

الف) $\frac{x^2 - 4x}{x^2 - x}$ $\left. \begin{array}{l} x^2 - x \neq 0 \\ x(x-1) \neq 0 \end{array} \right\} \Rightarrow x \neq 0, 1$

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

$$\text{ii)} \quad \sqrt{\frac{n^2 - n^2}{n^2 - n}} \quad n^2 - n \neq 0 \rightarrow n \neq -1, 0 \quad \frac{n^2 - n^2}{n^2 - n} \geq 0 \quad + \frac{1}{0} + \frac{1}{0} + \frac{1}{0} + \dots$$

$f = (0, +\infty)$
 $f = (0, +\infty)$
 $y = \frac{n+1}{\sqrt{n+|n|}}$
 $\sqrt{n+|n|} \neq 0$
 $n+|n| > 0$
 با جایگذاری
 منفی می شود $(-)$
 مثبت می شود $(+)$
 صفر می شود (0)

صفر می شود $\rightarrow$ (ن) منفی می شود $\rightarrow$ (-) $\rightarrow$ با جایگذازی $\sqrt{\frac{x_1}{x_2}} \neq \frac{x_1}{x_2}$
می شود $\rightarrow$ (+) مثبت می شود $\rightarrow$ $\frac{x_1}{x_2} > 0$

(الف) $y = \sqrt{r - [n]}$ $r - [n] > 0$ $[n] \ll r \rightarrow n \ll r$ $D_f = (-\infty, r)$

$$\text{---)} f = \frac{1}{\sqrt{r - [n]}} \quad \left. \begin{array}{l} \sqrt{r - [n]} \neq 0 \\ r - [n] \geq 0 \end{array} \right\} \rightarrow r - [n] > 0 \quad [n] < r \rightarrow n < r \quad D_f = (-\infty, r)$$

$$\lambda \geq \frac{1}{r} \quad D_f = [\frac{1}{r}, +\infty)$$

$$\therefore \left\lfloor n - \frac{1}{a} \right\rfloor + \left\lfloor -n + \frac{1}{a} \right\rfloor = \begin{cases} a-1 & \text{if } a \mid n \\ -1 & \text{if } a \nmid n \end{cases}$$

$$D_f = \left\{ n \mid \lambda = k + \frac{1}{r}, k \in \mathbb{Z} \right\} \quad \text{جواب (ب، الف)}$$

$$\text{الف) } y = \frac{r}{\sin n - 1} \quad \sin n - 1 \neq 0$$

$$\sin n \neq 1$$

$$n \neq 90^\circ, 180^\circ \rightarrow D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{r} \right\}$$

$$r \sin n - 1 \neq 0$$

$$\sin n \neq \frac{1}{r}$$

$$\sin n \neq \pm \frac{1}{\sqrt{r}} \rightarrow \sin n \neq \pm \frac{\sqrt{r}}{r}$$

$$n \neq \left(\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2} \right)$$

$$D_f = \mathbb{R} - \left\{ \frac{k\pi}{r} + \frac{\pi}{r} \right\}$$

الف) $y = \sqrt{x \sin x - 1}$ $x \sin x - 1 \geq 0$ $\sin x \geq \frac{1}{x}$ $D_f = \left[x k \pi + \frac{\pi}{4}, x k \pi + \frac{5\pi}{4} \right]$	6
ب) $y = \sqrt{\cos x - 1}$ $\cos x - 1 \geq 0$ $\cos x \geq 1$ $D_f = \{x k \pi\}$	7
الف) $\cos y = x - 2$ $-1 \leq x - 2 \leq 1$ $-1 \leq x \leq 3$ $D_f = (-\infty, -3] \cup [3, +\infty) \cup [-1, 1]$ $D_f = [-3, -2] \cup [-1, 0]$ ب) $y = \arcsin(x^2 + x + 1)$ $-1 \leq x^2 + x + 1 \leq 1$ ① $x^2 + x + 1 \geq -1$ $x^2 + x + 2 \geq 0$ $(x+1)(x+2) \geq 0$ $x \leq -2$ or $x \geq -1$ ② $x^2 + x + 1 \leq 1$ $x^2 + x \leq 0$ $x(x+1) \leq 0$ $-1 \leq x \leq 0$ ③ $x^2 + x + 1 \leq 1$ $x^2 + x \leq 0$ $x(x+1) \leq 0$ $-1 \leq x \leq 0$ ④ $x^2 + x + 1 \geq -1$ $x^2 + x + 2 \geq 0$ $(x+1)(x+2) \geq 0$ $x \leq -2$ or $x \geq -1$ ⑤ $x^2 + x + 1 \leq 1$ $x^2 + x \leq 0$ $x(x+1) \leq 0$ $-1 \leq x \leq 0$ ⑥ $x^2 + x + 1 \geq -1$ $x^2 + x + 2 \geq 0$ $(x+1)(x+2) \geq 0$ $x \leq -2$ or $x \geq -1$	8
الف) $y = \sqrt{2 - \log_2(x-2)}$ $x-2 > 0$ $x > 2$ $D_f = (2, 11]$ $2 - \log_2(x-2) \geq 0 \rightarrow \log_2(x-2) \leq 2 \rightarrow x-2 \leq 2^2 \rightarrow x-2 \leq 4 \rightarrow x \leq 11$ ب) $y = \log_2(x^2 - 2x)$ $x^2 - 2x > 0$ $x(x-2) > 0$ $D_f = (-\infty, 0) \cup (2, +\infty)$	9
الف) $y = \frac{x}{x^2 + 1}$ $\frac{x}{x^2 + 1} \rightarrow \frac{0}{0} \rightarrow D_f = \mathbb{R}$ ب) $y = \frac{x}{x^2 - 2}$ $x^2 - 2 \neq 0$ $x^2 \neq 2$ $\log_2 x \neq x$ $D_f = \mathbb{R} - \{\log_2 x\}$ ج) $y = \frac{x}{x^2 - 1}$ $x^2 - 1 \neq 0$ $x^2 \neq 1$ $x \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$ د) $y = \frac{x}{x^2 - x}$ $x^2 - x \neq 0$ $x^2 \neq x$ $x \neq \log_2 x$ $D_f = \mathbb{R} - \{\log_2 x\}$	10
الف) $y = (x+1)!$ $x+1 \in \mathbb{N}$ $x \in \frac{\mathbb{N}-1}{1}$ $D_f = \{x x = \frac{k-1}{1}, k \in \mathbb{N}\}$ ب) $y = \left(\frac{x^2 - 2}{x^2 - 1} \right)!$ $\frac{x^2 - 2}{x^2 - 1} \in \mathbb{N}$ $x \in \frac{-d\mathbb{N} + 2}{2\mathbb{N} - 1}$ $x \in \frac{d\mathbb{N} - 2}{2\mathbb{N} - 1}$	11