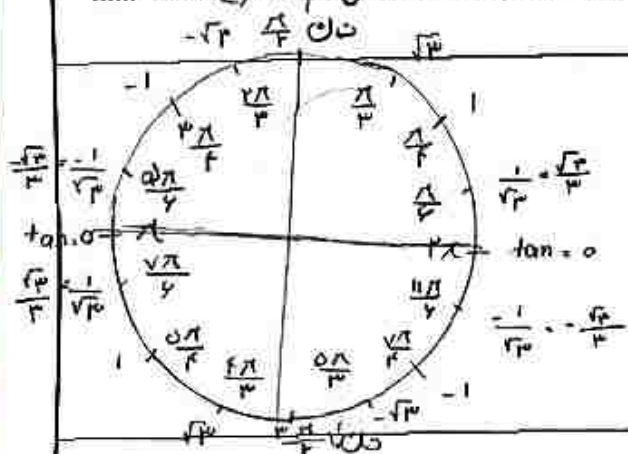




الف) $\sin \frac{\pi}{4} + \cos \pi + 2 \tan \frac{3\pi}{4} \Rightarrow \frac{1}{\sqrt{2}} + (-1) + (-2) \Rightarrow \frac{-5}{\sqrt{2}}$

ب) $-\cos \frac{5\pi}{4} + \sin \frac{3\pi}{4} - 2 \sin \frac{\pi}{4} \Rightarrow \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - \frac{2\sqrt{2}}{2} = 0$

ج) $\cot \frac{3\pi}{4} + 2 \cot \frac{\pi}{4} - \tan \frac{5\pi}{4} \Rightarrow -\frac{1}{\sqrt{2}} + \frac{2}{\sqrt{2}} + \frac{1}{\sqrt{2}} = \frac{2}{\sqrt{2}} \Rightarrow \frac{\sqrt{2}}{1} = \sqrt{2}$

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

$$f(x) = \begin{cases} x^2 + f(x) & x > 1 \\ x^2 + a + x & x \leq 1 \end{cases} \quad x=a \Rightarrow \begin{cases} a^2 + fa = fa + a + a \\ a^2 + a + x = (a-1)(a+x) \end{cases}$$

Dividing
 $\rightarrow f(1) = \frac{1+1+2}{1+1} = 2$

$$f(x) = \begin{cases} x^2 - b & |x+1| > 2 \\ a + x & -2 \leq x \leq -1 \end{cases} \Rightarrow \begin{cases} x+1 > 2 \\ x+1 \leq -2 \end{cases} \Rightarrow \begin{cases} x > 1 \\ x \leq -3 \end{cases}$$

if $x = -3 \rightarrow 1a - b = a - 9$
 $1a + 1 = a + b$
 $\underline{b = a + 10}$

الف) $y = \frac{1}{x^2 - f(x^2)} \rightarrow x^2 - f(x^2) = 0 \quad Df = R - \{0, f\}$
 $x^2(x-f) = 0 \quad \begin{cases} x=0 \\ x=f \end{cases}$

ب) $\frac{1}{x^2 + x^2 + x + f} \rightarrow \frac{1}{x^2(x+1) + x(x+f)} \Rightarrow \frac{1}{(x+1)(x^2+f)}$
 $(x+1)(x^2+f) = 0 \rightarrow x = -1 \quad Df = R - \{-1\}$

مثال) $y = \sqrt{x^2 - 1} + \sqrt{x - 2} \Rightarrow x^2 - 1 \geq 0 \rightarrow (x+1)(x-1) \geq 0 \quad \frac{-1}{+} \frac{-1}{-} \frac{+}{+}$ ①

$x - 2 \geq 0 \rightarrow x \geq 2$ ②

① ② $\Rightarrow D_f = (2, +\infty)$

ب) $y = \frac{\sqrt{4-x^2}}{\sqrt{4x-1^2}} \rightarrow 4-x^2 \geq 0 \rightarrow 4 \geq x^2 \rightarrow x \geq 2 \quad D_f = (\frac{1}{4}, 2]$
 $\sqrt{4x-1^2} \rightarrow 4x-1 \geq 0 \rightarrow 4x \geq 1 \rightarrow x \geq \frac{1}{4}$

$y = \sqrt{rx - a} + \sqrt{b - rx}$

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

$b - rx \geq 0 \rightarrow rx \leq b \rightarrow x \leq \frac{b}{r}$

$\frac{b}{r} = r \rightarrow \boxed{b = r^2} \quad \frac{a}{r} = r \rightarrow \boxed{a = r^2}$

$\frac{b}{a} = \frac{r^2}{r^2} = \boxed{\frac{1}{r}}$

مثال) $\sqrt{\frac{x^2 - x - 2}{x^2 - 1^2 x^2 + 1^2 y}} \Rightarrow \sqrt{\frac{(x-2)(x+1)}{(x^2-1)(x^2-9)}} \Rightarrow \sqrt{\frac{(x-2)(x+1)}{(x+1)(x-1)(x+3)(x-3)}} \Rightarrow$
 $\frac{-2}{+} \frac{+}{-} \frac{+}{-} \frac{+}{+} \quad D_f = (-\infty, -3) \cup (-1, 2) \cup (3, +\infty) \cup (-\infty, -1) \cup (2, +\infty) \cup (-3, 3)$

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

مثال) $y = \sqrt{r[x] - 1} \Rightarrow r[x] \geq 1 \rightarrow [x] \geq \frac{1}{r} \rightarrow D_f = [\frac{1}{r}, +\infty)$

ب) $y = \sqrt{r[x] - 0} \Rightarrow r[x] \geq 0 \rightarrow [x] \geq 0 \rightarrow D_f = [0, +\infty)$

$x \geq -1$

مثال) $y = \sqrt{\frac{x+1}{x^2-1}} + \sqrt{\frac{y-x}{x^2+2x+1}} \Rightarrow \frac{-1}{+} \frac{+}{-} \frac{+}{+} \frac{-x}{+} \frac{y}{+} \frac{+}{-}$
 $|x-1| = 1 \rightarrow x = 2 \quad (x+1)^2 \quad (-1, 2) \cup (2, +\infty) \cap ((-\infty, -2) \cup [-2, 2])$
 $\Rightarrow [-1, 2] \cup (2, 2]$

ب) $y = \sqrt{[x] - 1} + \sqrt{2 - [x]} \Rightarrow$

$[x] - 1 \geq 0 \rightarrow [x] \geq 1 \rightarrow x \geq 1 \quad \left\{ \begin{array}{l} 2 - [x] \geq 0 \\ 2 \geq [x] \rightarrow x < 3 \end{array} \right. \Rightarrow \boxed{[1, 3]}$