

۲۰. انتهای عالی و لامل نوشتن

الف) $y = \frac{x+2}{2x^2+2x^2-1x+3} = \frac{x+2}{(x-1)(2x-1)(x+3)}$ $\frac{-2}{+1} + \frac{1}{+1} - \frac{1}{+1} +$

$\Rightarrow (x-1)(2x-1)(x+3) \neq 0 \rightarrow x \neq 1, \frac{1}{2}, -3 \rightarrow D_f = \mathbb{R} - \{1, \frac{1}{2}, -3\}$ ۱

$\rightarrow y = \frac{x+2}{2x^2+2x^2-1x+3}$

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

الف) $y = \frac{x+2}{x^2-2x^2+2x-1}$ منفی شود

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

$\rightarrow x+1 \neq 0 \rightarrow D_f = \mathbb{R} - \{-1\}$

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

$\rightarrow \frac{x+2}{x^2-2x^2+2x-1} > 0 \rightarrow \frac{x+2}{(x-1)(x^2-x+1)} > 0$ $\frac{-2}{+1} - \frac{1}{+1} + \frac{1}{+1} \rightarrow D_f = (-\infty, -2) \cup (1, +\infty)$ $\Rightarrow D_f = (-\infty, -2) \cup (1, +\infty)$

$y = \frac{2}{x^2-2x-1} \rightarrow x^2-2x-1 \neq 0 \Rightarrow$

$\Rightarrow \begin{cases} x > 1 \rightarrow x^2-2x-1 \neq 0 \rightarrow x^2-2x+1 \neq 0 \rightarrow (x-1)^2 \neq 0 \rightarrow x \neq 1, 2 \\ x < 1 \rightarrow x^2+2x-1 \neq 0 \rightarrow x^2+2x \neq 0 \rightarrow (x+2)x \neq 0 \rightarrow x \neq 0, -2 \end{cases}$ ۳

$\Rightarrow D_f = \mathbb{R} - \{1, 2, 0, -2\}$

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

$\xrightarrow{t=x} -x \geq 2 \rightarrow x \leq -2 \Rightarrow D_f = (-\infty, -2]$ ۴

ب) $[x]^2-2[x]-2 \neq 0 \xrightarrow{[x]=t} t^2-2t-2 \neq 0 \rightarrow (t-2)(t+1) \neq 0 \rightarrow t \neq 2, -1$

$\xrightarrow{t=[x]} \begin{cases} [x] \neq 2 \rightarrow x \notin [2, 4) \\ [x] \neq -1 \rightarrow x \notin [-1, 0) \end{cases} \Rightarrow x \notin [-1, 0) \cup [2, 4) \rightarrow D_f = \mathbb{R} - [-1, 0) \cup [2, 4)$

الف) $y = \sqrt{[x-\frac{1}{2}]} + [x+\frac{1}{2}] \rightarrow [x-\frac{1}{2}] + [x+\frac{1}{2}] \geq 0 \xrightarrow{\text{در هر یک از موارد}} [x+\frac{1}{2}] + [x+\frac{1}{2}] \geq 1$

$\rightarrow 2[x+\frac{1}{2}] \geq 1 \rightarrow [x+\frac{1}{2}] \geq \frac{1}{2} \xrightarrow{\text{این معادله را به ازای } x \text{ حل می‌کنیم}} x+\frac{1}{2} \geq \frac{1}{2} \rightarrow x \geq 0 \Rightarrow D_f = [0, +\infty)$ ۵

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

if $\begin{cases} a \in \mathbb{Z} & [a] + [-a] = 0 \\ a \notin \mathbb{Z} & [a] + [-a] = -1 \end{cases} \Rightarrow x - \frac{1}{2} \in \mathbb{Z} \Rightarrow D_f = \{x \mid x = k + \frac{1}{2}, k \in \mathbb{Z}\}$

$$\text{الف) } y = \frac{\cot x + 1}{\tan x + 1} = \frac{\frac{\cos x}{\sin x} + 1}{\frac{\sin x}{\cos x} + 1} \left\{ \begin{array}{l} \sin x \neq 0 \rightarrow x \neq k\pi \\ \cos x \neq 0 \rightarrow x \neq k\pi + \frac{\pi}{2} \\ \tan x \neq -1 \rightarrow \tan x \neq -1 \rightarrow x \neq k\pi - \frac{\pi}{4} \end{array} \right\} \xrightarrow{U} D_f = \mathbb{R} \setminus \left\{ \frac{k\pi}{2}, k\pi - \frac{\pi}{4} \right\}$$

$$\text{ب) } y = \sqrt{1 - \sin^2 x} \rightarrow 1 - \sin^2 x \geq 0 \rightarrow \sin^2 x \leq 1 \rightarrow \sin x \leq \frac{1}{r} \quad \text{د}$$

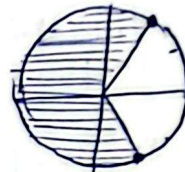
$$\rightarrow -\frac{1}{r} \leq \sin x \leq \frac{1}{r} \Rightarrow D_f = \left[k\pi - \frac{\pi}{2}, k\pi + \frac{\pi}{2} \right]$$

$$\text{الف) } y = \sqrt{r \sin x - 1} \rightarrow r \sin x - 1 \geq 0 \rightarrow r \sin x \geq \frac{1}{r}$$

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

$$\text{ب) } y = \sqrt{1 - r \cos x} \rightarrow 1 - r \cos x \geq 0 \rightarrow \cos x \leq \frac{1}{r} \quad \text{د}$$

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



$$\text{الف) } y = \arcsin(x^2 + rx + 1) \rightarrow -1 \leq x^2 + rx + 1 \leq 1$$

$$\left\{ \begin{array}{l} x^2 + rx + 1 \leq 1 \rightarrow x^2 + rx \leq 0 \rightarrow x(x+r) \leq 0 \quad \frac{-r}{2} \rightarrow x \in [-r, 0] \\ x^2 + rx + 1 \geq -1 \rightarrow x^2 + rx + 2 \geq 0 \rightarrow (x+1)(x+r) \geq 0 \quad \frac{-r-1}{2} \rightarrow x \in (-\infty, -1] \cup [-r-1, \infty) \end{array} \right\} \Rightarrow D_f = [-r, 0] \cup [-r-1, -1]$$

$$\text{ب) } \left\{ \begin{array}{l} \Delta - rx \geq 0 \rightarrow x \leq \frac{\Delta}{r} \rightarrow x \leq \sqrt{\Delta} \\ -1 \leq \sqrt{\Delta - rx} \leq 1 \rightarrow \Delta - rx \leq 1 \rightarrow x \geq r \end{array} \right\} \rightarrow r \leq x \leq \sqrt{\Delta} \Rightarrow D_f = [r, \sqrt{\Delta}]$$

$$\text{الف) } y = \log_r(1 - \log_c^x) \rightarrow 1 - \log_c^x > 0 \rightarrow \log_c^x < 1 \rightarrow x < c \Rightarrow D_f = (-\infty, c)$$

$$\text{ب) } y = \log_r(1 - \log_{\frac{1}{r}}^x) \rightarrow 1 - \log_{\frac{1}{r}}^x > 0 \rightarrow \log_{\frac{1}{r}}^x < 1 \rightarrow x > \frac{1}{r} \Rightarrow D_f = \left(\frac{1}{r}, +\infty \right)$$

$$\text{الف) } y = \sqrt{r^x x - x^r} \rightarrow r^x x - x^r \geq 0 \rightarrow r^x x \geq x^r \rightarrow r^x - x^{r-1} \geq 0$$

$$\rightarrow x[r^x - x^{r-1}] \leq 0 \rightarrow (x-1)(x-r) \leq 0 \quad \frac{1}{r} \rightarrow D_f = [1, r]$$

$$\text{ب) } y = \left(\frac{r^x + \Delta}{r^x + \epsilon} \right)! \rightarrow \frac{r^x + \Delta}{r^x + \epsilon} \in W \rightarrow r^x + \Delta = r^w x + \epsilon w \rightarrow r^x - r^w x = \epsilon w - \Delta$$

$$\rightarrow x = \frac{\epsilon w - \Delta}{r^x - r^w} \Rightarrow D_f = \left\{ x \mid x = \frac{\epsilon k - \Delta}{r^k - r^w}, k \in W \right\}$$