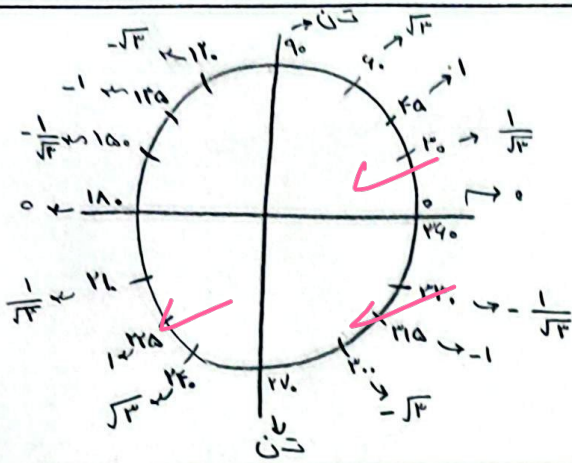




۲. افزین عالی نوشتی
 $\tan = \frac{\sin}{\cos}$

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

ب) $-\cos \frac{5\pi}{4} + \sin \frac{\pi}{4} - \tan \frac{\pi}{4} = -(-\frac{\sqrt{2}}{2}) + \frac{\sqrt{2}}{2} - 1 = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - 1 = \sqrt{2} - 1$

ج) $\cot \frac{\pi}{4} + \tan \frac{\pi}{4} - \tan \frac{5\pi}{4} = 1 + 1 - (-1) = 3$

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

$f(x) = \begin{cases} x^2 + kx & x \geq a \\ kx + a + r & x < a \end{cases}$

$a^2 + ka = ra + a + r \rightarrow a^2 + a - r = 0 \rightarrow a = -r$
 $\rightarrow a = 1$

① $a = -r \begin{cases} x^2 + kx & x \geq -r \\ kx & x < -r \end{cases}$

$f(1) = 2$

② $a = 1 \begin{cases} x^2 + kx & x \geq 1 \\ kx + r & x < 1 \end{cases} \quad f(1) = 2$

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

$11 - b = a - 4 \rightarrow a + b = 15$

الف) $y = \frac{1}{x^2 - kx^2}$

$x^2 - kx^2 \neq 0 \rightarrow x^2(x - k) \neq 0$

$D_f = \mathbb{R} - \{0, k\}$

ب) $y = \frac{1}{kx^2 + kx^2 + kx + k}$

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

$k[x^2(x+1) + 1(x+1)] \neq 0 \rightarrow k(x+1)(x^2+1) \neq 0$

$D_f = \mathbb{R} - \{-1\}$

الف) $y = \sqrt{x^2 - 1} + \sqrt{x - r}$

I: $x^2 - 1 \geq 0 \rightarrow (x-1)(x+1) \geq 0$

$\frac{-1 \pm 1}{2} \rightarrow (-\infty, -1] \cup [1, +\infty)$

II: $x - r \geq 0 \rightarrow x \geq r \rightarrow [r, +\infty)$

$D_f = [r, +\infty)$

ب) $y = \frac{\sqrt{4 - 3x}}{\sqrt{4x - r}}$

I: $4 - 3x \geq 0 \rightarrow 3x \leq 4 \rightarrow x \leq \frac{4}{3}$

$D_f = (\frac{1}{4}, \frac{4}{3}]$

II: $4x - r \geq 0 \rightarrow 4x \geq r \rightarrow x \geq \frac{r}{4}$

$$y = \sqrt{4x-a} + \sqrt{b-3x}$$

$$D_f = \{r\}$$

$$|r-a| \rightarrow a \geq r$$

$$b-4 \geq 0 \rightarrow b \geq 4$$

$$\frac{b}{a} = \frac{4}{1r} = \frac{1}{r}$$

$$\text{الف) } y = \sqrt{\frac{x^2-x-4}{x^2-13x^2+49}}$$

$$\frac{x^2-x-4}{x^2-13x^2+49} \geq 0 \rightarrow \frac{(x+1)(x-4)}{(x^2-9)(x^2-4)} \geq 0 \rightarrow \frac{-1}{+} \frac{-1}{-} \frac{+}{-} \frac{+}{+}$$

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

$$\text{ب) } \sqrt{\frac{x^2-2x^2-5x+9}{x^2+2x^2-5x-9}}$$

$$\frac{x^2-2x^2-5x+9}{x^2+2x^2-5x-9} \geq 0 \rightarrow \frac{(x-1)(x+2)(x-3)}{(x+1)(x-2)(x+3)} \geq 0$$

$$\begin{array}{r} x^2-2x^2-5x+9 \\ x^2-x^2 \\ \hline -x^2-5x+9 \\ -x^2+x \\ \hline -4x+9 \\ -4x+4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} x^2+2x^2-5x-9 \\ x^2+x^2 \\ \hline x^2-5x-9 \\ x^2+x \\ \hline -4x-9 \\ -4x-4 \\ \hline 5 \end{array}$$

$$\frac{-1}{+} \frac{-1}{-} \frac{-1}{+} \frac{+}{+}$$

$$D_f = (-\infty, -1) \cup [-1, 1] \cup [1, 2] \cup [2, +\infty)$$

$$\text{الف) } y = \sqrt{r[x]} - r$$

$$r[x] - r \geq 0 \rightarrow r[x] \geq r \rightarrow [x] \geq r \mid x \in [r, +\infty) \mid D_f = [r, +\infty)$$

$$\text{ب) } \sqrt{r[x]} - a$$

$$r[x] - a \geq 0 \rightarrow r[x] \geq a \rightarrow [x] \geq \frac{a}{r}$$

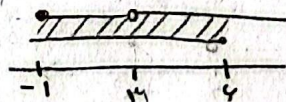
$$D_f = [\frac{a}{r}, +\infty)$$

$$\text{الف) } y = \sqrt{\frac{x+1}{|x-1|}} + \sqrt{\frac{4-x}{x^2+2x+1}}$$

$$I: \frac{x+1}{|x-1|} \geq 0 \rightarrow \frac{-1}{-} \frac{+}{+} \rightarrow [-1, 1) \cup (1, +\infty)$$

$$II: \frac{4-x}{x^2+2x+1} \geq 0$$

$$\frac{4}{+} \frac{-}{-} \rightarrow (-\infty, 4]$$

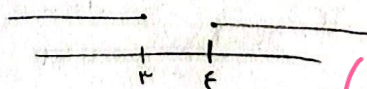


$$D_f = [-1, 1) \cup (1, 4]$$

$$\text{ب) } y = \sqrt{[x] - r} + \sqrt{r - [x]}$$

$$I: [x] - r \geq 0 \rightarrow [x] \geq r \rightarrow x \in [r, +\infty)$$

$$II: r - [x] \geq 0 \rightarrow [x] \leq r \rightarrow x \in (-\infty, r)$$



$$D_f = \emptyset$$