

الف) $x(x-4) \geq 0$ $\rightarrow$ $x(x^2-1) > 0$ $\begin{array}{c|ccc} x & -1 & 0 & 1 & 4 \\ \hline & + & + & + & - & + \end{array}$

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ب) $x^3(x^2-1) \geq 0$ $\rightarrow$ $x(x^2-1) > 0$ $\begin{array}{c|ccc} x & -1 & 0 & 1 \\ \hline & + & + & + \end{array}$

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$(x-1)(x+1) > 0$
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1 -1

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

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

الف) $2 - [x] \geq 0 \rightarrow -[x] \geq -2 \rightarrow [x] \leq 2 \quad D_f = (-\infty, 3)$

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

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

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

$a \in \mathbb{Z} \rightarrow [a] + [-a] \geq 0 \quad x - \frac{1}{x} \in \mathbb{Z}$ $x + \frac{1}{x} \geq 1 \rightarrow x \geq 1 - \frac{1}{x}$

$a \notin \mathbb{Z} \rightarrow [a] + [-a] \geq -1 \quad \{x | x = k + \frac{1}{x}, k \in \mathbb{Z}\}$ $x \geq \frac{1}{x}$

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

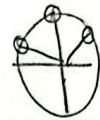
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ب) $2 \sin^2 x - 1 > 0 \rightarrow \sin^2 x > \frac{1}{2} \rightarrow \sin x > \sqrt{\frac{1}{2}}$

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$D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2}\}$

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



$D_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{4}, 2k\pi + \frac{3\pi}{4}, 2k\pi + \frac{5\pi}{4}, 2k\pi + \frac{7\pi}{4} \right\} \rightarrow 0 \leq x < 2\pi$

ب) $\cos x - 1 \geq 0 \rightarrow \cos x \geq 1$
 $\rightarrow 0 \leq x < 2\pi$



$D_f = \mathbb{R} - \{ 2k\pi \}$

الف) $-1 \leq |x| - 3 \leq 1 \rightarrow |x| \leq 4$
 $\sqrt{2} \leq |x|$

$x \in [-4, -\sqrt{2}] \cup [\sqrt{2}, 4]$

ب) $-1 \leq x^2 + 3x + 1 \leq 1$

$x^2 + 3x + 1 - 1 \leq 0 \rightarrow 0 \leq x^2 + 3x + 1 + 1 \rightarrow 0 \leq x^2 + 3x + 2$
 $0 \leq (x+2)(x+1)$

$x(x+3) \leq 0$

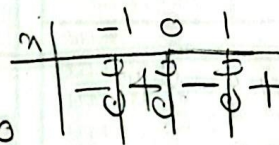
$D_f = [-3, -2] \cup [-1, 0]$

الف) $\sqrt{2} - \log_{\sqrt{2}}(n-2) \geq 0 \rightarrow -\log_{\sqrt{2}}(n-2) \geq -2 \rightarrow \log_{\sqrt{2}}(n-2) \leq 2$

$n-2 \leq 4 \rightarrow n \leq 11$

ب) $x^3 - n > 0 \rightarrow x(n^2 - 1) > 0$

$(n-1)(n+1) > 0$



$D_f = (-1, 0) \cup (1, \infty)$

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

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

$\mathbb{R} - \left\{ \frac{1}{\sqrt{2}} \right\}$

ج) $x^n - 2 \neq 0 \rightarrow x^n \neq 2 \rightarrow x^n \neq 2^1 \rightarrow x = 1 \rightarrow x = \frac{1}{\sqrt{2}}$

د) $x^n - 3 \neq 0 \rightarrow x^n \neq 3 \rightarrow \mathbb{R}$ (دائمًا متباين)

الف) $x_{n+1} \in W \rightarrow x_n \in W-1 \rightarrow x \in \frac{W-1}{\sqrt{2}} \rightarrow \{x | x = \frac{k-1}{\sqrt{2}}, k \in W\}$

ب) $\frac{x_n - 2}{x_n - 1} \in W \rightarrow x_n - 2 \in x_n W - 1W \rightarrow x = \frac{-1W + 2}{\sqrt{2} - 1W} = \frac{1W - 2}{\sqrt{2} - 1W}$

$D_f = \{x | x = \frac{1W - 2}{\sqrt{2} - 1W}, k \in W\}$