

الف) $\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right] \geq 0$ (5)

$\left[x + \frac{1}{x} - 1\right] + \left[x + \frac{1}{x}\right] \geq 0 \rightarrow \left[x + \frac{1}{x}\right] - 1 + \left[x + \frac{1}{x}\right] \geq 0$

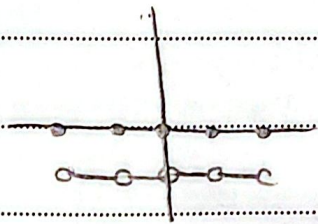
$\rightarrow 2\left[x + \frac{1}{x}\right] \geq 1 \rightarrow \left[x + \frac{1}{x}\right] \geq \frac{1}{2} \rightarrow x + \frac{1}{x} \geq 1$

$\rightarrow x \geq \frac{1}{x} = D_y$

ب) $\left[x - \frac{1}{x}\right] + \left[\frac{1}{x} - x\right] \geq 0$

$\rightarrow x - \frac{1}{x} \in \mathbb{Z} \rightarrow x \in \mathbb{Z} + \frac{1}{x}$

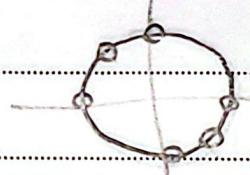
$D_y = \left\{x \mid x = k + \frac{1}{x}, k \in \mathbb{Z}\right\}$



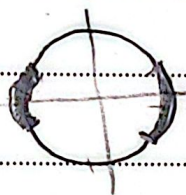
الف) I: $\cot = \frac{\cos}{\sin} \rightarrow \sin \neq 0$ II: $\tan = \frac{\sin}{\cos} \rightarrow \cos \neq 0$ (6)

III: $\tan x + 1 \neq 0 \rightarrow \tan x \neq -1$

$D_y = \mathbb{R} - \left\{\frac{k\pi}{4}, k\pi - \frac{\pi}{4}\right\}$



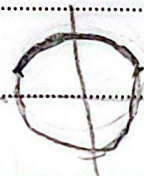
ب) $1 - \sqrt{\sin^2 x} \geq 0 \rightarrow \sin^2 x \leq \frac{1}{4} \rightarrow -\frac{1}{2} \leq \sin x \leq \frac{1}{2}$



$D_y = \left[\frac{k\pi}{2} - \frac{\pi}{6}, \frac{k\pi}{2} + \frac{\pi}{6}\right]$ (7)

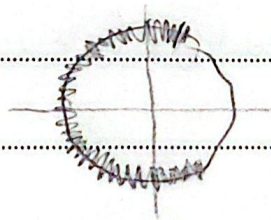
الف) $2\sin x - 1 \geq 0 \rightarrow \sin x \geq \frac{1}{2} \rightarrow$

$D_y = \left[\frac{2k\pi}{3} + \frac{\pi}{6}, \frac{2k\pi}{3} + \frac{5\pi}{6}\right]$



ب) $1 - 2\cos x \geq 0 \rightarrow \cos x \leq \frac{1}{2}$

$D_y = \left[\frac{k\pi}{3} + \frac{\pi}{3}, \frac{k\pi}{3} - \frac{\pi}{3}\right]$



$$1) \text{ الف) } -1 \leq x^2 + 3x + 1 \leq 1 \quad \begin{cases} \text{I} > x^2 + 3x < 0 \rightarrow \frac{-3 \pm 0}{\pm 1 - 1 \pm} \\ x \in [-3, 0] \\ \text{II} > x^2 + 3x + 1 \leq 1 \rightarrow \frac{-3 \pm 1}{\pm 1 - 1 \pm} \rightarrow (-\infty, -1] \cup [-1, +\infty) \end{cases} \quad \text{A}$$

$$2) I \cap II \rightarrow [-3, -1] \cup [-1, 0]$$

$$3) \text{ ب) } -1 \leq \sqrt{2 - 2x} \leq 1 \rightarrow 0 \leq \sqrt{2 - 2x} \leq 1$$

$$4) \text{ ج) } 0 < 2 - 2x \leq 1 \rightarrow 1 \leq 2x \leq 2 \rightarrow 1/2 \leq x \leq 1$$

$$5) D_f = [1/2, 1]$$

$$6) \text{ الف) } I > x > 0 \quad II > 1 - \log_3 x > 0 \rightarrow \log_3 x < 1 \rightarrow x < 3 \quad \text{9}$$

$$7) I \cap II \rightarrow (0, 3)$$

$$8) \text{ ب) } I > x > 0 \quad II > 1 - \log_{1/3} x > 0 \rightarrow \log_{1/3} x < 1 \rightarrow x > 1/3$$

$$9) I \cap II = (1/3, +\infty)$$

$$10) \text{ الف) } x^2 - x^2 - 2^x > 0 \rightarrow x^2 - x^2 \geq 2^x \rightarrow x^2 - x^2 \geq 2^x$$

$$11) \rightarrow (x - 2)(x - 1) \leq 0 \rightarrow \frac{1}{1 - 1} \quad D_f = [1, 2]$$

$$12) \text{ ب) } \frac{3x + d}{2x + f} \in W \rightarrow x \in - \frac{fW - d}{2W - 3}$$

$$13) D_f = \left\{ x \mid x = - \frac{fK + d}{2K - 3}, K \in W \right\}$$

$$1 \quad 2x^3 + 3x^2 - 11x + 3 \neq 0 \xrightarrow{\text{بقسمة بسيطة}} (x-1)(2x^2 + 5x - 3) \neq 0 \quad (1)$$

$$2 \quad \rightarrow (x-1)(2x-1)(x+3) \neq 0 \quad D_f = \mathbb{R} - \left\{ -3, \frac{1}{2}, 1 \right\}$$

$$3 \quad 2x^3 + 9x^2 + 10x + 3 \xrightarrow{\text{بقسمة}} (x+1)(2x^2 + 7x + 3) \neq 0$$

$$4 \quad \rightarrow (x+1)(x+3)(2x+1) \neq 0 \rightarrow D_f = \mathbb{R} - \left\{ -3, -\frac{1}{2}, -1 \right\}$$

$$5 \quad (الف) \quad x^3 - 2x^2 + 2x - 1 \neq 0 \xrightarrow{\text{بقسمة}} (x-1)(x^2 - x + 1) \neq 0 \quad (2)$$

$$7 \quad D_f = \mathbb{R} - \{1\}$$

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$$8 \quad (ب) \quad \sqrt{\frac{x+3}{x^3 - 2x^2 + 2x - 1}} = y \quad \frac{-3}{+ \phi} \quad \frac{1}{- \frac{1}{2} +} \quad D_f = (-\infty, -2] \cup (1, +\infty)$$

$$10 \quad x^2 - 2|x-1| - 2x + 2 \neq 0 \quad x \neq 2/2 \quad (3)$$

$$11 \quad x \geq 1 \rightarrow x^2 - 2x + 2 - 2x + 2 \neq 0 \rightarrow x^2 - 4x + 4 \neq 0 \rightarrow (x-2)^2 \neq 0 \rightarrow x \neq 2$$

$$12 \quad x \leq 1 \rightarrow x^2 + 2x - 2 - 2x + 2 \neq 0 \rightarrow x^2 \neq 0 \rightarrow x \neq 0 \quad (4)$$

$$13 \quad D_f = \mathbb{R} - \{-2, 0, 2, 2\}$$

$$15 \quad (الف) \quad [-x] - 2 \geq 0 \rightarrow [x] \geq 2 \rightarrow -x \geq 2 \rightarrow x \leq -2 \quad (5)$$

$$16 \quad D_f = (-\infty, -2]$$

$$17 \quad (ب) \quad [x]^2 - 2[x] - 3 \neq 0 \rightarrow ([x] - 3)([x] + 1) \neq 0$$

$$18 \quad \rightarrow D_f = (-\infty, -1) \cup [0, 3] \cup [4, +\infty)$$

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