

۲. افزاین علی و مرتب نوشتن

الف) $\frac{x+3}{2x^3+3x^2-18x+3} \rightarrow$ جمع ضرایب $\rightarrow$ ضرایب زوج فرد برابر $\rightarrow$ ضرایب زوج فرد برابر

$$\frac{x+3}{2x^3+3x^2-18x+3} = \frac{x+3}{(2x-1)(x+3)(x-1)}$$

$$R = \left\{ -\frac{3}{2}, \frac{1}{2}, 1 \right\}$$

الف) $\frac{x+3}{x^3-2x^2+2x-1}$ جمع ضرایب $\rightarrow$ ضرایب زوج فرد برابر $\rightarrow$ ضرایب زوج فرد برابر

$$\frac{x+3}{x^3-2x^2+2x-1} = \frac{x+3}{(x-1)(x^2-x+1)}$$

$$R = \{1\}$$

$$(-\infty, -\frac{3}{2}] \cup (1, +\infty)$$

$y = \frac{2}{x^2-5|x-1|-2x+5}$

$$y = \frac{2}{x^2-7x+10} \quad x \geq 0 \rightarrow \frac{2}{(x-5)(x-2)} \quad x \neq 5, x \neq 2$$

$$y = \frac{2}{x^2+3x} \quad x \leq 0 \rightarrow \frac{2}{x(x+3)} \quad x \neq 0, x \neq -3$$

$$R = \left\{ -\frac{3}{2}, 0, 2, 5 \right\}$$

الف) $y = \sqrt{[-x]-2} \quad [-x] \geq 2 \quad -x \geq 2 \quad x \leq -2 \quad (-\infty, -2]$

ب) $y = \frac{5x^2+4}{[x]^2-2[x]-3} = \frac{5x^2+4}{([x]-3)([x]+1)}$

$$[x] \neq 3 \quad x \notin [3, 4)$$

$$[x] \neq -1 \quad x \notin [-1, 0)$$

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

الف) $y = \sqrt{\left[x-\frac{1}{x}\right] + \left[x+\frac{y}{x}\right]} \rightarrow \left[x-\frac{1}{x}\right] + \left[x+\frac{y}{x}\right] \geq 0 \quad \left[x+\frac{y}{x}\right] - 1 + \left[x+\frac{y}{x}\right] \geq 0$

$$2\left[x+\frac{y}{x}\right] \geq 1 \quad \left[x+\frac{y}{x}\right] \geq \frac{1}{2} \quad x+\frac{y}{x} \geq 1 \quad x \geq \frac{1}{x} \quad \left[\frac{1}{x} + \infty\right)$$

ب) $y = \sqrt{\left[x-\frac{1}{x}\right] + \left[\frac{1}{x}-x\right]} \Rightarrow \begin{cases} x-\frac{1}{x} \in \mathbb{Z} & \left[x-\frac{1}{x}\right] + \left[\frac{1}{x}-x\right] = 0 \quad x-\frac{1}{x} \in \mathbb{Z} \\ x-\frac{1}{x} \notin \mathbb{Z} & \left[x-\frac{1}{x}\right] + \left[\frac{1}{x}-x\right] = -1 \end{cases}$

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

$y = \frac{\cot x + 1}{\tan x + 1} = \frac{\frac{\cos x}{\sin x} + 1}{\frac{\sin x}{\cos x} + 1}$ $\sin x \neq 0 \quad x \neq k\pi$ $\cos x \neq 0 \quad x \neq k\pi + \frac{\pi}{2}$ $\tan x \neq -1 \quad x \neq k\pi - \frac{\pi}{4}$ $R = \left\{ \frac{k\pi}{4}, k\pi - \frac{\pi}{4} \right\}$	
$y = \sqrt{1 - \varepsilon \sin^2 x}$ $1 - \varepsilon \sin^2 x \geq 0$ $\varepsilon \sin^2 x \leq 1$ $\sin^2 x \leq \frac{1}{\varepsilon}$ $-\frac{1}{\sqrt{\varepsilon}} \leq \sin x \leq \frac{1}{\sqrt{\varepsilon}}$  $\left[k\pi - \frac{\pi}{\sqrt{\varepsilon}}, k\pi + \frac{\pi}{\sqrt{\varepsilon}} \right]$	8
$y = \sqrt{\gamma \sin x - 1}$ $\gamma \sin x - 1 \geq 0$ $\gamma \sin x \geq 1$ $\sin x \geq \frac{1}{\gamma}$  $\left[\gamma k\pi + \frac{\pi}{\gamma}, \gamma k\pi + \frac{\pi}{\gamma} \right]$	
$y = \sqrt{1 - \gamma \cos x}$ $1 - \gamma \cos x \geq 0$ $\gamma \cos x \leq 1$ $\cos x \leq \frac{1}{\gamma}$  $\left[\gamma k\pi + \frac{\pi}{\gamma}, \gamma k\pi + \frac{\pi}{\gamma} \right]$	9
$y = \arcsin(x^2 + \gamma x + 1)$ $-1 \leq x^2 + \gamma x + 1 \leq 1$ $x^2 + \gamma x \leq 0$ $x(x + \gamma) \leq 0$ $x^2 + \gamma x + \gamma \geq 0$ $(x + \gamma)(x + 1) \geq 0$ $\frac{-\gamma}{+\gamma - \gamma +} \quad \frac{-1}{+\gamma - \gamma +}$ $[-\gamma, -1] \cup [-1, 0]$ $\cos y = \sqrt{1 - \gamma x}$ $1 - \gamma x \geq 0$ $\gamma x \leq 1$ $x \leq \frac{1}{\gamma}$ $0 \leq \sqrt{1 - \gamma x} \leq 1$ $0 \leq 1 - \gamma x \leq 1$ $0 \leq \gamma x \leq 1$ $\frac{0}{\gamma} \leq x \leq \frac{1}{\gamma}$ $\left[\frac{1}{\gamma}, \frac{1}{\gamma} \right]$	10
$y = \log_{\gamma} (1 - \log_{\gamma} x)$ $x > 0$ $1 - \log_{\gamma} x > 0$ $\log_{\gamma} x < 1$ $x < \gamma$ $(0, \gamma)$ $y = \log_{\gamma} (1 - \log_{\gamma} \frac{1}{\gamma})$ $x > 0$ $1 - \log_{\gamma} \frac{1}{\gamma} > 0$ $\log_{\gamma} \frac{1}{\gamma} < 1$ $x > \frac{1}{\gamma}$ $\left(\frac{1}{\gamma}, +\infty \right)$	11
$y = \sqrt{\gamma^x - x^{\gamma}} - 1$ $\gamma^x - x^{\gamma} - 1 \geq 0$ $\gamma^x - x^{\gamma} \geq 1$ $\gamma^x - x^{\gamma} \geq \gamma$ $x^{\gamma} - \gamma x + \gamma \leq 0$ $(x - \gamma)(x - 1) \leq 0$ $\frac{1}{+\gamma - \gamma +} \quad \frac{\gamma}{+\gamma - \gamma +}$ $[1, \gamma]$ $y = \left(\frac{\gamma x + \omega}{\gamma x + \varepsilon} \right)!$ $\frac{\gamma x + \omega}{\gamma x + \varepsilon} \in W$ $x \in -\frac{\gamma \omega - \omega}{\gamma \omega - \gamma}$ $\left\{ x \mid x = \frac{\omega - \gamma k}{\gamma k - \gamma}, k \in W \right\}$	12