

$$y = \frac{x^2 + 3}{x^2 - 2x - 1} = \frac{x + 3}{(x-1)(x^2 + 2x - 1)} \quad D = R - \left\{1, \frac{1}{2} \pm \frac{\sqrt{5}}{2}\right\}$$

$$b) y = \frac{x + 3}{x^2 + 9x^2 + 16x - 2} \rightarrow (x+1)(x^2 + 7x + 2) \quad D = R - \left\{-1, \frac{1}{4} \pm \frac{\sqrt{15}}{4}\right\}$$

$$الف) y = \frac{x + 3}{x^2 - 2x + 1} = \frac{x + 3}{(x-1)(x^2 - x + 1)} \quad D = R - \{1\}$$

$$b) y = \sqrt{\frac{x + 3}{x^2 - 2x + 1}} \rightarrow \frac{x + 3}{x - 1} \geq 0, x \neq 1 \rightarrow D = (-\infty, -3] \cup (1, +\infty)$$

$$y = \frac{2}{x^2 - 5|x - 1| - 2x + 5} \xrightarrow{x \geq 1} x^2 - 5(x-1) - 2x + 5 = x^2 - 7x + 10 = (x-2)(x-5)$$

$$\xrightarrow{x \leq 1} x^2 - 5(1-x) - 2x + 5 = x^2 + 3x \rightarrow x(x+3) \Rightarrow D = R - \left\{-\frac{3}{2}, 0, 5\right\}$$

$$الف) y = \sqrt{[-x] - 2} \rightarrow [-x] - 2 \geq 0 \rightarrow [-x] \geq 2 \rightarrow -x \geq 2 \rightarrow x \leq -2$$

$$D = (-\infty, -2]$$

$$b) \frac{(5x^2 + 4)}{(x^2 - 2x - 3)} \rightarrow -1 \quad D = (-\infty, -1) \cup [0, 3) \cup [5, +\infty)$$

$$(x^2 - 3)(x^2 + 1)$$

$$x \in [-1, 3] \rightarrow [x] = 3 \rightarrow x \in [3, 4)$$

$$[x] = -1 \rightarrow x \in [-1, 0)$$

$$الف) y = \sqrt{\left\lceil x - \frac{1}{2} \right\rceil + \left\lfloor x + \frac{1}{2} \right\rfloor} \rightarrow \left\lceil x - \frac{1}{2} \right\rceil + 1 \geq 0 \rightarrow \left\lceil x - \frac{1}{2} \right\rceil \geq -1 \rightarrow \left\lceil x - \frac{1}{2} \right\rceil \geq 0$$

$$\rightarrow x \geq \frac{1}{2}$$

$$D = \left[\frac{1}{2}, +\infty\right)$$

$$b) y = \sqrt{\left\lfloor x - \frac{1}{2} \right\rfloor + \left\lceil \frac{1}{2} - x \right\rceil}$$

$$\left\lfloor x - \frac{1}{2} \right\rfloor + \left\lceil \frac{1}{2} - x \right\rceil \geq 0$$

$$\{t\} + \{ -t \} \geq 0$$

$$\text{if } t = 2 \rightarrow \checkmark$$

$$\text{if } t = -1, 0 \rightarrow \{t\} = 2$$

$$-t = x, 0 \rightarrow \{-t\} = -3 \quad \times$$

$$D = \mathbb{Z}$$

$$y = \frac{\cot x + 1}{\tan x + 1} \rightarrow \tan x \neq -1 \quad D = \mathbb{R} \setminus \{x \mid x = -\frac{\pi}{4} + k\pi, k \in \mathbb{Z}\}$$

$$a) y = \sqrt{1 - \epsilon \sin x} \quad \sin x \leq \frac{1}{\epsilon} \quad -\frac{1}{\epsilon} \leq \sin x \leq \frac{1}{\epsilon}$$

$$D: x \in \left[k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right] (k \in \mathbb{Z})$$

$$b) y = \sqrt{1 - \epsilon \sin x} \rightarrow \sin x \geq \frac{1}{\epsilon} \quad D: x \in \left[\frac{\pi}{4} + k\pi, \frac{3\pi}{4} + k\pi \right] (k \in \mathbb{Z})$$

$$c) y = \sqrt{1 - \epsilon \cos x} \quad \cos x \leq \frac{1}{\epsilon} \quad D: x \in \left[\frac{\pi}{2} + k\pi, \frac{3\pi}{2} + k\pi \right] (k \in \mathbb{Z})$$

$$a) y = \arcsin(x^2 + 2x + 1) \quad x^2 + 2x + 1 \leq 1 \rightarrow x(x+2) \leq 0 \rightarrow x \in [-2, 0] \\ -1 \leq x^2 + 2x + 1 \leq 1 \quad x^2 + 2x \leq 0 \rightarrow x(x+2) \leq 0 \rightarrow x \in [-2, 0] \\ \rightarrow D: [-2, -1] \cup [-1, 0]$$

$$b) \cos y = \sqrt{1 - 2x} \rightarrow 0 \leq 1 - 2x \leq 1 \rightarrow 0 \leq 2x \leq 1 \rightarrow x \in [0, \frac{1}{2}] \\ D: [0, \frac{1}{2}]$$

$$y = \log_{\frac{1}{2}}(1 - \log_{\frac{1}{2}} x) \rightarrow 1 - \log_{\frac{1}{2}} x > 0 \rightarrow \log_{\frac{1}{2}} x < 1 \rightarrow x < \frac{1}{2} \quad D: 0 < x < \frac{1}{2}$$

$$b) \log_{\frac{1}{2}}(1 - \log_{\frac{1}{2}} x)^{x > 0} \quad 1 - \log_{\frac{1}{2}} x > 0 \rightarrow \log_{\frac{1}{2}} x < 1 \rightarrow x < \frac{1}{2} \\ \rightarrow D: x < \frac{1}{2}$$

$$a) \sqrt{1 - \epsilon x - x^2} \quad 1 - \epsilon x - x^2 \geq 0 \rightarrow x^2 + \epsilon x - 1 \leq 0 \\ x^2 - \epsilon x + 1 \leq 0 \\ (x-1)(x-\epsilon) \leq 0 \\ D = [1, \epsilon]$$

$$b) y = \left(\frac{x + \omega}{x + \epsilon} \right) \quad D = \left\{ \frac{\omega - \epsilon n}{\epsilon n - \omega} \mid n \in \mathbb{Z}_{\geq 0} \right\} \\ \frac{x + \omega}{x + \epsilon} = n \quad n \in \{0, 1, 2, \dots\}$$

$$x + \omega = n(x + \epsilon) \rightarrow x = \frac{\omega - \epsilon n}{\epsilon n - \omega} \\ x(\epsilon n - \omega) = \epsilon n - \omega$$