

الف) $\frac{x+3}{2x^3 + 3x^2 - 11x + 3} \xrightarrow{2x^3 - 11x + 3 = 0} (x-1)(2x^2 + Ax - 3)$
 $Ax^2 - 2x^2 = +3x^2 \Rightarrow A = 3$
 $= (x-1)(2x^2 + 3x - 3)$
 $x = \frac{-3 \pm \sqrt{9 + 24}}{4} = \frac{-3 \pm 5}{4} \Rightarrow D_f = \mathbb{R} - \left\{ -\frac{1}{2}, \frac{1}{2} \right\}$

ب) $\frac{x+3}{2x^3 + 9x^2 + 10x + 3} \xrightarrow{2x^3 + 10x + 3 = 0} (x+1)(2x^2 + Ax + 3)$
 $Ax^2 + 2x^2 = 9x^2 \Rightarrow A = 7$
 $= (x+1)(2x^2 + 7x + 3)$
 $x = \frac{-7 \pm \sqrt{49 - 24}}{4} = \frac{-7 \pm 5}{4} \Rightarrow D_f = \mathbb{R} - \left\{ -\frac{1}{2}, -1, -\frac{3}{2} \right\}$

الف) $\frac{x+3}{x^3 - 2x^2 + 2x - 1} \xrightarrow{1+2-2+1=0} (x-1)(x^2 + Ax + 1)$
 $Ax^2 - 2x^2 = -x^2 \Rightarrow A = -1$
 $= (x-1)(x^2 - x + 1)$
 $x = 1$
 $D_f = \mathbb{R} - \{1\}$

ب) $\sqrt{\frac{x+3}{x^3 - 2x^2 + 2x - 1}}$ تجزیه مشابه است با قسمت الف
 $x+3 \rightarrow x = -3$
 $(x-1)(x^2 - x + 1)$
 $x = 1$
 $D_f = (-\infty, -3] \cup (1, \infty)$

$y = \frac{2}{x^2 - 2|x-1| - 2x + 2}$
 $D_f = \mathbb{R} - \{-2, 0, 1, 2\}$
 $\begin{cases} x \geq 1 \rightarrow x^2 - 2x + 2 - 2x + 2 = x^2 - 4x + 4 \rightarrow x = 2, 0 \\ x < 1 \rightarrow x^2 + 2x - 2 - 2x + 2 = x^2 \rightarrow x = 0, -2 \end{cases}$

$y = \sqrt{[-x] - 2} \rightarrow [-x] \geq 2 \rightarrow 2 \leq -x < 3 \rightarrow -2 \geq x > -3$
 $D_f = (-3, -2]$
 $y = \frac{2x^2 + 9}{[x]^2 - 2[x] - 2} \rightarrow ([x]-3)([x]+1)$
 $3 \leq x < 4 \rightarrow [x] = 3$
 $-1 \leq x < 0 \rightarrow [x] = -1$
 $D_f = \mathbb{R} - \{ [2, 4) \cup [-1, 0) \}$

$y = \sqrt{[x - \frac{1}{2}] + [x + \frac{2}{3}]} \Rightarrow y = \sqrt{2[x + \frac{1}{6}] - 1} \rightarrow [x + \frac{1}{6}] \geq \frac{1}{2} \rightarrow x \geq \frac{1}{3}$
 $D_f = [\frac{1}{3}, \infty)$

$y = \sqrt{[x - \frac{1}{2}] + [\frac{1}{2} - x]} \rightarrow \sqrt{[t] + [-t]} \rightarrow (t \geq 0) \in \mathbb{Z}$
 $\rightarrow x - \frac{1}{2} \in \mathbb{Z}^+ \rightarrow x \in \mathbb{Z}^+ + \frac{1}{2}$



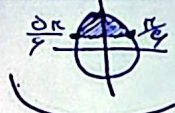
$D_f = \left\{ x \mid x \geq \frac{1}{2}, x \in \mathbb{Z} + \frac{1}{2} \right\}$

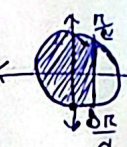
$$y = \frac{\cot x + 1}{\tan x + 1} \rightarrow y = \frac{\frac{\cos x}{\sin x} + 1}{\frac{\sin x}{\cos x} + 1} \rightarrow \frac{\cos x + \sin x}{\sin x + \cos x} = \frac{\cos x}{\sin x} = \cot x$$

$$y = \sqrt{1 - \varepsilon \sin^2 x} \rightarrow \sin^2 x \leq \frac{1}{\varepsilon} \rightarrow \frac{1}{\sqrt{\varepsilon}} \leq \sin x \leq \frac{1}{\sqrt{\varepsilon}} \rightarrow D_f = \left[k\pi - \frac{\pi}{2}, k\pi + \frac{\pi}{2} \right]$$

$\sin x \neq 0 \rightarrow x \neq k\pi$, $\cos x \neq 0 \rightarrow x \neq k\pi + \frac{\pi}{2}$, $\tan x + 1 \rightarrow x \neq 2k\pi - \frac{\pi}{4}$

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

$$y = \sqrt{r \sin x - 1} \rightarrow \sin x \geq \frac{1}{r} \rightarrow D_f = \left[2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right]$$


$$y = \sqrt{1 - r \cos x} \rightarrow \cos x \leq \frac{1}{r} \rightarrow D_f = \left[2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2} \right]$$


$$y = \arcsin(x^r + rx + 1) \rightarrow -1 \leq x^r + rx + 1 \leq 1$$

(I) $x^r + rx \leq 0 \rightarrow \frac{x}{x+1} \leq 0$

(II) $\frac{-r}{x+1} - 1 \leq x^r + rx + r \leq 0$

(I) || (II) $D_f = [-r, -1] \cup [-1, 0]$

$$y = \cos y = \sqrt{\delta - rx} \rightarrow \delta - rx \geq 0 \rightarrow x \leq \frac{\delta}{r}$$

$\sqrt{\delta - rx} \leq 1 \rightarrow rx \geq \delta - 1 \rightarrow x \geq \frac{\delta - 1}{r}$

$\rightarrow D_f = \left[\frac{\delta - 1}{r}, \frac{\delta}{r} \right]$

$$y = \log_r \left(1 - \log_r \frac{x}{r} \right) \rightarrow x > 0$$

$1 - \log_r \frac{x}{r} > 0 \rightarrow \log_r \frac{x}{r} < 1 \rightarrow x < r \Rightarrow D_f \in \emptyset$

$$y = \log_r \left(1 - \log_r \frac{1}{r} \right) \rightarrow x > 0$$

$1 > \log_r \frac{1}{r} \rightarrow x < \frac{1}{r} \Rightarrow D_f = \left(0, \frac{1}{r} \right)$

$$y = \sqrt{r^{\varepsilon x - x^r} - 1} \rightarrow \varepsilon x - x^r \geq r \rightarrow x^r - \varepsilon x + r \leq 0$$

$\rightarrow D_f = [1, +\infty]$

$$y = \left(\frac{rx + \delta}{rx + \varepsilon} \right)!$$

$\rightarrow \frac{rx + \delta}{rx + \varepsilon} \in \mathbb{N} \rightarrow x \in \frac{\varepsilon w - \delta}{r w - r}$

$\rightarrow D_f = \left\{ x \mid x = k, k \in \frac{\varepsilon w - \delta}{r w - r} \right\}$