

۲. اولین عاملی که کامل نوشتن یکی از صورت‌های تجزیه می‌شود

الف) $y = \frac{x+3}{x^2+x^2-11x+6} = \frac{x+3}{(x-1)(x-1)(x+3)} \Rightarrow$ تجزیه می‌شود

$(x-1)(x-1)(x+3) \neq 0 \Rightarrow x \neq 1, -\frac{1}{2}, -3 \Rightarrow D_f = \mathbb{R} - \{-3, -\frac{1}{2}, 1\}$

ب) $y = \frac{x+3}{x^2+9x^2+11x+6} = \frac{x+3}{(x+1)(x+1)(x+6)} \Rightarrow$ تجزیه می‌شود

$\Rightarrow (x+1)(x+1)(x+6) \neq 0 \Rightarrow x \neq -1, -\frac{1}{2}, -6 \Rightarrow D_f = \mathbb{R} - \{-6, -\frac{1}{2}, -1\}$

الف) $y = \frac{x+6}{x^2-2x^2+2x-1} = \frac{x+6}{(x-1)(x^2-x+1)} \Rightarrow$ تجزیه می‌شود

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

ب) $y = \sqrt{\frac{x+6}{x^2-2x^2+2x-1}} \Rightarrow \frac{x+6}{x^2-2x^2+2x-1} \geq 0 \Rightarrow \frac{x+6}{(x-1)(x^2-x+1)} \geq 0$

$\Rightarrow D_f = (-\infty, -3] \cup (1, +\infty) = \mathbb{R} - (-3, 1]$

$y = \frac{2}{x^2-5|x-1|-2x+8} \Rightarrow x^2-5|x-1|-2x+8 \neq 0$

$\rightarrow x \geq 1 \Rightarrow x^2-5x+5-2x+8 \neq 0 \Rightarrow x^2-7x+13 \neq 0 \Rightarrow (x-2)(x-11) \neq 0$

$\rightarrow x < 1 \Rightarrow x^2+5x-5-2x+8 \neq 0 \Rightarrow x^2+3x+3 \neq 0 \Rightarrow x(x+3) \neq 0$

$x \neq 0, -3 \Rightarrow D_f = \mathbb{R} - \{0, 2, 11, -3\}$

الف) $y = \sqrt{[x]-2} \Rightarrow [x]-2 \geq 0 \Rightarrow [x] \geq 2 \Rightarrow -x \geq 2$

$x \leq -2 \Rightarrow D_f = (-\infty, -2]$

ب) $y = \frac{5x^2+4}{[x]^2-2[x]-6} = \frac{5x^2+4}{([x]-2)([x]+3)} \Rightarrow ([x]-2)([x]+3) \neq 0$

$\left\{ \begin{array}{l} [x] \neq 2 \Rightarrow x \notin [2, 3) \\ [x] \neq -3 \Rightarrow x \notin [-3, -2) \end{array} \right\} \Rightarrow D_f = \mathbb{R} - \{[2, 3) \cup [-3, -2)\}$

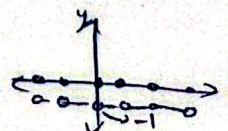
الف) $y = \sqrt{[x-\frac{1}{2}]+[x+\frac{1}{2}]} \Rightarrow [x-\frac{1}{2}]+[x+\frac{1}{2}] \geq 0$

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

$x+\frac{1}{2} \geq 1 \Rightarrow x \geq \frac{1}{2} \Rightarrow D_f = [\frac{1}{2}, +\infty)$

ب) $y = \sqrt{[x-\frac{1}{2}]+[\frac{1}{2}-x]} \Rightarrow [x-\frac{1}{2}]+[\frac{1}{2}-x] \geq 0$

$\Rightarrow x-\frac{1}{2} \in \mathbb{Z} \Rightarrow x \in \mathbb{Z} + \frac{1}{2} \Rightarrow D_f = \{x | x = k + \frac{1}{2}, k \in \mathbb{Z}\}$

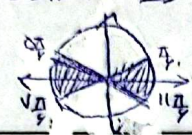


$[0] + [-0] = 0$

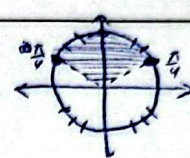
$$\text{a)} \quad y = \frac{\arctan x + 1}{\tan x + 1} = \frac{\frac{\cos x}{\sin x} + 1}{\frac{\sin x}{\cos x} + 1} \Rightarrow \begin{cases} \sin x \neq 0 \Rightarrow \mathbb{R} - \{k\pi\} \\ \cos x \neq -1 \Rightarrow \mathbb{R} - \{k\pi + \pi\} \\ \tan x \neq -1 \Rightarrow \mathbb{R} - \{k\pi - \frac{\pi}{4}\} \end{cases}$$

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

$$\text{b)} \quad y = \sqrt{1 - \varepsilon \sin^2 x} \Rightarrow 1 - \varepsilon \sin^2 x \geq 0 \Rightarrow \varepsilon \sin^2 x \leq 1 \Rightarrow \sin^2 x \leq \frac{1}{\varepsilon}$$

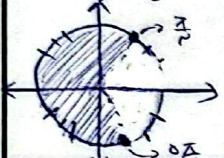
$$-\frac{1}{\sqrt{\varepsilon}} \leq \sin x \leq \frac{1}{\sqrt{\varepsilon}}$$


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

$$\text{a)} \quad y = \sqrt{y \sin x - 1} \Rightarrow y \sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{y}$$


$$D_f = \left[k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4} \right]$$

$$\text{b)} \quad y = \sqrt{1 - y \cos x} \Rightarrow 1 - y \cos x \geq 0 \Rightarrow y \cos x \leq 1 \Rightarrow \cos x \leq \frac{1}{y}$$



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

$$\text{a)} \quad y = \arcsin(x^2 + 2x + 1) \Rightarrow -1 \leq x^2 + 2x + 1 \leq 1$$

$$\begin{cases} x^2 + 2x + 1 \geq -1 \\ x^2 + 2x + 1 \leq 1 \end{cases} \Rightarrow \begin{cases} x^2 + 2x + 2 \geq 0 \\ x^2 + 2x \leq 0 \end{cases} \Rightarrow \begin{cases} (x+1)^2 \geq -1 \\ x(x+2) \leq 0 \end{cases} \Rightarrow \begin{cases} \text{always true} \\ x \in [-2, 0] \end{cases}$$

$$\Rightarrow D_f = [-2, 0] \cup [1, \infty)$$

$$\text{b)} \quad \cos y = \sqrt{\delta - yx} \Rightarrow \begin{cases} \delta - yx \geq 0 \\ -1 \leq \sqrt{\delta - yx} \leq 1 \end{cases} \Rightarrow \begin{cases} yx \leq \delta \\ \delta - yx \leq 1 \end{cases} \Rightarrow \begin{cases} yx \leq \delta \\ yx \geq \delta - 1 \end{cases}$$

$$\Rightarrow D_f = [r, r/\delta]$$

$$\text{a)} \quad y = \log_r(1 - \log_2 x) \Rightarrow \begin{cases} 1 - \log_2 x > 0 \\ 1 - \log_2 x > 0 \end{cases} \Rightarrow \begin{cases} \log_2 x < 1 \\ x > 0 \end{cases} \Rightarrow x < 2$$

$$\Rightarrow D_f = (0, 2)$$

$$\text{b)} \quad y = \log_r(1 - \log_{\frac{1}{r}} x) \Rightarrow \begin{cases} 1 - \log_{\frac{1}{r}} x > 0 \\ x > 0 \end{cases} \Rightarrow \begin{cases} \log_{\frac{1}{r}} x < 1 \\ x > 0 \end{cases} \Rightarrow x > \frac{1}{r}$$

$$D_f = \left(\frac{1}{r}, \infty \right)$$

$$\text{a)} \quad y = \sqrt{\frac{\varepsilon x - x^2}{-1}} \Rightarrow \frac{\varepsilon x - x^2}{-1} \geq 0 \Rightarrow \varepsilon x - x^2 \leq 0 \Rightarrow x(\varepsilon - x) \leq 0$$

$$\varepsilon x - x^2 \geq 0 \Rightarrow x(\varepsilon - x) \geq 0 \Rightarrow x \in [0, \varepsilon]$$

$$D_f = [0, \varepsilon]$$

$$\text{b)} \quad y = \left(\frac{x+2}{x+1} \right)^{\frac{1}{x}} \Rightarrow \frac{x+2}{x+1} \in \mathbb{W} \Rightarrow x \in \mathbb{W} - \frac{\delta - \varepsilon \mathbb{W}}{\mathbb{W} - \varepsilon} \Rightarrow x \in \frac{\delta - \varepsilon \mathbb{W}}{\mathbb{W} - \varepsilon}$$

$$\Rightarrow D_f = \left\{ x \mid x = \frac{\delta - \varepsilon k}{\mathbb{W} - \varepsilon}, k \in \mathbb{W} \right\}$$