

۱) $\frac{x^2 - 4x}{x^2 - x} \geq 0 \rightarrow \frac{x(x-4)}{x(x-1)} \rightarrow \frac{-1}{-} \frac{0}{+} \frac{1}{+} \frac{4}{-} \rightarrow D_f = (-1, 1) \cup [4, +\infty) - \{0\}$

✓

۲) $\frac{x^3 - x^2}{x^2 - x} \geq 0 \rightarrow \frac{x^2(x-1)}{x(x-1)(x+1)} \rightarrow \frac{-1}{+} \frac{0}{+} \frac{1}{+} \rightarrow D_f = \mathbb{R} - \{-1, 0, 1\}$

۱) $\frac{x+1}{\sqrt{x+|x|}} \rightarrow x+|x| > 0 \rightarrow \oplus \oplus \oplus \rightarrow D_f = \mathbb{R}^+$

۲) $\frac{1}{\sqrt{x+|x|}} \rightarrow x+|x| > 0 \rightarrow \oplus \ominus \oplus \rightarrow D_f = \mathbb{R}^+$

۱) $\sqrt{y-[x]} \rightarrow y-[x] \geq 0 \rightarrow [x] \leq y \rightarrow D_f = (-\infty, y)$

۲) $\frac{1}{\sqrt{y-[x]}} \rightarrow y-[x] > 0 \rightarrow [x] < y \rightarrow D_f = (-\infty, y)$

۱) $[x - \frac{1}{y}] + [x + \frac{y}{y}] \rightarrow [x - 1 + \frac{y}{y}] + [x + \frac{y}{y}] \geq 1 \rightarrow y[x + \frac{y}{y}] \geq 1 \rightarrow [x + \frac{y}{y}] \geq \frac{1}{y}$

$[n] + [-n] \rightarrow \begin{cases} \in \mathbb{Z} = 0 \\ \notin \mathbb{Z} = -1 \end{cases}$

۲) $[x - \frac{1}{y}] + [-x + \frac{1}{y}] \geq 0 \rightarrow [x] + [-x] \geq 0 \rightarrow D_f = \mathbb{Z} + \frac{1}{y}$

$\cancel{D_f = \mathbb{Z}} \quad x - \frac{1}{y} \in \mathbb{Z} \rightarrow x \in \mathbb{Z} + \frac{1}{y} \rightarrow D_f = \{x \in \mathbb{R} \mid x = K + \frac{1}{y}, K \in \mathbb{Z}\}$

۱) $\sin x = 1 \rightarrow \sin x \neq 1 \rightarrow D_f = \mathbb{R} - \{x \mid x = k\pi + \frac{\pi}{2}\}$

✓

۲) $x \sin^2 x = 1 \neq 0 \rightarrow x \sin^2 x \neq 1 \rightarrow \sin^2 x \neq \frac{1}{x} \rightarrow \sin x \neq \pm \sqrt{\frac{1}{x}} \rightarrow D_f = \mathbb{R} - \{\frac{k\pi}{\sqrt{x}} + \frac{\pi}{\sqrt{x}}\}$

$$\text{ا) } \sqrt{r \sin x - 1} \rightarrow r \sin x - 1 \geq 0 \rightarrow r \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{r} \rightarrow D_f = \left[r \sin \frac{\pi}{2}, r \sin \frac{3\pi}{2} \right]$$

(2) ✓

$$\text{ب) } \sqrt{\cos x - 1} \rightarrow \cos x - 1 \geq 0 \rightarrow \cos x \geq 1 \rightarrow D_f = \{k\pi\}$$

$$\text{ا) } \cos y = |x| - r \rightarrow -1 \leq |x| - r \leq 1 \rightarrow r \leq |x| \leq r+1 \rightarrow D_f = [r, r+1] \cup [-r-1, -r]$$

$$\text{ب) } y = a \cos(x^r + rx + 1) \rightarrow -1 \leq x^r + rx + 1 \leq 1 \rightarrow [-r - r] \cup [r, r]$$

$$-r \leq x \leq 0 \quad \begin{matrix} \leftarrow x(x+r) \end{matrix} \quad \begin{matrix} \leftarrow x^r + rx + 1 \end{matrix} \quad \begin{matrix} \leftarrow -1 \end{matrix} \quad \begin{matrix} \leftarrow -r \end{matrix} \quad \begin{matrix} \leftarrow -\frac{r}{2} \end{matrix} \rightarrow x \leq -r \quad x \geq -1$$

$$\text{ا) } \sqrt{r - \log_r(x-r)} \rightarrow r - \log_r(x-r) \geq 0 \rightarrow \log_r(x-r) \leq r \rightarrow x-r \leq r^r \rightarrow x \leq r+r^r$$

$$\text{ب) } \log(x^r - r) \rightarrow x^r - r > 0 \rightarrow x^r > r \rightarrow x > \sqrt[r]{r} \rightarrow D_f = \mathbb{R}^+ \setminus (-\infty, \sqrt[r]{r}]$$

$$\text{ا) } y = \frac{r}{x^r + 1} \rightarrow x^r + 1 \neq 0 \rightarrow x^r \neq -1 \rightarrow D_f = \mathbb{R}$$

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

$$\text{ج) } \frac{r}{x^r - r} \rightarrow x^r - r \neq 0 \rightarrow x^r \neq r \rightarrow x \neq \sqrt[r]{r} \rightarrow D_f = \mathbb{R} - \{\sqrt[r]{r}\}$$

$$\text{د) } \frac{r}{x^r - r} \rightarrow x^r - r \neq 0 \rightarrow x^r \neq r \rightarrow x \neq \sqrt[r]{r} \rightarrow D_f = \mathbb{R} - \{\sqrt[r]{r}\}$$

$$\text{ا) } (k+1)! \rightarrow k+1 \in \mathbb{N} \rightarrow k \in \mathbb{N} + 1 \rightarrow x \in \frac{w+1}{r} \rightarrow D_f = \left\{ x/k : \frac{w+1}{r} = k \in \mathbb{N} \right\}$$

$$\text{ب) } \frac{w+1}{x-r} \in \mathbb{N} \rightarrow x \in \frac{-w+1+r}{r} \rightarrow x \in \frac{w+1-r}{r} \rightarrow D_f = \left\{ x/k : \frac{w+1-r}{r} = k \in \mathbb{N} \right\}$$

$$k \neq 0 \rightarrow x \neq \frac{w+1-r}{r}$$