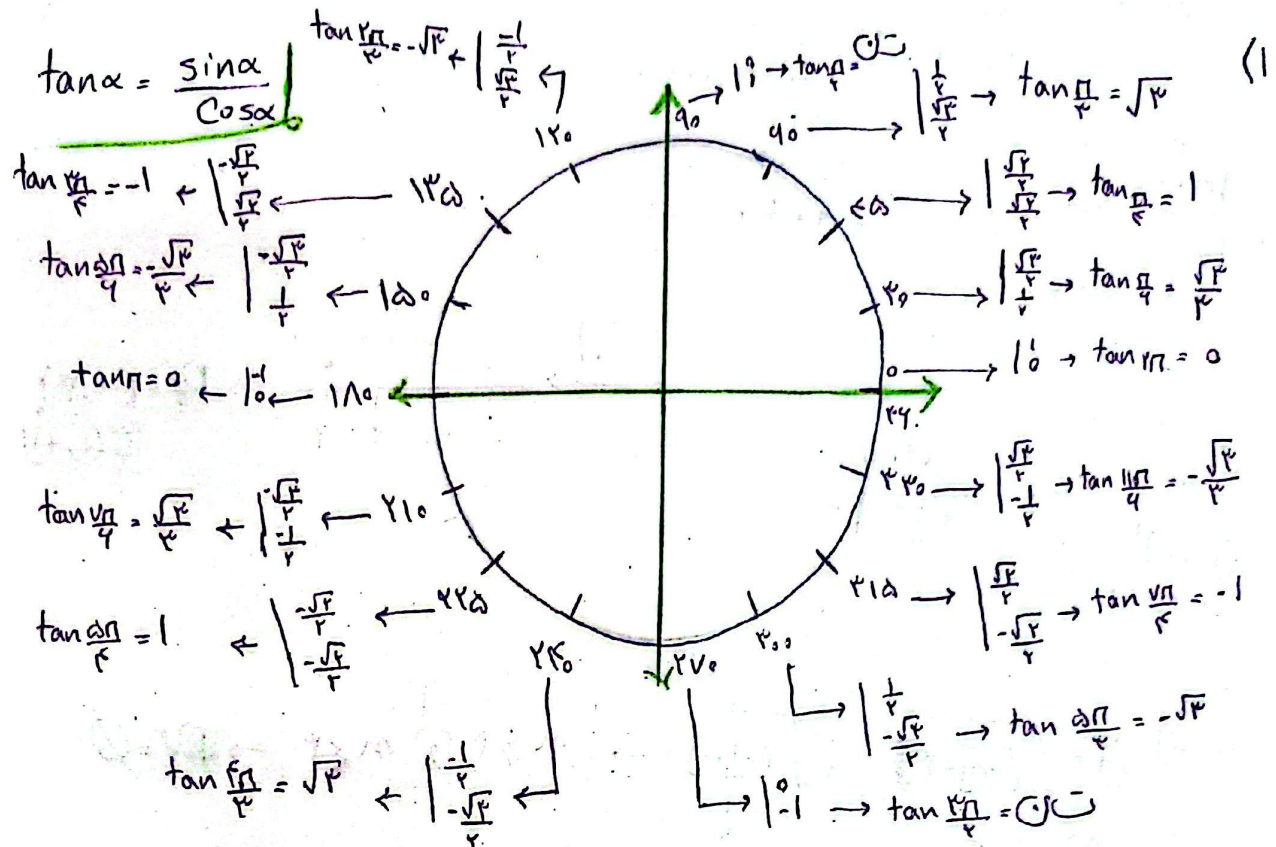




الف) $\sin \frac{\pi}{4} + \cos \frac{\pi}{4} + 2 \tan \frac{\pi}{4} = \frac{1}{\sqrt{2}} - \frac{\sqrt{2}}{2} - 2 = -\frac{3\sqrt{2}}{2}$ (1)

ب) $-\cos \frac{5\pi}{4} + \sin \frac{5\pi}{4} - 3 \sin \frac{\pi}{4} = -(-\frac{\sqrt{2}}{2}) + \frac{\sqrt{2}}{2} - 3(\frac{\sqrt{2}}{2}) = \frac{\sqrt{2}}{2}$

ج) $\cot \frac{\pi}{4} + 3 \cot \frac{\pi}{4} - 2 \tan \frac{5\pi}{4} = \frac{\sqrt{2}}{2} + 3(\frac{\sqrt{2}}{2}) - 2(-\frac{\sqrt{2}}{2}) = \frac{6\sqrt{2}}{2}$

د) $\cos(\sin \pi) + \sin(\cos \frac{\pi}{4}) = 1 + 1 = 2$

$f(a) = \begin{cases} a^2 + 2a & a \geq 1 \\ 2a + a + 2 & a < 1 \end{cases} \xrightarrow{a=1} a^2 + 2a = 2a + a + 2$ (2)

$a^2 + 2a - 2a - 2 = 0 \rightarrow a^2 - 2 = 0$
 $(a+2)(a-2) = 0$

$a = -2 \rightarrow \text{Not in domain}$
 $a = 2 \rightarrow \text{Not in domain}$

$f(1) = (1)^2 + 2(1) = 3$

$f(n) = \begin{cases} 2n^2 - b & |n+1| \geq 2 \\ a + 2n & -2 \leq n \leq -1 \end{cases}$

$|n+1| \geq 2 \rightarrow n+1 \geq 2 \rightarrow n \geq 1$
 $n+1 \leq -2 \rightarrow n \leq -3$ (3)

$n = -3 \rightarrow 2(9) - b = a - 4 \Rightarrow 18 + 4 = a + b \rightarrow a + b = 22$

$$\text{الف) } y = \frac{1}{n^2 - 4n^2} \rightarrow \frac{1}{\underset{0 \leftarrow}{n^2(n-4)} \xrightarrow{4}} \rightarrow D_f = \mathbb{R} - \{0, 4\} \quad (5)$$

$$\text{ب) } y = \frac{1}{\underbrace{2n^2 + 4n^2 + 2n + 2}_{2n^2(n+2)} \xrightarrow{2(n+2)} \frac{1}{(n+2)(2n^2+2)} \xrightarrow{(n+2) \xrightarrow{2} -2} \frac{1}{-2} \rightarrow D_f = \mathbb{R} - \{-2\}$$

$$\text{الف) } y = \sqrt{n^2 - 1} + \sqrt{n-2} \quad \left. \begin{array}{l} n^2 - 1 \geq 0 \rightarrow \frac{-1 \pm 1}{2} \\ n - 2 \geq 0 \rightarrow n \geq 2 \end{array} \right\} \rightarrow \begin{array}{c} \text{---} \bullet \text{---} \\ | \quad | \quad | \\ -1 \quad 1 \quad 2 \end{array} \quad (4)$$

$$D_f = [2, +\infty)$$

$$\text{ب) } y = \frac{\sqrt{4-4n}}{\sqrt{4n-4}} \rightarrow \left. \begin{array}{l} 4-4n \geq 0 \rightarrow n \leq 1 \\ 4n-4 \geq 0 \rightarrow n \geq 1 \end{array} \right\} \rightarrow D_f = \left(\frac{1}{4}, 1\right]$$

$$\sqrt{4n-a} + \sqrt{b-4n} \rightarrow \left. \begin{array}{l} 4n-a \geq 0 \rightarrow n \geq \frac{a}{4} \\ b-4n \geq 0 \rightarrow -4n \geq -b \rightarrow n \leq \frac{b}{4} \end{array} \right\} \quad (v)$$

$$\left. \begin{array}{l} \frac{b}{4} = 1 \rightarrow b = 4 \\ \frac{a}{4} = 1 \rightarrow a = 4 \end{array} \right\} \rightarrow \frac{b}{a} = \frac{1}{1}$$

$$\text{الف) } y = \sqrt{\frac{n^2 - n - 4}{n^2 - 14n^2 + 49}} \Rightarrow \frac{n^2 - n - 4}{(n^2 - 9)(n^2 - 7)} \geq 0$$

$$\begin{array}{c} -3 \quad -1 \quad 4 \quad 7 \\ + \quad - \quad - \quad + \end{array} \rightarrow D_f = (-\infty, -3) \cup (1, 7) \cup (7, +\infty)$$

$$\text{ب) } y = \sqrt{\frac{n^3 - 2n^2 - 5n + 4}{n^3 + 2n^2 - 5n - 4}} \rightarrow \frac{(n-1)(n-3)(n+4)}{(n+1)(n+2)(n-4)} \geq 0$$

$$\begin{array}{c} -3 \quad -2 \quad -1 \quad 1 \quad 2 \quad 4 \\ + \quad - \quad - \quad + \quad - \quad + \end{array} \rightarrow D_f = (-\infty, -3) \cup [-2, -1) \cup [1, 2) \cup [4, +\infty)$$

$$\text{الف) } \sqrt{2[n]-4} \quad 2[n]-4 \geq 0 \rightarrow [n] \geq 2 \rightarrow n \geq 2 \rightarrow D_f = [2, +\infty) \quad (9)$$

$$\text{ب) } \sqrt{2[n]-5} \quad 2[n]-5 \geq 0 \rightarrow [n] \geq 2.5 \rightarrow n \geq 3 \rightarrow D_f = [3, +\infty)$$

$$\begin{aligned}
 \text{ا) } y &= \sqrt{\frac{x+1}{|x-r|}} + \sqrt{\frac{y-x}{x^2+2x+2}} \quad (1) \\
 \frac{x+1}{|x-r|} &\geq 0 \quad \frac{-1}{-1+\phi} + \frac{r^*}{+} \\
 \frac{y-x}{x^2+2x+2} &\geq 0 \quad \rightarrow \quad \frac{y}{+ \phi -}
 \end{aligned}
 \left. \vphantom{\begin{aligned} \frac{x+1}{|x-r|} &\geq 0 \\ \frac{y-x}{x^2+2x+2} &\geq 0 \end{aligned}} \right\} \cap \rightarrow D_f = [-1, r) \cup [r, y]$$

$\in \mathbb{R}$
 $\Delta < 0$
 $\alpha > 0$

$$\begin{aligned}
 \text{ب) } y &= \sqrt{[x]-r} + \sqrt{r-[x]} \rightarrow x \geq r \wedge x < r \rightarrow D_f = \emptyset \\
 &\quad \downarrow \quad \downarrow \\
 &\quad x \geq \varepsilon \quad r \geq [x] \rightarrow x < r
 \end{aligned}$$