

الف) $\frac{x(x-4) \rightarrow 4}{x \in (x-1)(x+1) \rightarrow -1}$ $x \neq 0$

ب) $\frac{x^2(x-1)(x+1)}{x(x-1)} \geq 0$ $x^2(x+1) \geq 0$ $x+1 \geq 0$ $x \geq -1$

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

الف) $x + |x| > 0$ $|x| > -x$ $D_f = (-\infty, 0)$

ب) $x|x| > 0$ $D_f \rightarrow (0, +\infty) \subseteq \mathbb{R}^+ \cup \{0\}$

الف) $[x] \leq 2 \rightarrow x < 3 \rightarrow D_f = (-\infty, 3)$

ب) $[x] < 2 \rightarrow x < 2 \rightarrow D_f = (-\infty, 2)$

الف) $[x + \frac{1}{x}] - [x - \frac{1}{x}] = 1 \rightarrow [x - \frac{1}{x} + 1 - 1] [x + \frac{1}{x}] - 1 + [x + \frac{1}{x}] = 2[x + \frac{1}{x}] - 1$

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

ب) if $\begin{cases} a \in \mathbb{Z} & [a] + [-a] = 0 \\ a \notin \mathbb{Z} & [a] + [-a] = -1 \end{cases} \rightarrow x - \frac{1}{x} \in \mathbb{Z}$ $D_f = \{x \mid x = k + \frac{1}{x} \mid k \in \mathbb{Z}\}$

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

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

$D_f = \mathbb{R} - \{\frac{n}{x} + \frac{k\pi}{x} \mid k \in \mathbb{Z}\}$

الف) $2\sin x \geq 1 \quad \sin x \geq \frac{1}{2} \quad D_f = [\frac{\pi}{6} + 2k\pi, \frac{5\pi}{6} + 2k\pi]$

ب) $\cos x \geq 1 \quad D_f \rightarrow R = \{2k\pi\}$

(2) ✓

الف) $-1 \leq |x-2| < 1$ $\frac{-x-1}{+6-4+}$ $-f \leq x < f$

$D_f = R[-f, -2] \cup [2, f]$

ب) $-1 \leq x^2 + 2x + 1 \leq 1$

$\frac{-x-1}{+6-4+}$

$D_f \rightarrow R = [-3, -2] \cup [-1, 0]$

1) $x^2 + 2x + 1 \geq -1 \rightarrow x^2 + 2x + 2 \geq 0 \rightarrow (x+1)(x+2) \rightarrow D_f \rightarrow R(-\infty, -2] \cup [-1, +\infty)$

2) $x^2 + 2x + 1 \leq 1 \rightarrow x^2 + 2x \leq 0 \rightarrow x(x+2) \leq 0 \rightarrow D_f \rightarrow R[-2, 0]$

الف) $x-2 > 0 \rightarrow x > 2$

$\frac{-x-1}{+6-4+}$

$\wedge D_f = (2, +\infty)$

$x - \log_2^{x-2} \geq 0 \rightarrow \log_2^{x-2} \leq x \rightarrow x-2 \leq 2^x \rightarrow x \leq 11$

ب) $x(x^2-1) > 0 \rightarrow x(x-1)(x+1) > 0$ $\frac{-1}{+6-4+}$ $D_f = (-1, 0) \cup (1, +\infty)$

الف) $x_{n+1} \neq 0 \quad x_n \neq -1 \quad D_f = \{R\} \rightarrow$ چون x همیشه مثبت

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

(2) ✓

ج) $x^n \neq 2^n \rightarrow x \neq 2 \quad x \neq 0, \infty \quad R - \{0, \infty\}$

د) $x^n - 2^n \neq 0 \quad x^n \neq 0 \rightarrow x \neq \log_2^n \quad R - \{\log_2^n\}$

الف) $x_{n+1} \in W \quad x_n \in W-1 \quad D_f = \{x | x = \frac{k-1}{e}, k \in W\}$

(2) ✓

ب) $\frac{x^n-1}{x^n-\omega} \in W \quad x^n-1 \in W \quad x^n-\omega \in W \quad x^n-1 \in W \quad x^n-\omega \in W$

$x = \frac{x-\omega}{x^n-1}$

$D_f = \{x | x = \frac{ak-1}{pk-1}, k \in W\}$