

$$الف) y = \sqrt{1 - \sin x}$$

$$1 - \sin x \geq 0$$

$$|\sin x| \leq 1$$

$$\sin x \in [-1, 1]$$

$$D_f = \left\{ x \mid x \in \frac{\pi}{2} + 2k\pi, \frac{3\pi}{2} + 2k\pi \right\}$$

$$ب) y = \sqrt{\cos x - 1}$$

$$\cos x - 1 \geq 0$$

$$|\cos x| \leq 1$$

$$\cos x \in [-1, 1]$$

$$D_f = \{x \mid x \in 2k\pi\}$$

$$الف) (\cos y = |x| - 3)$$

$$-1 \leq |x| - 3 \leq 1$$

$$-1 \leq |x| - 3$$

$$|x| \geq 2$$

$$x \geq 2$$

$$x \leq -2$$

$$|x| - 3 \leq 1$$

$$|x| \leq 4$$

$$-4 \leq x \leq 4$$

$$D_f = [2, 4] \cup [-4, -2]$$

$$ب) y = \arcsin(x^2 + 3x + 1)$$

$$-1 \leq x^2 + 3x + 1 \leq 1$$

$$-1 \leq x^2 + 3x + 1$$

$$x^2 + 3x + 1 \leq 1$$

$$x^2 + 3x \leq 0$$

$$x(x + 3) \leq 0$$

$$[-3, -1] \cup [1, 3]$$

$$الف) y = \sqrt{1 - \log_p(x-2)}$$

$$x - 2 > 0 \rightarrow x > 2$$

$$1 - \log_p(x-2) \geq 0$$

$$\log_p(x-2) \leq 1$$

$$\log_p(x-2) < 2$$

$$x - 2 < 9$$

$$x < 11$$

$$ب) \log(x^2 - x)$$

$$x^2 - x > 0$$

$$x(x-1) > 0 \Rightarrow x < 0 \text{ or } x > 1$$

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

$$الف) y = \frac{p}{x^2 + 1}$$

$$x^2 + 1 \neq 0$$

$$x^2 \neq -1$$

$$ب) y = \frac{p}{x^2 - 1}$$

$$x^2 - 1 \neq 0$$

$$x^2 \neq 1$$

$$x \neq \pm 1$$

$$D_f = \mathbb{R}$$

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

$$ج) y = \frac{p}{x^2 - p}$$

$$x^2 - p \neq 0$$

$$x^2 \neq p$$

$$د) y = \frac{p}{x^2 - p}$$

$$x^2 - p \neq 0$$

$$x^2 \neq p$$

$$D_f = \mathbb{R} - \left\{ \frac{1}{p} \right\}$$

$$D_f = \mathbb{R} - \left\{ \log_p p \right\}$$

$$الف) y = (x+1)!$$

$$x+1 \in \mathbb{N}$$

$$x \in \mathbb{N} - 1$$

$$D_f = \left\{ x \mid x = \frac{k-1}{p}, k \in \mathbb{N} \right\}$$

$$ب) \left(\frac{p-x}{p-\omega} \right)!$$

$$\frac{p-x}{p-\omega} \in \mathbb{N} \quad D_f = \left\{ x \mid x = \frac{p-\omega k}{p-pk}, k \in \mathbb{N} \right\}$$

$$p-x = p-\omega k$$

$$p-x = p-\omega k \rightarrow x = p-\omega k$$

$$x(p-pk)$$

$$p-pk$$

الف) $y = \sqrt{\frac{x^2 - 4x}{x^3 - x}}$

$\frac{x^2 - 4x}{x^3 - x} \geq 0$

$$\frac{-1}{-1} + \frac{+}{+} + \frac{-}{-} + \frac{+}{+} +$$

$x^2 - 4x = 0$
 $x^3 - x \neq 0$
 $x(x-4) = 0 \rightarrow x = 0, 4$
 $x(x^2 - 1) \neq 0 \rightarrow x \neq 0, 1, -1$

$D = \mathbb{R} - \{-1, 0, 1\}$
 $x(x^2 - 1) \neq 0 \Rightarrow x \neq 0, 1, -1$
 $x^3 - x \neq 0 \Rightarrow x \neq 0, 1, -1$
 $x^3(x^2 - 1) = 0 \Rightarrow x = 0, 1, -1$

الف) $y = \sqrt{x + |x|}$

$x + |x| \geq 0$
 $x + 1 = 0$
 $x = -1$
 $\text{if } x > 0 \rightarrow \checkmark$
 $\text{if } x = 0 \rightarrow \checkmark$
 $\text{if } x < 0 \rightarrow x$
 $D = [0, +\infty)$

ب) $y = \frac{1}{\sqrt{x|x|}}$

$x|x| > 0$
 $D = \mathbb{R}^+ \setminus \{0\}$
 $\text{if } x > 0 \rightarrow \checkmark$
 $\text{if } x = 0 \rightarrow \text{مخرج صفر}$
 $\text{if } x < 0 \rightarrow \text{مخرج منفی}$
 $D = \mathbb{R}^+$

الف) $y = \sqrt{2 - [x]}$

$2 - [x] \geq 0$
 $[x] \leq 2 \rightarrow x < 3$
 $D = (-\infty, 3)$

ب) $y = \frac{1}{\sqrt{2 - [x]}}$

$2 - [x] > 0$
 $[x] < 2$
 $D = (-\infty, 2)$

الف) $y = \sqrt{[x - \frac{1}{p}] + [x + \frac{1}{p}]} =$

$[x - \frac{1}{p}] + [x + \frac{1}{p}] + 1 \geq 0$
 $2[x - \frac{1}{p}] \geq -1 \rightarrow x - \frac{1}{p} \geq 0$
 $x \geq \frac{1}{p}$
 $D = [\frac{1}{p}, +\infty)$

ب) $y = \sqrt{[x - \frac{1}{p}] + [-x + \frac{1}{p}]} =$

$[x - \frac{1}{p}] + [-x + \frac{1}{p}] \geq 0$
 $\text{if } a \in \mathbb{Z} \rightarrow [a] + [-a] = 0 \Rightarrow x - \frac{1}{p} \in \mathbb{Z}$
 $\text{if } a \notin \mathbb{Z} \rightarrow [a] + [-a] = -1$
 $D = \{x | x = k + \frac{1}{p}, k \in \mathbb{Z}\}$

الف) $y = \frac{2}{\sin x - 1}$

$\sin x - 1 \neq 0$
 $\sin x \neq 1$
 $D = \mathbb{R} - \{2k\pi, \frac{\pi}{2}\}$

ب) $y = \frac{3}{2 \sin^2 x - 1}$

$2 \sin^2 x - 1 \neq 0$
 $\sin x \neq \pm \frac{\sqrt{2}}{2}$
 $D = \mathbb{R} - \{\frac{\pi}{4} + \frac{k\pi}{2}, \frac{3\pi}{4} + \frac{k\pi}{2}\}$