

الف) $y = \frac{x+3}{2x^3+3x^2+8x+3} \xrightarrow{\text{تقسیم بر } x-1} y = \frac{x+3}{(x-1)(2x-1)(x+3)} \rightarrow D_f = \mathbb{R} - \left\{ \frac{1}{2}, \frac{1}{2} \right\}$

ب) $y = \frac{x+3}{2x^3+9x^2+14x+3} \xrightarrow{\text{تقسیم بر } x+1} y = \frac{x+3}{(x+1)(2x+1)(x+3)} \rightarrow D_f = \mathbb{R} - \left\{ -\frac{1}{2}, -1, -\frac{1}{2} \right\}$

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

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

$y = \frac{x}{x^2 - 5|x-1| - 2x + 5}$

$\rightarrow x \geq 1 \Rightarrow x^2 - 5x - 2x + 5 + 5 = x^2 - 7x + 10 = 0$
 $(x-2)(x-5) = 0$

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

$D_f = \mathbb{R} - \left\{ -3, 0, 2, 5 \right\}$

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

ب) $y = \frac{5x^2+4}{[x]^2-2[x]-4} \Rightarrow \frac{5x^2+4}{([x]-2)([x]+1)} \rightarrow x \in (3, 4) / x \in (-1, 0)$

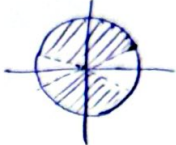
$D_f = \mathbb{R} - \left((-1, 0) \cup (3, 4) \right)$

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

$D_f = \left[\frac{1}{2}, +\infty \right)$

ب) $y = \sqrt{\left[\frac{x-1}{x} \right] \left(\frac{1}{x} - x \right)}$ ۲۰ $\rightarrow$ n باید عضو $\mathbb{Z}$ باشد در غیر این صورت جواب $\frac{1}{x}$ است که زیر رادیکال جواب غیر صحیح است.

$\rightarrow x \in \mathbb{Z} \rightarrow [a] + [-a] = 0 \rightarrow x - \frac{1}{x} \in \mathbb{Z} \rightarrow x \in \mathbb{Z} + \frac{1}{x} \rightarrow D_f = \left\{ x \mid x = k + \frac{1}{x}, k \in \mathbb{Z} \right\}$

$\text{مثال } y = \frac{\cos n + 1}{\tan n + 1} \rightarrow \sin n \neq 0$ $\cos n \neq 0$ $\tan n \neq -1$  $D_f = \mathbb{R} - \left\{ \frac{k\pi}{r}, k\pi - \frac{\pi}{2} \right\}$	8
$\rightarrow y = \sqrt{1 - \varepsilon \sin^2 n} \rightarrow \varepsilon \sin^2 n \leq 1 \rightarrow \sin^2 n \leq \frac{1}{\varepsilon} \rightarrow \frac{1}{\sqrt{\varepsilon}} \leq \sin n \leq \frac{1}{\sqrt{\varepsilon}}$ $D_f = \left[k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right]$ 	9
$\text{مثال } y = \sqrt{r \sin n - 1} \rightarrow \sin n \geq \frac{1}{r}$  $D_f = \left[r k \pi + \frac{\pi}{4}, r k \pi + \frac{5\pi}{4} \right]$ $\rightarrow y = \sqrt{1 - r \cos n} \rightarrow \cos n \leq \frac{1}{r}$  $D_f = \left[r k \pi + \frac{\pi}{r}, r k \pi + \frac{2\pi}{r} \right]$	10
$\text{مثال } y = a r \cos(n^r + r n + 1) \rightarrow -1 \leq n^r + r n + 1 \leq 1$ $-1 \leq n^r + r n + 1 \rightarrow n^r + r n + r \geq 0 \rightarrow (n+1)(n+r) \geq 0 \rightarrow \frac{r}{r+1} \leq n \leq \frac{r}{r-1}$ $n^r + r n + 1 \leq 1 \rightarrow n^r + r n \leq 0 \rightarrow n(n+r) \leq 0 \rightarrow \frac{-r}{r+1} \leq n \leq 0$ $\rightarrow D_f = [-r, -r] \cup [-1, 0]$ $\rightarrow y = \sqrt{2 - r n} \rightarrow 0 \leq 2 - r n \leq 1 \rightarrow -2 \leq -r n \leq -1 \rightarrow \frac{1}{r} \leq n \leq \frac{2}{r}$ $\rightarrow D_f = \left[\frac{1}{r}, \frac{2}{r} \right]$	11
$\text{مثال } y = \log_r (1 - \log_r^n)$ $\rightarrow 1 - \log_r^n > 0 \rightarrow \log_r^n < 1 \rightarrow n < r$ $D_f = (0, r)$ $\rightarrow y = \log_r (1 - \log_r^n \frac{1}{r})$ $\rightarrow 1 - \log_r^n \frac{1}{r} > 0 \rightarrow \log_r^n \frac{1}{r} < 1 \xrightarrow{\text{Limit}} n > \frac{1}{r}$ $D_f = \left(\frac{1}{r}, +\infty \right)$	12
$\text{مثال } y = \sqrt{r \varepsilon n - n^r} - \Lambda \rightarrow r \varepsilon n - n^r - \Lambda > 0 \rightarrow r \varepsilon n - n^r > \Lambda \rightarrow \varepsilon n - n^r > \frac{\Lambda}{r}$ $n^r - \varepsilon n + \frac{\Lambda}{r} \leq 0 \rightarrow (n-1)(n-r) \leq 0 \rightarrow \frac{1}{r} \leq n \leq r$ $D_f = [1, r]$ $\rightarrow y = \left(\frac{r n + a}{r n + 2} \right)! \rightarrow \frac{r n + a}{r n + 2} \in \mathbb{N} \rightarrow n = -\frac{2a - a}{r - r} \rightarrow D_f = \left\{ n \mid n = \frac{2k + a}{r - r}, k \in \mathbb{N} \right\}$	13