

$$\begin{aligned} \sin 0^\circ &= 0 & \sin 180^\circ &= 0 \\ \sin 90^\circ &= 1 & \sin 270^\circ &= -1 \\ \sin 45^\circ &= \frac{\sqrt{2}}{2} & \sin 225^\circ &= -\frac{\sqrt{2}}{2} \\ \sin 135^\circ &= \frac{\sqrt{2}}{2} & \sin 315^\circ &= -\frac{\sqrt{2}}{2} \\ \sin 60^\circ &= \frac{\sqrt{3}}{2} & \sin 240^\circ &= -\frac{\sqrt{3}}{2} \\ \sin 150^\circ &= \frac{1}{2} & \sin 330^\circ &= -\frac{1}{2} \end{aligned}$$

الف) $\frac{1}{4} + (-1) + 2 \times (-1) = -2.25$

ب) $\frac{1}{4} + \frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4} - 2 \times (-\frac{\sqrt{3}}{4}) = \frac{1+\sqrt{3}}{2}$

ج) $-\frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4} + \frac{1}{4} = \frac{1}{4}$

د) $1 + 1 + 2 = 4$

$a^2 + 2a = 2a + a + a \Rightarrow a^2 + a - 2 = 0$

$(a-1)(a+2) = 0 \Rightarrow a_1 = 1, a_2 = -2$

$f(x) = \begin{cases} x^2 + 2x & x \geq 1 \\ 2x + 2 & x \leq 1 \end{cases} \rightarrow f(1) = 3$

$|x+1| \geq 2 \Rightarrow x+1 \geq 2 \vee x+1 \leq -2 \Rightarrow x \geq 1, x \leq -3$

$x=1 \Rightarrow x-b = -2+a \Rightarrow a+b=3$

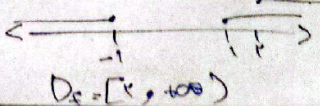
الف) $x^2 - \varepsilon x^2 \neq 0 \rightarrow x(x^2 - \varepsilon) \neq 0 \rightarrow x \neq 0, \pm \sqrt{\varepsilon}$

$D_f = \mathbb{R} - \{0, -1, 2\}$

ب) $\forall x \in \mathbb{R} \setminus \{0, -1, 2\} \quad x^2 + 2x \neq 0 \Rightarrow x^2 + 2x + 1 \neq 1 \Rightarrow (x+1)^2 \neq 1 \Rightarrow (x+1) \neq \pm 1 \Rightarrow x \neq 0, -2$
 $D_f = \mathbb{R} - \{0, -2\}$

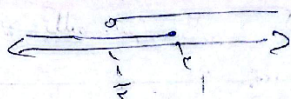
الف) $x^2 - 1 \geq 0 \Rightarrow x \geq 1, x \leq -1$

$x-2 \geq 0 \Rightarrow x \geq 2$



$D_f = (-1, 1)$

$$\begin{aligned} \rightarrow x - \infty &\leq 0 \rightarrow x \leq \infty \\ x - \infty &\geq 0 \rightarrow x \geq \frac{1}{x} \end{aligned}$$



$$D_f = \left(\frac{1}{2}, 1\right]$$

$$x - \infty = 0 \rightarrow x = \infty$$

$$b = \infty = 0 \rightarrow x = \infty \rightarrow \frac{b}{x} = \frac{\infty}{\infty} = \frac{1}{x}$$

①

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

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

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

01) $\frac{x^2 - 1}{x^2 + 1} \geq 0 \rightarrow [x] \geq 1 \rightarrow x \leq \infty$

02) $\frac{x^2 - 1}{x^2 + 1} \geq 0 \rightarrow [x] \geq 1 \rightarrow x \leq \infty$

②

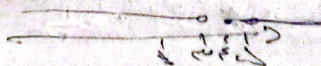
01) $\frac{x+1}{x-1} \geq 0 \rightarrow \frac{x+1}{x-1} \geq 0 \rightarrow \frac{x+1}{x-1} \geq 0 \rightarrow \frac{x+1}{x-1} \geq 0 \rightarrow \frac{x+1}{x-1} \geq 0$

$$\frac{x+1}{x-1} \geq 0 \rightarrow \frac{x+1}{x-1} \geq 0 \rightarrow \frac{x+1}{x-1} \geq 0 \rightarrow \frac{x+1}{x-1} \geq 0 \rightarrow \frac{x+1}{x-1} \geq 0$$

$$\rightarrow [x] - 1 \geq 0 \rightarrow x \leq \infty$$

$$x - [x] \geq 0 \rightarrow [x] \leq x \rightarrow x \leq \infty$$

$$D_f = \{0\}$$



③