

۲. افین

الف) $\frac{x+3}{2x^3+3x^2-8x+3} \rightarrow$ مخرج ضرایب $\rightarrow (x-1)(2x^2+5x-3) \rightarrow 2x^2+5x-3=0$
 $\xrightarrow{\text{رک}} x^2+5x-6=0 \rightarrow (x+6)(x-1) \Rightarrow -\frac{6}{2} \text{ و } \frac{1}{2} \Rightarrow D_f = \mathbb{R} - \{\frac{1}{2}, -3\}$

ب) $\frac{x+3}{2x^3+9x^2+10x+3} \rightarrow (x+1)(2x^2+7x+3) \xrightarrow{\text{رک}} x^2+7x+6=0 \Rightarrow (x+6)(x+1)$
 $\rightarrow -\frac{6}{2} \text{ و } -\frac{1}{2} \Rightarrow D_f = \mathbb{R} - \{\frac{1}{2}, -3, 1\}$

الف) $\frac{x+3}{x^3-2x^2+2x-1} \rightarrow (x-1)(2x^2-2x)=0 \Rightarrow (x-1)(x^2+x+1)-2x(x-1)=0$
 $(x-1)[(x^2+x+1)-2x]=0 \Rightarrow (x-1)(x^2-x+1)=0 \Rightarrow x^2-x+1=0 \Rightarrow \Delta < 0$
 $\Rightarrow D_f = \mathbb{R} - \{-1\}$

ب) $\sqrt{\frac{x+3}{x^3-2x^2+2x-1}} \rightarrow \frac{x+3}{(x-1)(x^2-x+1)} \geq 0 \rightarrow x \geq -3$
 $D_f = (-\infty, -3] \cup (1, +\infty)$

الف) $y = \frac{2}{x^2-5/x-1-2x+5} \rightarrow x \geq 1 \Rightarrow x^2-5/(x-1)-2x+5=0$
 $\Rightarrow x^2-5x+5-2x+5=0 \Rightarrow x^2-7x+10=0$
 $\Rightarrow (x-2)(x-5)=0 \Rightarrow x \leq \frac{2}{5}$
 $x < 1 \Rightarrow x^2-5/(-x-1)-2x+5=0 \Rightarrow x^2+5x-5-2x+5=0 \Rightarrow x^2+3x=0$
 $x(x+3)=0 \Rightarrow -\frac{3}{1} \Rightarrow D_f = \mathbb{R} - \{2, 5, 0, -3\}$

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

ب) $\frac{5x^2+6}{[x]^2-2[x]-3} \rightarrow ([x]-3)([x]+1)=0 \Rightarrow [x]-3 \rightarrow [x]=3 \Rightarrow x \in [3, 4)$
 $[x]+1 \rightarrow [x]=-1 \Rightarrow x \in [-1, 0)$
 $D_f = \mathbb{R} - \{[-1, 0) \cup [3, 4)\}$

الف) $\sqrt{[x-\frac{1}{3}]+[x+\frac{2}{3}]} \rightarrow [x-\frac{1}{3}]+[x+\frac{2}{3}] \geq 0 \Rightarrow [x+\frac{2}{3}] \rightarrow [x+1-\frac{1}{3}] = [x-\frac{1}{3}]+1$
 $\Rightarrow 2[x-\frac{1}{3}]+1 \geq 0 \Rightarrow [x-\frac{1}{3}] \geq -\frac{1}{2} \Rightarrow [x-\frac{1}{3}] \geq 0 \Rightarrow x-\frac{1}{3} \geq 0 \Rightarrow D_f = [\frac{1}{3}, +\infty)$

ب) $\sqrt{[x-\frac{1}{3}]+[\frac{1}{3}-x]} \rightarrow [x-\frac{1}{3}]+[\frac{1}{3}-x] = 0$
 $\Rightarrow [x]+[-x] = 0$
 $\Rightarrow [x]+[-x] = -1$
 $x-\frac{1}{3} = k \ (k \in \mathbb{Z}) \Rightarrow x = k+\frac{1}{3}$
 $D_f = \{k+\frac{1}{3} \mid k \in \mathbb{Z}\}$

الف) $\frac{\cos x+1}{\tan x+1} \Rightarrow x = k\pi + \frac{\pi}{2} \Rightarrow$ ناهیات $x = k\pi$ کثرت $\tan x + 1 \neq 0 \Rightarrow \tan x \neq -1$
 $\Rightarrow x \neq k\pi - \frac{\pi}{4}$

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

ب) $\sqrt{1-4\sin^2 x}$ $1-4\sin^2 x \geq 0 \Rightarrow 4\sin^2 x \leq 1 \Rightarrow \sin^2 x \leq \frac{1}{4}$

$\Rightarrow -\frac{1}{2} \leq \sin x \leq \frac{1}{2} \Rightarrow D_f = \left\{ x \in \mathbb{R} \mid k\pi - \frac{\pi}{6} \leq x \leq k\pi + \frac{\pi}{6}, k \in \mathbb{Z} \right\}$

الف) $\sqrt{2\sin x - 1} \Rightarrow 2\sin x \geq 1 \Rightarrow \sin x \geq \frac{1}{2} \Rightarrow D_f = \left\{ x \in \mathbb{R} \mid 2k\pi + \frac{\pi}{6} \leq x \leq 2k\pi + \frac{5\pi}{6}, k \in \mathbb{Z} \right\}$

ب) $\sqrt{1-2\cos x} \Rightarrow 1 \geq 2\cos x \Rightarrow \cos x \leq \frac{1}{2}$

$\Rightarrow D_f = \left\{ x \in \mathbb{R} \mid 2k\pi + \frac{\pi}{3} \leq x \leq 2k\pi + \frac{5\pi}{3}, k \in \mathbb{Z} \right\}$

الف) $y = \arcsin(x^2 + 3x + 1) \Rightarrow -1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow \begin{cases} x^2 + 3x + 2 \geq 0 \\ x(x+3) \leq 0 \end{cases}$
 $D_f = [-3, -2] \cup [1, 0]$

ب) $\cos y = \sqrt{5-2x} \Rightarrow 5-2x \geq 0 \Rightarrow 5 \geq 2x \Rightarrow x \leq \frac{5}{2}$

$\sqrt{5-2x} \leq 1 \Rightarrow 5-2x \leq 1 \Rightarrow 2x \geq 4 \Rightarrow x \geq 2 \Rightarrow D_f = [2, \frac{5}{2}]$

الف) $\log_2(1-\log_3 x)$ $x > 0, 1-\log_3 x > 0 \Rightarrow \log_3 x < 1 \Rightarrow x < 3 \Rightarrow D_f = (0, 3)$

ب) $\log_2(1-\log_{\frac{1}{2}} x)$ $x > 0, 1-\log_{\frac{1}{2}} x > 0 \Rightarrow \log_{\frac{1}{2}} x < 1 \Rightarrow x > (\frac{1}{2})^1 \Rightarrow x > \frac{1}{2}$

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

الف) $\sqrt{4n-n^2}$ $4n-n^2 \geq 0 \Rightarrow 2^{4n-n^2} \geq 8 \Rightarrow 2^{4n-n^2} \geq 2^3 \Rightarrow 4n-n^2 \geq 3 \Rightarrow -n^2+4n-3 \geq 0$
 $\Rightarrow n^2-4n+3 \leq 0 \Rightarrow (n-1)(n-3) \leq 0 \Rightarrow D_f = [1, 3]$

ب) $\left(\frac{3n+5}{2n+4} \right) \mid \frac{3n+5}{2n+4} = k \ (k \in \mathbb{Z}, k \geq 0)$ $3n+5 = k(2n+4) \Rightarrow 3n+5 = 2kn+4k$
 $\Rightarrow 3n-2kn = 4k-5 \Rightarrow n(3-2k) = 4k-5 \Rightarrow n = \frac{4k-5}{3-2k} \Rightarrow D_f = \left\{ \frac{4k-5}{3-2k} \mid k \in \mathbb{N} \right\}$