 5n - r_n$ $n = \frac{5n - r_n}{5 - r_n}$ $D = \left\{ \frac{5 - r_n}{r_n - 5} \mid n = 0, 1, 2, \dots \right\}$	10