

الف) $y = \frac{x+3}{2x^3+3x^2-1x+3} = \frac{x+3}{(x-1)(x+3)(2x-1)}$ $\Rightarrow (x-1)(x+3)(2x-1) \neq 0$

ب) $y = \frac{x+3}{2x^3+9x^2+10x+3} \Rightarrow 2x^3+9x^2+10x+3 \neq 0 \Rightarrow (x+1)(x+3)(2x+1) \neq 0 \Rightarrow x \neq -1, -3, -\frac{1}{2}$

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

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

$y = \frac{2}{x^2-5|x-1|-2x+5} \Rightarrow x^2-5|x-1|-2x+5 \neq 0 \Rightarrow x \geq 1 \Rightarrow x^2-6x+10 \neq 0 \Rightarrow (x-2)(x-5) \neq 0 \Rightarrow x \neq 2, 5$

$\Rightarrow D_f = \mathbb{R} - \{-3, 2, 5\}$ $x \leq 1 \Rightarrow x^2+3x+5 \neq 0 \Rightarrow x(x+3) \neq 0 \Rightarrow x \neq 0, -3$

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

ب) $y = \frac{5x^2+9}{[x]^2-2[x]-3} \Rightarrow [x]^2-2[x]-3 \neq 0 \Rightarrow ([x]-3)([x]+1) \neq 0 \Rightarrow [x] \neq -1, 3$

$D_f = (-\infty, -1) \cup [0, 3) \cup (4, +\infty)$

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

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

ب) $y = \sqrt{[x-\frac{1}{3}]+[\frac{1}{3}-x]} = \sqrt{[x-\frac{1}{3}]+[-(x-\frac{1}{3})]} \rightarrow \begin{cases} a \in \mathbb{Z} \Rightarrow [a]+[-a] = 0 \\ a \in \mathbb{Z} \Rightarrow [a]+[-a] = -1 \end{cases}$

$D_f = \{ \dots \}$

الف) $y = \frac{\cot x + 1}{\tan x + 1} \rightarrow D_f = \mathbb{R} - \{ \frac{k\pi}{2} \}$

ب) $y = \sqrt{1-4\sin^2 x} \Rightarrow (1-2\sin x)(1+2\sin x) \geq 0$

$D_f = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}] \cup [2k\pi + \frac{7\pi}{6}, 2k\pi + \frac{11\pi}{6}]$

الف) $y = \sqrt{2 \sin x - 1} \Rightarrow 2 \sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{2} \Rightarrow D_f = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$

ب) $y = \sqrt{1 - 2 \cos x} \Rightarrow \cos x \leq \frac{1}{2} \Rightarrow D_f = [2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3}]$

در بنایه آخر بازه از اول بازه فاصله باز شد

الف) $y = \arcsin(x^2 + 3x + 1) \Rightarrow -1 \leq x^2 + 3x + 1 \leq 1$
 $\Rightarrow x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0$
 $\Rightarrow x \in [-3, 0]$
 $\Rightarrow D_f = (-\infty, -3] \cup [0, +\infty)$

ب) $\cos y = \sqrt{5 - 2x} \Rightarrow -1 \leq \sqrt{5 - 2x} \leq 1 \Rightarrow 0 \leq 5 - 2x \leq 1$
 $\Rightarrow 5 - 2x \geq 0 \Rightarrow 2x \leq 5 \Rightarrow x \leq \frac{5}{2}$
 $\Rightarrow 5 - 2x \leq 1 \Rightarrow 2x \geq 4 \Rightarrow x \geq 2$
 $D_f = [2, \frac{5}{2}]$

الف) $y = \log_p(1 - \log_p x) \Rightarrow x > 0 \text{ I} / 1 - \log_p x > 0 \Rightarrow \log_p x < 1 \Rightarrow x < p \text{ II}$

$D_f = \text{I} \cap \text{II} = (0, p)$

ب) $y = \log_p(1 - \log_p \frac{x}{p}) \Rightarrow x > 0 \text{ I} / 1 - \log_p \frac{x}{p} > 0 \Rightarrow \log_p \frac{x}{p} < 1 \Rightarrow \frac{x}{p} < p \Rightarrow x < p^2$
 $D_f = \text{I} \cap \text{II} = (0, \frac{1}{p}) \cup (\frac{1}{p^2} + \infty)$

الف) $y = \sqrt{2^4 x - x^2} \Rightarrow 2^4 x - x^2 \geq 0 \Rightarrow x(2^4 - x) \geq 0 \Rightarrow x \in [0, 2^4]$
 $\Rightarrow (x-0)(x-16) \leq 0 \Rightarrow D_f = [0, 16]$

ب) $y = \left(\frac{3^x + 5}{2^x + 4} \right)!$
 $\frac{3^x + 5}{2^x + 4} \in \mathbb{N} \Rightarrow 3^x + 5 \in 2^x + 4 \Rightarrow 3^x - 2^x \in 4 - 5 \Rightarrow 3^x - 2^x \in -1$

$\Rightarrow x \in \frac{4 - 5}{3 - 2} \Rightarrow x \in -1$
 $\{x \mid x = \frac{4 - 5}{3 - 2}, k \in \mathbb{N}\} = \{-1\}$

باین الگوریتم برای n درآوردی، اما هیچگاه n برابر 2 نمی شود

برابریت
 $\frac{4w - 5}{3 - 2w} = 2 \Rightarrow 4w - 5 = 4 - 2w \Rightarrow 6w = 9 \Rightarrow w = \frac{3}{2}$

$$5- \text{ب) } \left[n - \frac{1}{r} \right] + \left[-n + \frac{1}{r} \right] \geq 0$$

مردانیم:

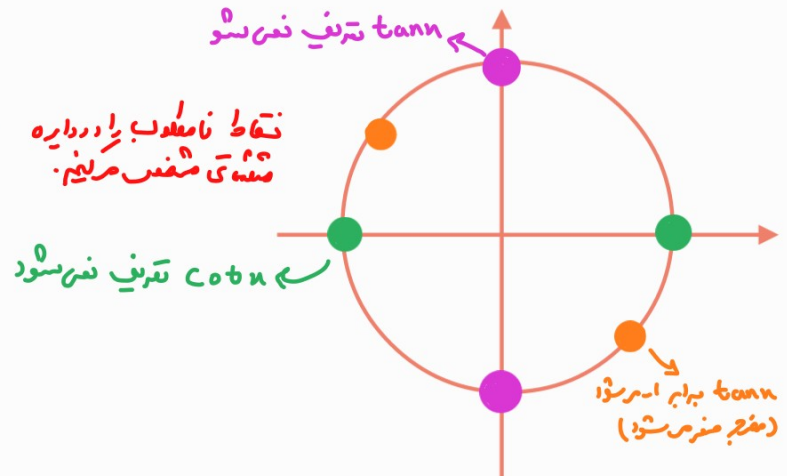
$$\begin{aligned} [n] + [-n] & \begin{cases} n \in \mathbb{Z} & 0 \checkmark \\ n \notin \mathbb{Z} & -1 \times \end{cases} \end{aligned}$$

$$\rightarrow \left[n - \frac{1}{r} \right] \in \mathbb{Z} \rightarrow n \in \mathbb{Z} + \frac{1}{r}$$

$$D_f = \left\{ n \mid n = k + \frac{1}{r}, k \in \mathbb{Z} \right\}$$

$$9- \text{الف) } y = \frac{\cot x + 1}{\tan x + 1}$$

نقاط نامعلوم را در دایره
مختصات مشخص میکنیم.



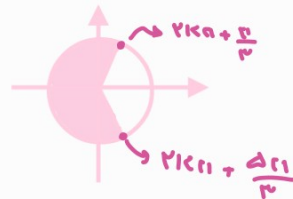
$$x \neq k\pi + \frac{\pi}{2}$$

$$x \neq k\pi + \frac{\pi}{r} \cup x \neq k\pi$$

$$\rightarrow x \neq \frac{k\pi}{r}$$

$$\rightarrow D_f = \mathbb{R} - \left\{ \frac{k\pi}{r}, k\pi + \frac{\pi}{r} \right\}$$

$$10- \text{ب) } 1 - r \cos x \geq 0 \rightarrow \cos x \leq \frac{1}{r}$$



$$\rightarrow D_f = \left[\arccos\left(\frac{1}{r}\right), \pi - \arccos\left(\frac{1}{r}\right) \right]$$

$$11- \text{الف) } -1 \leq x^2 + \frac{9}{r} + 1 \leq 1 \rightarrow -1 \leq x^2 + \frac{9}{r} \leq -\frac{1}{r} \leq 1$$

$$\frac{1}{2} \leq x^2 + \frac{9}{r} \leq \frac{9}{r} \rightarrow \frac{1}{2} \leq \left(x + \frac{3}{r}\right)^2 \leq \frac{9}{r}$$

$$\begin{cases} \left(x + \frac{3}{r}\right)^2 \leq \frac{9}{r} \rightarrow -\frac{3}{r} \leq x + \frac{3}{r} \leq \frac{3}{r} \rightarrow -\frac{6}{r} \leq x \leq 0 \quad I \\ \left(x + \frac{3}{r}\right)^2 \geq \frac{1}{2} \rightarrow x + \frac{3}{r} \geq \frac{1}{\sqrt{2}} \rightarrow x \geq -\frac{3}{r} + \frac{1}{\sqrt{2}} \quad II \end{cases}$$

$$I \cap II \rightarrow D_f = \left[-\frac{6}{r}, -\frac{3}{r} + \frac{1}{\sqrt{2}} \right] \cup \left[-\frac{3}{r}, 0 \right]$$

$$9 - \text{ب} \quad y = \log_r \left(1 - \log^{\frac{n}{r}} \frac{1}{r} \right) \rightarrow \log^{\frac{n}{r}} \frac{1}{r} \rightarrow n > 0.$$

$$\hookrightarrow 1 - \log^{\frac{n}{r}} \frac{1}{r} > 0 \rightarrow \log^{\frac{n}{r}} \frac{1}{r} < 1 \xrightarrow{\text{مناسب (مربع)}} n > \frac{1}{r}$$

$$Df_r \left(\frac{1}{r}, +\infty \right)$$