

$$\text{الف) } \frac{x+3}{2x^3+3x^2-12x+3} = \frac{x+3}{(x-1)(x+3)(x-\frac{1}{2})}$$

۱- مخرج مخالف مخرج

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

$$\text{ب) } \frac{x+3}{2x^3+4x^2+10x+3} = \frac{x+3}{(x+1)(x+3)(x+\frac{1}{2})}$$

مخرج مخالف مخرج

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

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

$$\Rightarrow D_f = \mathbb{R} - \{1\}$$

مخرج برابر مخرج باشد

$$\text{ب) } \sqrt{\frac{x+3}{x^3-2x^2+2x-1}} = \sqrt{\frac{x+3}{(x-1)(x^2-x+1)}} \Rightarrow \frac{x+3}{(x-1)(x^2-x+1)} \Rightarrow \frac{-3}{+} + \frac{1}{-} + \frac{1}{+} \Rightarrow D_f = \mathbb{R} - (-3, 1]$$

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

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$$\textcircled{1} \quad x^2-\Delta x+\Delta-2x+\Delta \neq 0 \Rightarrow x^2-2x+1 \neq 0 \Rightarrow (x-1)^2 \neq 0 \Rightarrow x \neq 1, \Delta$$

$$\textcircled{2} \quad x^2+\Delta x-\Delta-2x+\Delta \neq 0 \Rightarrow x^2+3x \neq 0 \Rightarrow x(x+3) \neq 0 \Rightarrow x \neq -3, 0$$

$$D_f = \mathbb{R} - \{-3, 0, 1, \Delta\}$$

$$\text{الف) } \sqrt{[-x]-2} \quad [-x]-2 \geq 0 \Rightarrow [-x] \geq 2 \quad D_f = (-\infty, -2]$$

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ب)

الف) $\sqrt{\left[x - \frac{1}{3}\right] + \left[x + \frac{2}{3}\right]} \Rightarrow \left[x - \frac{1}{3}\right] + \left[x + \frac{2}{3}\right] \geq 0 \Rightarrow \left[x - \frac{1}{3}\right] + \left[x + \frac{2}{3}\right] + 1 \geq 1$ -5

$2\left[x + \frac{2}{3}\right] \geq 1 \Rightarrow \left[x + \frac{2}{3}\right] \geq \frac{1}{2} \Rightarrow \left[x + \frac{2}{3}\right] \geq 1 \Rightarrow x + \frac{2}{3} \geq 1 \Rightarrow x \geq \frac{1}{3} \Rightarrow D_f = \left[\frac{1}{3}, +\infty\right)$

ب) $\sqrt{\left[x - \frac{1}{3}\right] + \left[\frac{1}{3} - x\right]} \Rightarrow \left[x - \frac{1}{3}\right] + \left[\frac{1}{3} - x\right] \geq 0$

$x - \frac{1}{3} \in \mathbb{Z} \Rightarrow x \in \mathbb{Z} + \frac{1}{3} \Rightarrow D_f = \left\{x \mid x = k + \frac{1}{3}, k \in \mathbb{Z}\right\}$

الف) $y = \frac{\cot x + 1}{\tan x + 1} \Rightarrow \frac{\frac{\cos x}{\sin x} + 1}{\frac{\sin x}{\cos x} + 1}$ -4

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

$D_f = \left[k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4}\right]$

الف) $\sqrt{2\sin x - 1} \quad 2\sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{2} \Rightarrow D_f = \left[k\pi + \frac{\pi}{6}, k\pi + \frac{5\pi}{6}\right]$ -V

ب) $\sqrt{1 - 2\cos x} \quad 1 - 2\cos x \geq 0 \Rightarrow \frac{1}{2} \geq \cos x \Rightarrow D_f = \left[k\pi + \frac{\pi}{3}, k\pi + \frac{5\pi}{3}\right]$

الف) $\arcsin(x^2 + 3x + 1)$ $-1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow$ ① $-1 \leq x^2 + 3x + 1 \Rightarrow 0 \leq x^2 + 3x + 2$ -A

$0 \leq (x+1)(x+2) \Rightarrow \begin{matrix} - & + & - & + \\ 1 & 2 & -1 & -2 \end{matrix}$ ② $x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow \begin{matrix} - & + & - & + \\ 0 & -3 & 0 & 3 \end{matrix}$

① $\cap$ ② $\Rightarrow [-2, -1] \cup [-1, 0] \Rightarrow D_f$

ب) $\cos y = \sqrt{\Delta - 2x} \quad -1 \leq \sqrt{\Delta - 2x} \leq 1 \Rightarrow 0 \leq \Delta - 2x \leq 1 \Rightarrow \begin{cases} \Delta - 2x \geq 0 \\ \Delta - 2x \leq 1 \end{cases}$

① $0 \leq \Delta - 2x \Rightarrow 2x \leq \Delta \Rightarrow x \leq \frac{\Delta}{2}$ ② $\Delta - 2x \leq 1 \Rightarrow 2x \geq \Delta - 1 \Rightarrow \frac{\Delta - 1}{2} \leq x$ ① $\cap$ ② $\Rightarrow D_f = \left[\frac{\Delta - 1}{2}, \frac{\Delta}{2}\right]$

الف) $1 - \log_3 x \geq 0 \Rightarrow 1 \geq \log_3 x \Rightarrow 3 \geq x, x > 0 \Rightarrow D_f = (0, 3)$ -A

ب) $1 - \log_3 \frac{x}{2} \geq 0 \Rightarrow 1 \geq \log_3 \frac{x}{2} \Rightarrow \frac{1}{2} \geq x, x > 0 \Rightarrow D_f = (0, \frac{1}{2})$

الف) $\sqrt{\frac{x^2 - x^2}{x^2 - 1}} - 1$ $\frac{x^2 - x^2}{x^2 - 1} - 1 \neq 0 \Rightarrow \frac{x^2 - x^2}{x^2 - 1} \neq x^2 \Rightarrow \frac{x^2 - x^2}{x^2 - 1} \neq x^2 \Rightarrow -x^2 + x^2 \neq 0$ - 1.

$(x-3)(x-1) < 0$ $\begin{array}{c} 1 \quad 3 \\ + \quad - \quad + \end{array} \Rightarrow D_f = [1, 3]$

ب) $\left(\frac{3x+2}{x+1} \right)!$ $\frac{3x+2}{x+1} \in \mathbb{N} \Rightarrow x \in \frac{-2x+2}{x-1}$

$D_f = \left\{ x \mid x = \frac{2-2k}{k-1}, k \in \mathbb{N} \right\}$