

الف) $x^2 - 6x \geq 0 \Rightarrow x(x-6) \geq 0 \Rightarrow x \geq 6, 0$

ب) $x^2 - x > 0 \Rightarrow x^2 > x \Rightarrow x(x-1) > 0 \Rightarrow x \notin \{0, 1\}$

$\Rightarrow D_f = (-1, 0) \cup (0, 1) \cup [6, +\infty)$

ج) $x^2 - x^3 \geq 0 \Rightarrow x^2(1-x) \geq 0 \Rightarrow x \leq 1$

$\Rightarrow D_f = (-\infty, 1]$

د) $x^2 - x > 0 \Rightarrow x(x-1) > 0 \Rightarrow x \notin \{0, 1\}$

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

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

ب) $x|x| > 0 \Rightarrow \begin{cases} x > 0 \\ x = 0 \\ x < 0 \end{cases} \Rightarrow x > 0 \Rightarrow D_f = (0, +\infty)$

الف) $2 - [x] > 0 \Rightarrow [x] \leq 2 \Rightarrow x < 3 \Rightarrow D_f = (-\infty, 3)$

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

الف) $[n - \frac{1}{r}] + [n + \frac{r}{r}] \geq 0 \Rightarrow [n - \frac{1}{r} + 1] + [n + \frac{r}{r}] \geq 0 \Rightarrow [n + \frac{r}{r}] - 1 + [n + \frac{r}{r}] \geq 0 \Rightarrow 2[n + \frac{r}{r}] - 1 \geq 0$

$\Rightarrow [n + \frac{r}{r}] \geq \frac{1}{2} \Rightarrow n + \frac{r}{r} \geq \frac{1}{2} \Rightarrow n \geq \frac{1}{2} - \frac{r}{r} \Rightarrow D_f = [\frac{1}{r}, +\infty)$

ب) $[a] + [-a] = \begin{cases} 0 & a \in \mathbb{Z} \\ -1 & a \notin \mathbb{Z} \end{cases} \Rightarrow [a] + [-a] \geq 0 \Rightarrow a \in \mathbb{Z} \Rightarrow x - \frac{1}{r} \in \mathbb{Z} \Rightarrow x = \mathbb{Z} + \frac{1}{r}$

$\Rightarrow D_f = \{x + \frac{1}{r} \mid x \in \mathbb{Z}\} = \{x \mid x = k + \frac{1}{r}, k \in \mathbb{Z}\}$

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

ب) $2\sin^2 x - 1 \neq 0 \Rightarrow \sin^2 x \neq \frac{1}{2} \Rightarrow \sin x \neq \pm \frac{1}{\sqrt{2}} = \pm \frac{\sqrt{2}}{2} \Rightarrow D_f = \mathbb{R} - \{\frac{k\pi}{4} + \frac{\pi}{4}\}$

$$a) r \sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{r} \Rightarrow \text{Unit Circle Diagram} \Rightarrow D_f = [rk\pi + \frac{\pi}{6}, rk\pi + \frac{5\pi}{6}]$$

$$b) \cos x - 1 \geq 0 \Rightarrow \cos x \geq 1 \Rightarrow \cos x = 1 \Rightarrow D_f = \{rk\pi\}$$

$-1 \leq \cos x \leq 1$

$$c) -1 \leq |x-3| \leq 1 \Rightarrow 2 \leq |x| \leq 4 \Rightarrow \begin{cases} 2 \leq x \leq 4 \\ -4 \leq x \leq -2 \end{cases} \Rightarrow D_f = [-4, -2] \cup [2, 4]$$

$$d) -1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow \begin{cases} (I) x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0 \Rightarrow 0, -3 \\ (II) x^2 + 3x + 1 \geq -1 \Rightarrow x^2 + 3x + 2 \geq 0 \Rightarrow (x+2)(x+1) \geq 0 \Rightarrow -1, -2 \end{cases}$$

$(I) \frac{-3 \pm \sqrt{9-4}}{2} \quad (II) \frac{-3 \pm \sqrt{9-4}}{2} \Rightarrow D_f = [-3, -2] \cup [-1, 0]$

$$e) 2 - \log_3(x-2) \geq 0 \Rightarrow \begin{cases} x-2 \geq 1 \Rightarrow x \geq 3 \\ \log_3(x-2) \leq 2 \Rightarrow x-2 \leq 9 \Rightarrow x \leq 11 \end{cases} \Rightarrow D_f = [3, 11]$$

$$f) \log_{\frac{1}{2}} x^2 - x \Rightarrow x^2 - x > 0 \Rightarrow x(x-1) > 0 \Rightarrow \frac{-1 \pm \sqrt{1+4}}{2} \Rightarrow D_f = (-1, 0) \cup (1, +\infty)$$

$$g) x^n + 1 \neq 0 \Rightarrow x^n \neq -1 \Rightarrow x \neq \log_x^{(-1)} \Rightarrow D_f = \mathbb{R} - \{\log_x^{(-1)}\} \Rightarrow \mathbb{R} = D_f$$

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$$h) x^n - 1 \neq 0 \Rightarrow x^n \neq 1 \Rightarrow x \neq \log_x^1 = 0 \Rightarrow D_f = \mathbb{R} - \{0\} = \mathbb{R} - \{\log_x^1\}$$

$$i) x^n - 2 \neq 0 \Rightarrow x^n \neq 2 \Rightarrow x \neq \log_x^2 \Rightarrow D_f = \mathbb{R} - \{\log_x^2\}$$

$$j) x^n - 3 \neq 0 \Rightarrow x^n \neq 3 \Rightarrow x \neq \log_x^3 \Rightarrow D_f = \mathbb{R} - \{\log_x^3\}$$

$$k) x_{n+1} \in \mathbb{W} \Rightarrow x = \frac{1W-1}{f} \Rightarrow D_f = \{x | x = \frac{k-1}{f}, k \in \mathbb{W}\}$$

$$l) \frac{x_n - 2}{x_n - 5} \in \mathbb{W} \Rightarrow x_n - 2 \in \mathbb{W} \cdot \delta \Rightarrow x_n - 2 \in \mathbb{W} \Rightarrow x(x-2) = 2 - \delta w$$

$$\Rightarrow x = \frac{2 - \delta w}{x - 2} \Rightarrow D_f = \{x | x = \frac{2 - \delta k}{x - 2}, k \in \mathbb{W}\}$$