

$$\begin{aligned} \text{الف)} \quad & \left. \begin{aligned} x^2 - 1 \geq 0 &\rightarrow x^2 \geq 1 \rightarrow (-\infty, -1] \cup [1, +\infty) \\ x - 2 \geq 0 &\rightarrow x \geq 2 \rightarrow [2, +\infty) \end{aligned} \right\} \Rightarrow [1, +\infty) \rightarrow D_f = [1, +\infty) \end{aligned}$$

$$\begin{aligned} \text{ب)} \quad & \left. \begin{aligned} 2 - 3x > 0 &\rightarrow 2x \leq 2 \rightarrow x \leq 1 \\ 4x - 2 > 0 &\rightarrow 4x > 2 \rightarrow x > \frac{1}{2} \end{aligned} \right\} \Rightarrow D_f = \left(\frac{1}{2}, 1\right] \end{aligned}$$

$$\begin{aligned} \sqrt{12-a} + \sqrt{b-4} &= 0 \\ \downarrow \quad \quad \downarrow \\ 12-a=0 \quad b-4=0 \\ \boxed{a=12} \quad \boxed{b=4} \end{aligned} \quad \frac{b}{a} = \frac{4}{12} = \frac{1}{3}$$

$$\text{الف)} \quad y = \sqrt{\frac{(x-3)(x+2)}{(x^2-4)^2 - x^2}} = \sqrt{\frac{(x-3)(x+2)}{(x^2-x-4)(x^2+x-4)}} = \sqrt{\frac{(x-3)(x+2)}{(x-4)(x+4)(x+2)(x-2)}} = \sqrt{\frac{1}{(x+4)(x-2)}}$$

$$\frac{1}{(x+4)(x-2)} \geq 0 \quad \frac{x}{y} + \frac{-4}{4} - \frac{2}{4} + \frac{2}{4} \rightarrow D_f = (-\infty, -4) \cup (2, +\infty)$$

$$\text{ب)} \quad y = \sqrt{\frac{(x-1)(x-3)(x+2)}{(x+1)(x+4)(x-2)}} \geq 0 \quad \frac{x}{y} + \frac{-3}{4} - \frac{1}{4} + \frac{1}{4} - \frac{1}{4} + \frac{2}{4} - \frac{2}{4} + \frac{2}{4} \rightarrow D_f = (-\infty, -4) \cup [-2, -1) \cup [2, 4) \cup [4, +\infty)$$

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

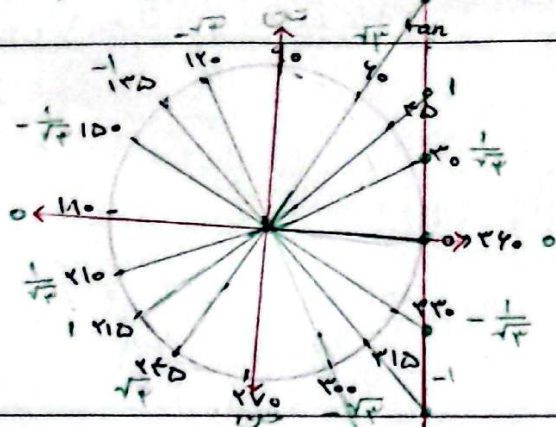
$$\text{ب)} \quad y = \sqrt{x[x]-5} \rightarrow x[x]-5 \geq 0 \rightarrow x[x] \geq 5 \rightarrow [x] \geq \frac{5}{x} \rightarrow [x] \geq 3 \rightarrow D_f = [3, +\infty)$$

$$\text{الف)} \quad \frac{x+1}{|x-3|} \geq 0 \quad \frac{x}{y} + \frac{-1}{4} - \frac{3}{4} + \frac{3}{4} \rightarrow (-\infty, -1] \cup (3, +\infty) \Rightarrow D_f = (-\infty, -1] \cup (3, 4]$$

$$\frac{4-x}{x^2+x+4} \geq 0 \quad \frac{x}{y} + \frac{4}{4} - \frac{4}{4} \rightarrow (-\infty, 4]$$

$$[x]-4 \geq 0 \rightarrow [x] \geq 4 \rightarrow [4, +\infty)$$

$$\text{ب)} \quad \begin{aligned} x-[x] \geq 0 &\rightarrow [x] \leq x \rightarrow (-\infty, 4) \\ 2-[x] \geq 0 &\rightarrow [x] \leq 2 \rightarrow (-\infty, 2) \end{aligned} \Rightarrow D_f = \emptyset$$



ا) $\frac{1}{\sqrt{2}} + (-1) + (2 \times 1) = -\frac{5}{\sqrt{2}}$
 ب) $-(-\frac{\sqrt{2}}{2}) + (\frac{\sqrt{2}}{2}) - (2 \times -\frac{\sqrt{2}}{2}) = \sqrt{2} + \frac{2\sqrt{2}}{2} = \frac{5\sqrt{2}}{2}$
 ج) $-\frac{\sqrt{2}}{2} + (\sqrt{2}) - (2 \times -\frac{\sqrt{2}}{2}) = \frac{4\sqrt{2}}{2}$
 د) $\cos 0 + \sin(\frac{\pi}{2}) = 1 + 1 = 2$

$a^2 + 4a = 2a + a + 2$
 $a^2 + a - 2 = 0 \rightarrow \boxed{a=1}$
 $a = -2$ و $a = 2$
 $f(1) = 1 + 4 = \boxed{5}$

$|x+1| \geq 2 \rightarrow \begin{cases} x+1 \geq 2 \rightarrow x \geq 1 \\ x+1 \leq -2 \rightarrow \boxed{x \leq -3} \end{cases}$
 $\boxed{-3 \leq x \leq 1}$
 $x = -3 \rightarrow \begin{cases} 1 - b = a - 2 \\ \boxed{a + b = 24} \end{cases}$

ا) $x^2 - 4x^2 \neq 0 \rightarrow x^2(x-4) \neq 0 \rightarrow \begin{cases} x \neq 0 \\ x \neq 4 \end{cases} \rightarrow D_f = \mathbb{R} - \{0, 4\}$

ب) $2x^2 + 2x + 4x^2 + 4 \neq 0 \rightarrow 2x(x^2+1) + 4(x^2+1) \neq 0 \rightarrow (2x+4)(x^2+1) \neq 0 \rightarrow \begin{cases} x^2 \neq -1 \\ \boxed{x \neq -2} \end{cases}$
 $D_f = \mathbb{R} - \{-2\}$