

الف) $x^2 + 3x - 4 = 0 \rightarrow (x-1)(x+4) = 0$
 $2x^3 + 3x^2 - 11x + 4 \rightarrow (x-1)(2x^2 + 5x - 4) \rightarrow (x-1)(x+4)(2x-1)$
 $D_f = \mathbb{R} - \{-3, \frac{1}{2}, 1\}$

ب) $x^2 + 3x - 4 = 0 \rightarrow (x-1)(x+4) = 0$
 $2x^3 + 9x^2 + 10x + 3 \rightarrow (x+1)(2x^2 + 7x + 3) \rightarrow (x+1)(x+4)(2x+1)$
 $D_f = \mathbb{R} - \{-3, -\frac{1}{2}, -1\}$

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الف) $x^2 - 2x^2 + 2x - 1 = 0 \rightarrow (x-1)(x^2 - x + 1) = 0$
 $D_f = \mathbb{R} - \{1\}$

ب) $y = \sqrt{\frac{x+3}{x^3 - 2x^2 + 2x - 1}}$
 $\frac{-3}{+1 - \frac{1}{x} + \frac{1}{x^2}}$
 $D_f = (-\infty, -1] \cup (1, +\infty)$

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$x^2 - 5|x-1| - 2x + 5 = 0$
 $x > 0 \rightarrow x^2 - 5x + 5 - 2x + 5 = 0 \rightarrow x^2 - 7x + 10 = 0 \rightarrow (x-2)(x-5) = 0$
 $x < 0 \rightarrow x^2 + 5x - 5 - 2x + 5 = 0 \rightarrow x^2 + 3x = 0 \rightarrow x(x+3) = 0$
 $D_f = \mathbb{R} - \{-3, 0, 2, 5\}$

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

ب) $[x]^2 - 2[x] - 3 \neq 0 \rightarrow [x] = t \rightarrow t^2 - 2t - 3 = 0 \rightarrow (t-3)(t+1) = 0$
 $[x] = -1 \rightarrow x = [-1, 0)$
 $[x] = 3 \rightarrow x = [3, 4)$
 $D_f = \mathbb{R} - \{-1, 0, 3, 4\}$

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

ب) $[x - \frac{1}{x}] + [-(x - \frac{1}{x})] \rightarrow \begin{cases} a \in \mathbb{Z} & [a] + [-a] = 0 \\ a \notin \mathbb{Z} & [a] + [-a] = -1 \end{cases} \Rightarrow x - \frac{1}{x} \in \mathbb{Z}$
 $D_f = \{x \mid x = k + \frac{1}{k}, k \in \mathbb{Z}\}$

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الف) $\tan n + 1 \neq 0 \quad \tan n \neq -1 \quad D_f, \mathbb{R} - \left\{ K\pi - \frac{\pi}{4} \right\}$ $\tan n \rightarrow \cdot \neq \cot n \rightarrow n \neq K\pi + \frac{\pi}{4}$ $\cot n \rightarrow \cdot \neq \tan n \rightarrow n \neq K\pi$ ب) $1 - \tan^2 n \geq 0 \quad \tan^2 n \leq 1 \quad \sin^2 n \leq \frac{1}{4} \quad -\frac{1}{4} \leq \sin n \leq \frac{1}{4}$ $D_f = \left[K\pi, K\pi + \frac{\pi}{4} \right] \cup \left[K\pi, K\pi - \frac{\pi}{4} \right]$	1.8
الف) $r \sin n - 1 \geq 0 \quad r \sin n \geq 1 \quad \sin n \geq \frac{1}{r}$ $D_f = \left[K\pi + \frac{\pi}{4}, K\pi + \frac{5\pi}{4} \right]$ ب) $1 - r \cos n \geq 0 \quad r \cos n \leq 1 \quad \cos n \leq \frac{1}{r}$ $D_f = \mathbb{R} - \left(K\pi - \frac{\pi}{4}, K\pi + \frac{\pi}{4} \right)$	9
الف) $-1 \leq \sqrt{x^2 + 3x + 1} \leq 1$ $x^2 + 3x + 1 \geq -1$ $x^2 + 3x + 2 \geq 0$ $(x+1)(x+2) \geq 0$ $x \leq -2$ or $x \geq -1$ (I) $x^2 + 3x + 1 \leq 1$ $x^2 + 3x \leq 0$ $x(x+3) \leq 0$ $-3 \leq x \leq 0$ (II) $I \cap II = [-3, -1]$ $D_f = [-3, -1] \cup [1, +\infty)$ ب) $-1 \leq \sqrt{-2x} \leq 1$ $\sqrt{-2x} \leq 1 \Rightarrow -2x \leq 1 \Rightarrow x \geq -\frac{1}{2}$ (I) $\sqrt{-2x} \geq -1 \Rightarrow -2x \geq 1 \Rightarrow x \leq -\frac{1}{2}$ (II) $I \cap II = \left\{ -\frac{1}{2} \right\}$ $D_f = \left\{ -\frac{1}{2} \right\}$	1.5
الف) $x > 0$ (I) $1 - \log_3 x > 0 \Rightarrow \log_3 x < 1 \Rightarrow x < 3$ (II) $I \cap II = (0, 3)$ $D_f = (0, 3)$ ب) $x > 0$ (I) $1 - \log_{\frac{1}{2}} x > 0 \Rightarrow \log_{\frac{1}{2}} x < 1 \Rightarrow x < \frac{1}{2}$ (II) $I \cap II = (0, \frac{1}{2}) = D_f$	1.5
الف) $r^{2n-2r} - 1 \geq 0 \quad r^{2n-2r} = 1$ $\frac{1}{r} = 1 \Rightarrow r = 1$ $D_f = [1, 3]$ ب) $\frac{r^{n+5}}{r^{n+5}} \in \mathbb{N}$ $x \in -\frac{\omega w - \omega}{\frac{rw - r}{r - rw}} \Rightarrow D_f = \left\{ x \mid x = \frac{\omega k - \omega}{r - rk}, k \in \mathbb{N} \right\}$	10

(1)

$$\begin{array}{l}
 \text{1) } \frac{x^r + rx^r - 1n + r}{-x^r + rx^r} \cdot \frac{(n-1)}{rx^r + \omega x - r} \\
 \frac{\omega x^r - 1n + r}{-\omega x^r + \omega x} \\
 \frac{-rx + r}{+rx - r} \\
 \frac{0}{0}
 \end{array}
 \quad
 \begin{array}{l}
 \frac{rx^r}{n} \leq rx^r(n-1) \leq rx^r - rx^r \\
 \frac{\omega x^r}{n} \leq \omega x(n-1) \leq \omega x^r - \omega x \\
 \frac{-rx}{n} \leq -r(n-1) \leq -rx + r \\
 x^r + \omega x - r = 0 \\
 (x+4)(x-1) \\
 \begin{cases} -4 \leq r \leq 1 \end{cases}
 \end{array}$$

$$\begin{array}{l}
 \text{2) } \frac{rx^r + 9x^r + 10x + r}{-rx^r - rx^r} \cdot \frac{(n+1)}{rx^r + vx + r} \\
 \frac{vx^r + 10x + r}{-vx^r - vx} \\
 \frac{rx + r}{-rx - r} \\
 \frac{0}{0}
 \end{array}
 \quad
 \begin{array}{l}
 \frac{rx^r}{n} \leq rx^r(n+1) \leq rx^r + rx^r \\
 \frac{vx^r}{n} \leq vx(n+1) \leq vx^r + vx \\
 \frac{rx}{n} \leq r(n+1) \leq rx + r
 \end{array}$$

$$\begin{array}{l}
 \text{3) } \frac{x^r - rx^r + rx - 1}{-x^r + x^r} \cdot \frac{(n-1)}{x^r n + 1} \\
 \frac{-x^r + rx - 1}{+x^r - x} \\
 \frac{n-1}{n+1} \\
 \frac{0}{0}
 \end{array}
 \quad
 \begin{array}{l}
 \frac{x^r}{n} \leq x^r(n-1) \leq x^r - x^r \\
 \frac{-x^r}{n} \leq -x(n-1) \leq -x^r + x
 \end{array}$$

(2)

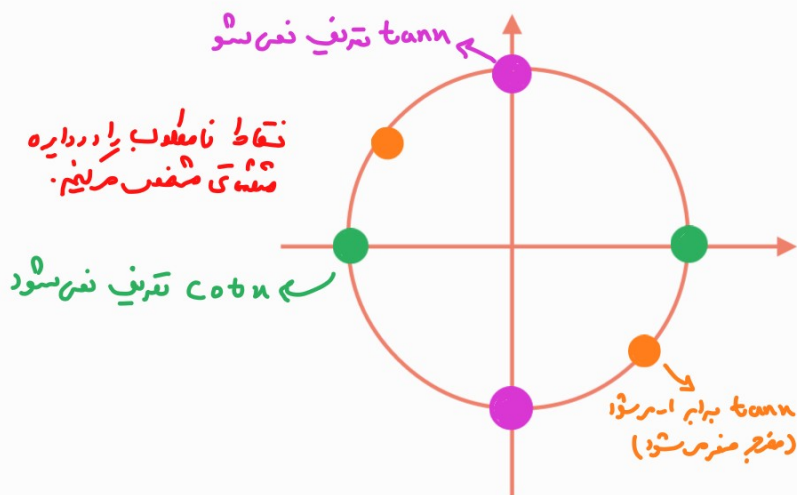
9- الف) $y = \frac{\cot x + 1}{\tan x + 1}$

$x \neq k\pi + \frac{\pi}{2}$

$x \neq k\pi + \frac{\pi}{4} \cup x \neq k\pi$

$\rightarrow x \neq \frac{k\pi}{4}$

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



8- الف) $-1 \leq x^2 + \frac{9}{x} \leq 1 \rightarrow -1 \leq x^2 + \frac{9}{x} + \frac{9}{x} - \frac{9}{x} \leq 1$

$\frac{1}{x} \leq x^2 + \frac{9}{x} + \frac{9}{x} \leq \frac{9}{x} \rightarrow \frac{1}{x} \leq (x + \frac{3}{x})^2 \leq \frac{9}{x}$

$\int (x + \frac{3}{x})^2 \leq \frac{9}{x} \rightarrow -\frac{3}{x} \leq x + \frac{3}{x} \leq \frac{3}{x} \rightarrow -3 \leq x \leq 0 \quad I$

$\int (x + \frac{3}{x})^2 \geq \frac{1}{x} \rightarrow x + \frac{3}{x} \geq \frac{1}{x} \rightarrow x \geq -1 \quad \cup \quad x + \frac{3}{x} \leq -\frac{1}{x} \rightarrow x \leq -2 \quad II$

$I \cap II \rightarrow D_f = [-3, -2] \cup [-1, 0]$

8- ب) $\sqrt{5-2x} \rightarrow 5-2x \geq 0 \rightarrow x \leq \frac{5}{2}$

$\rightarrow D_f = [1, \frac{5}{2}]$

$-1 \leq \sqrt{5-2x} \leq 1 \rightarrow 5-2x \leq 1 \rightarrow -2x \leq -4 \rightarrow x \geq 2$

همواره برقرار است ✓

9- ب) $y = \log_2 (1 - \log_{\frac{1}{2}} x)$ $\rightarrow \log_{\frac{1}{2}} x \rightarrow x > 0$

$\hookrightarrow 1 - \log_{\frac{1}{2}} x > 0 \rightarrow \log_{\frac{1}{2}} x < 1 \xrightarrow{\text{مناسب (و 1)}}$ $x > \frac{1}{2}$

$D_f = (\frac{1}{2}, +\infty)$