

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

ب) $\frac{x^3(x-1)(x+1)}{x(x-1)(x+1)} \geq 0$ $x \neq 1, -1$ $x \rightarrow 0, 4$ $D_f = (-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup (1, +\infty)$

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

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

الف) $y - [x] \geq 0$ $y \geq [x]$ $D_f = (-\infty, 3]$

ب) $y - [x] > 0$ $y > [x]$ $D_f = (-\infty, 2)$

الف) $[x + \frac{1}{2} - 1] + [x + \frac{1}{2}] \geq 0$ $2[x + \frac{1}{2}] \geq 1$ $D_f = [\frac{1}{2}, +\infty)$
 $[x + \frac{1}{2}] \geq \frac{1}{2}$ $x + \frac{1}{2} \geq 1$ $x \geq \frac{1}{2}$

ب) $[x - \frac{1}{2}] + [- (x - \frac{1}{2})] \geq 0$ $a \in \mathbb{Z} \quad [a] + [-a] = 0$
 $a \notin \mathbb{Z} \quad [a] + [-a] = -1 \rightarrow x - \frac{1}{2} \in \mathbb{Z}$
 $D_f = \{x | x = k + \frac{1}{2}, k \in \mathbb{Z}\}$

الف) $\frac{y}{\sin x - 1}$ $\sin x - 1 \neq 0$ $\sin x \neq 1$ $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$

ب) $\frac{y}{y \sin^2 x - 1}$ $y \sin^2 x - 1 \neq 0$ $\sin^2 x \neq \frac{1}{y}$
 $\sin x \neq \pm \frac{\sqrt{y}}{y}$ $D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{2} | k \in \mathbb{Z}\}$

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

ب) $\cos n - 1 \geq 0 \quad \cos n \geq 1 \quad D_f = \{2k\pi \mid k \in \mathbb{Z}\}$

الف) $-1 \leq |x| - 2 \leq 1 \quad |x| \geq 2 \quad 2 \leq x \leq -2 \quad |x| < 2 \quad -2 \leq x \leq 2$
 $D_f = [-2, -1] \cup [1, 2]$

ب) $-1 \leq x^2 + 2x + 1 \leq 1 \quad x^2 + 2x + 1 \leq 1 \quad (x+1)(x+2) \geq 0$
 $x(x+2) \leq 0 \quad -1 \geq x \geq x \geq -2$
 $-2 \leq x \leq 0$
 $D_f = [-2, -1] \cup [-1, 0]$

الف) $x - 2 > 0 \rightarrow x > 2$
 $2 - \log_2 x > 0 \rightarrow \log_2 x \leq 2 \rightarrow x - 2 \leq 4 \rightarrow x \leq 11$
 $D_f = (2, 11]$

ب) $x^2 - x > 0$
 $x(x-1) > 0$
 $x(x-1)(x+1) > 0 \rightarrow 0, 1, -1$
 $D_f = (-1, 0) \cup (1, +\infty)$

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

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

ج) $x^n - 2 \neq 0 \quad x^n \neq 2 \quad x \neq \log_2 x \quad D_f = \mathbb{R} - \{\log_2 x\}$

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

الف) $x+1 \in \mathbb{W} \quad x \in \mathbb{W} - 1 \quad D_f = \{x \mid x = \frac{k-1}{2}, k \in \mathbb{W}\}$
 $x \in \frac{\mathbb{W}-1}{2}$

ب) $\frac{x^2 - 2}{x - 2} \in \mathbb{W} \quad x^2 - 2 \in \mathbb{W}(x - 2)$
 $x^2 - 2 \in -\mathbb{W} + 2$
 $x(x-2) \in -\mathbb{W} + 2$
 $x \in \frac{-\mathbb{W} + 2}{x-2}$
 $D_f = \{x \mid x = \frac{-2k+2}{x-2}, k \in \mathbb{W}\}$