

الف

$$\sqrt{\frac{x^2 - 4x}{x^2 - x}}$$

$$x^2 - 4x = x(x - 4) \rightarrow 4$$

①

$$x^2(x-1) \rightarrow +1, 0$$

$$\begin{array}{c|c|c} 0 & 1 & 4 \\ \hline - & + & - \end{array}$$

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

ب

$$\sqrt{\frac{x^5 - x^3}{x^5 - x}} \rightarrow x^2(x^2 - 1) \rightarrow 1, 0$$

$$\begin{array}{c|c} x & x \\ \hline 0 & 1 \\ \hline + & + \end{array}$$

$$(-\infty, 0) \cup (0, 1) \cup (1, +\infty)$$

الف

$$\frac{x+1}{\sqrt{x+|x|}} \rightarrow \checkmark$$

$$\sqrt{x+|x|} \rightarrow x+|x| > 0$$

الحد $\leftarrow$ صفر $\checkmark$

الحد $\leftarrow$ صفر $\checkmark$

الحد $\oplus \leftarrow$ مثبت $\checkmark$ (0, +\infty) $\checkmark$ R^+ $\checkmark$ D_f $\checkmark$ اعداد موجبة $\checkmark$

②

ب

$$\frac{1}{\sqrt{x|x|}} \rightarrow \checkmark$$

$$\sqrt{x|x|} \rightarrow x|x| > 0$$

الحد $\leftarrow$ صفر $\checkmark$

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الحد $\oplus \leftarrow$ مثبت $\checkmark$

$D_f = R^+$

$$\text{الف) } y = \sqrt{2 - [x]} \rightarrow y \geq 0 \rightarrow [x] \leq 2 \rightarrow x \leq 3$$

$$D_f = (-\infty, 3)$$

$$\text{ب) } \frac{1}{\sqrt{2 - [x]}} \rightarrow > 0 \rightarrow [x] < 2 \rightarrow x < 2$$

$$D_f = (-\infty, 2)$$

$$\text{الف) } y = \sqrt{[x - \frac{1}{3}] + [x + \frac{2}{3}]} \rightarrow [x - \frac{1}{3}] + [x + \frac{2}{3}] \geq 0 \rightarrow$$

$$[x + \frac{2}{3} - 1] + [x + \frac{2}{3}] \geq 0 \rightarrow [x + \frac{2}{3}] - 1 + [x + \frac{2}{3}] \geq 0 \rightarrow$$

$$2[x + \frac{2}{3}] \geq 1 \rightarrow [x + \frac{2}{3}] \geq \frac{1}{2} \rightarrow x + \frac{2}{3} \geq 1 \rightarrow x \geq \frac{1}{3} \rightarrow$$

$$D_f = [\frac{1}{3}, +\infty)$$

$$\text{ب) } y = \sqrt{[x - \frac{1}{3}] + [-x + \frac{1}{3}]} \rightarrow \sqrt{[x - \frac{1}{3}] + (-[x - \frac{1}{3}])} \quad x \in \mathbb{Z} \xrightarrow{\text{Cl}_2} [x] + [-x] = 0$$

$$x - \frac{1}{3} \in \mathbb{Z} \rightarrow D_f = \{x \mid x = k - \frac{1}{3}, k \in \mathbb{Z}\}$$

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

$\sin x \neq 1$

$x \neq \frac{\pi}{2}, \frac{3\pi}{2}$

(3)

$D_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{2} \right\}$

ب) $\frac{2}{2\sin^2 x - 1} \rightarrow \neq 0$

$2\sin^2 x \neq 1$

$\sin^2 x \neq \frac{1}{2} \rightarrow \sin x \neq \pm \frac{1}{\sqrt{2}}$

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

(4)

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

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

الف) $\cos y = |x| - 2 \rightarrow -1 \leq |x| - 2 \leq 1 \rightarrow 1 \leq |x| \leq 3 \rightarrow D_f = [-3, -1] \cup [1, 3]$

(5)

ب) $\arccos(x^2 + 3x + 1) \rightarrow x^2 + 3x + 1 \geq -1 \rightarrow x^2 + 3x + 2 \geq 0$

$x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0$

$\rightarrow (x+2)(x+1) \geq 0$

$\rightarrow x(x+3) \geq 0$

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

الف) $y = \sqrt{2 - \log_3^{(x-2)}}$ $x-2 > 0$ $x > 2$

(1)

$2 - \log_3^{x-2} \geq 0 \rightarrow \log_3^{x-2} \leq 2 \rightarrow x-2 \leq 9 \rightarrow x \leq 11$

$D_f = (2, 11]$

ب) $\log \left(\frac{x^2 - x}{x(x^2 - 1)} \right) > 0$ $\frac{0}{+} \cdot \frac{1}{+} \cdot D_f = (-\infty, 0] \cup [1, \infty)$

الف) $x^n + 1 \neq 0 \rightarrow x^n \neq -1 \rightarrow \checkmark D_f = \mathbb{R}$

(9)

ب) $x^n - 1 \neq 0 \rightarrow x^n \neq 1 \rightarrow x \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$

ج) $x^n - 2 \neq 0 \rightarrow x^n \neq 2 \rightarrow D_f = \mathbb{R} - \{\log_3^x\}$

د) $x^n - 3 \neq 0 \rightarrow x^n \neq 3 \rightarrow D_f = \mathbb{R} - \{\log_3^x\}$

الف) $y = (kn+1)! \rightarrow kn+1 \in \mathbb{N} \rightarrow kn \in \mathbb{N} - 1 \rightarrow n \in \frac{\mathbb{N}-1}{k}$ (13)

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

ب) $y = \left(\frac{kn-2}{kn-5} \right)! \rightarrow n = -\frac{\omega\mathbb{N}+2}{2\mathbb{N}+3} \rightarrow D_f = \left\{ n \mid -\frac{\omega k+2}{2k+3}, k \in \mathbb{N} \right\}$