

$$\text{الف) } y = \frac{x+3}{2x^3+3x^2-8x+3} \Rightarrow 2x^3+3x^2-8x+3=0 \Rightarrow (x-1)(2x^2+5x-3)$$

$$(x-1)(x+4)(x-1) \Rightarrow x=1, -\frac{4}{5}, \frac{1}{2} \Rightarrow D_f = \mathbb{R} - \left\{-\frac{4}{5}, \frac{1}{2}, 1\right\}$$

$$\text{ب) } y = \frac{x+3}{x^3+9x^2+10x+3} \Rightarrow x^3+9x^2+10x+3=0 \Rightarrow (x+1)(x^2+8x+3) \Rightarrow$$

$$(x+1)(x+9)(x+1) \Rightarrow x=-1, -\frac{9}{2}, -\frac{1}{2} \Rightarrow D_f = \mathbb{R} - \left\{-\frac{9}{2}, -1, -\frac{1}{2}\right\}$$

$$\text{الف) } y = \frac{x+3}{x^3-2x^2+2x+1} \Rightarrow x^3-2x^2+2x+1=0 \Rightarrow (x-1)(x^2-x+1) \Rightarrow -2$$

$$(x-1)(x^2-x+1) \Rightarrow (x-1)(x^2-x+1) \Rightarrow x=1 \Rightarrow D_f = \mathbb{R} - \{1\}$$

$$b^2 - 4ac = 1 - 4 = -3$$

$$\text{ب) } y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}} \Rightarrow \frac{x+3}{x^3-2x^2+2x-1} \geq 0 \Rightarrow \frac{x+3}{(x-1)(x^2-x+1)} \geq 0$$

$$\begin{array}{c} -3 \quad 1 \\ + \quad | \quad - \quad | \quad + \\ 0 \quad 1 \end{array} \Rightarrow D_f = (-\infty, -3] \cup (1, +\infty)$$

$$y = \frac{\gamma}{x^2 - \Delta |x-1| - \gamma x + \Delta} \Rightarrow x^2 - \Delta |x-1| - \gamma x + \Delta \neq 0$$

$$\text{I: } x \leq 1, |x-1| = 1-x \Rightarrow x^2 - \Delta(x-1) - \gamma x + \Delta = x^2 - \Delta x + \Delta - \gamma x + \Delta =$$

$$x^2 - \gamma x + 2\Delta = 0 \Rightarrow (x-\gamma)(x-\Delta) = 0 \Rightarrow x = \gamma, \Delta$$

$$\text{II } x > 1, |x-1| = x-1 \Rightarrow x^2 - \Delta(x-1) - \gamma x + \Delta = x^2 - \Delta + \Delta x - \gamma x + \Delta =$$

$$x^2 + \gamma x = 0 \Rightarrow x(x+\gamma) = 0 \Rightarrow x = 0, -\gamma$$

$$\text{I} \cup \text{II} = \boxed{\mathbb{R} - \{-\gamma, 0, \gamma, \Delta\}}$$

$$\text{الف) } y = \sqrt{[-x] - 2} \Rightarrow [-x] - 2 \geq 0 \Rightarrow [-x] \geq 2 \Rightarrow \frac{[-x]}{1} \geq 2$$

$$-x = t \Rightarrow [t] \geq 2 \Rightarrow t \geq 2 \Rightarrow -x \geq 2, x \leq -2 \Rightarrow x = (-\infty, -1)$$

$$\text{ب) } y = \frac{5x^2 + 4}{[x]^2 - 2[x] - 3} \Rightarrow [x]^2 - 2[x] - 3 \neq 0 \Rightarrow [x] = t \Rightarrow t^2 - 2t - 3 = 0$$

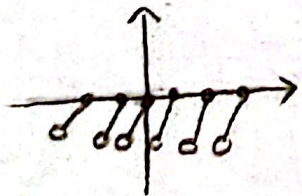
$$(t - 3)(t + 1) = 0 \Rightarrow t \neq -1, 3 \Rightarrow [x] \neq -1, 3 \Rightarrow \begin{array}{l} \text{I: } [x] = 3 \Rightarrow [3, 4) \\ \text{II: } [x] = -1 \Rightarrow (0, -1] \end{array}$$

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

$$\text{الف) } y = \sqrt{[x - \frac{1}{\mu}] + [x + \frac{\nu}{\mu}]} \Rightarrow [x - \frac{1}{\mu}] + [x + \frac{\nu}{\mu}] \geq 0 \Rightarrow -\infty$$

$$[x - \frac{1}{\mu}] \geq 0 \Rightarrow x \geq \frac{1}{\mu}, [x + \frac{\nu}{\mu}] \geq 0 \Rightarrow x \geq -\frac{\nu}{\mu} \Rightarrow [\frac{1}{\mu}, +\infty)$$

$$\text{ب) } y = \sqrt{[x - \frac{1}{\mu}] + [\frac{1}{\nu} - x]} \Rightarrow [a] + [-a] \Rightarrow \left\{ k + \frac{1}{\mu} \mid k \in \mathbb{Z} \right\}$$



$$\text{الف) } y = \frac{\cot x + 1}{\tan x + 1} = \frac{\frac{\cos x}{\sin x} + 1}{\frac{\sin x}{\cos x} + 1} \Rightarrow \cos x \neq 0, \tan x \neq 0$$

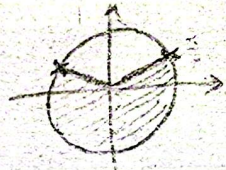


-4

$$D_f = R - \left\{ \frac{k\pi}{\epsilon} \right\}$$

$$\text{ب) } y = \sqrt{1 - \epsilon \sin^2 x} \Rightarrow 1 - \epsilon \sin^2 x \geq 0 \Rightarrow \epsilon \sin^2 x \leq 1 \Rightarrow \sin^2 x \leq \frac{1}{\epsilon}$$

$$\sin x \leq \frac{1}{\sqrt{\epsilon}}$$



$$R - \left(k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4} \right)$$

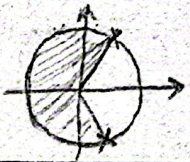
$$\text{الف) } y = \sqrt{\epsilon \sin x - 1} \Rightarrow \epsilon \sin x - 1 \geq 0 \Rightarrow \epsilon \sin x \geq 1 \Rightarrow \sin x \geq \frac{1}{\epsilon}$$

-5



$$\left[k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4} \right]$$

$$\text{ب) } y = \sqrt{1 - \epsilon \cos x} \Rightarrow 1 - \epsilon \cos x \geq 0 \Rightarrow \epsilon \cos x \leq 1 \Rightarrow \cos x \leq \frac{1}{\epsilon}$$



$$R - \left(k\pi - \frac{\pi}{3}, k\pi + \frac{\pi}{3} \right)$$

الف) $y = \arcsin(x^2 + 3x + 1) \Rightarrow -1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow -1 \leq x^2 + 3x + 1$
 $x^2 + 3x + 1 \geq 0 \Rightarrow (x+1)(x+2) \geq 0 \Rightarrow x \leq -2 \text{ or } x \geq -1$
 $x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow -3 \leq x \leq 0 \Rightarrow [-3, -1] \cup [-1, 0]$

ب) $\cos y = \sqrt{5 - 2x} \Rightarrow I: 5 - 2x \geq 0 \Rightarrow 2x \leq 5 \Rightarrow x \leq \frac{5}{2}$
 $II: -1 \leq 5 - 2x \leq 1 \Rightarrow -9 \leq -2x \leq -6 \Rightarrow 3 \geq x \geq 2 \Rightarrow I \cap II \Rightarrow [2, \frac{5}{2}]$

الف) $y = \log_r(1 - \log_r x)$ $\Rightarrow 1 - \log_r x > 0 \Rightarrow \log_r x < 1 \Rightarrow x < r$
 $\log_r x > 0 \Rightarrow x > 0 \Rightarrow I \cap II = (0, r)$

ب) $y = \log_r(1 - \log_{\frac{1}{r}} x)$ $\Rightarrow I: \log_{\frac{1}{r}} x > 0 \Rightarrow x > 0$ $II: 1 - \log_{\frac{1}{r}} x > 0 \Rightarrow \log_{\frac{1}{r}} x < 1 \Rightarrow x < \frac{1}{r}$
 $\Rightarrow I \cap II = (0, \frac{1}{r})$

الف) $y = \sqrt{r^{\epsilon x} - x^r} - 1 \Rightarrow r^{\epsilon x} - x^r - 1 \geq 0 \Rightarrow r^{\epsilon x} \geq x^r + 1$
 $\epsilon x - x^r \geq r \Rightarrow -(x^r - \epsilon x + r) \geq 0 \Rightarrow -(x^r - 3)(x - 1) \geq 0 \Rightarrow [1, 3]$

ب) $y = \left(\frac{rx + \omega}{rx + \epsilon} \right)!$ $\frac{rx + \omega}{rx + \epsilon} \in \mathbb{N} \Rightarrow rx + \omega = rxw + \epsilon w \Rightarrow rx - rxw = -\omega + \epsilon w \Rightarrow x(r - rw) = -\omega + \epsilon w \Rightarrow x = \frac{-\omega + \epsilon w}{r - rw} \Rightarrow$
 $\left\{ x \mid w \in \mathbb{N}, \frac{rx - \omega}{r - rw} \right\}$

مسئله معروف بازدم B