

$$الف) y = \frac{x+4}{x^2 + 4x^2 - 12x + 4}$$

مخرج را به صورت $x^2 - 1$ می‌نویسیم

$$\begin{array}{r} x^2 + 4x^2 - 12x + 4 \quad | \quad x-1 \\ -x^2 + 12x - 4 \\ \hline 12x - 4 \\ -12x + 12 \\ \hline 8 \end{array}$$

$$\begin{array}{r} x^2 + 4x^2 - 12x + 4 \\ \hline x^2 + 4x^2 - 12x + 4 \\ \hline 8 \end{array}$$

$$D = \mathbb{R} - \left\{ -\frac{1}{4}, -\frac{3}{4}, \frac{1}{4} \right\}$$

$$ب) y = \frac{x+4}{x^2 + 9x^2 + 10x + 4}$$

مخرج را به صورت $x^2 + 1$ می‌نویسیم

$$\begin{array}{r} x^2 + 9x^2 + 10x + 4 \quad | \quad x+1 \\ -x^2 - 10x - 4 \\ \hline 10x + 4 \\ -10x - 10 \\ \hline -6 \end{array}$$

$$\begin{array}{r} x^2 + 9x^2 + 10x + 4 \\ \hline x^2 + 9x^2 + 10x + 4 \\ \hline -6 \end{array}$$

$$D = \mathbb{R} - \left\{ -1, -\frac{3}{4}, -\frac{1}{4} \right\}$$

$$الف) y = \frac{x+4}{x^2 - 4x^2 + 4x - 1}$$

مخرج را به صورت $x^2 - 1$ می‌نویسیم

$$\begin{array}{r} x^2 - 4x^2 + 4x - 1 \quad | \quad x-1 \\ -x^2 + 4x - 1 \\ \hline 4x - 1 \\ -4x + 4 \\ \hline 3 \end{array}$$

$$\begin{array}{r} x^2 - 4x^2 + 4x - 1 \\ \hline x^2 - 4x^2 + 4x - 1 \\ \hline 3 \end{array}$$

$$D = \mathbb{R} - \{1\}$$

$$ب) y = \sqrt{\frac{x+4}{x^2 - 4x^2 + 4x - 1}}$$

مخرج را به صورت $x^2 - 1$ می‌نویسیم

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

$$D = (-\infty, -1] \cup (1, +\infty)$$

$$x > 1 \Rightarrow |x-1| = x-1 \Rightarrow x^2 - 4x^2 + 4x - 1 = 0 \Rightarrow x^2 - 4x^2 + 4x - 1 = 0 \Rightarrow x^2 - 4x^2 + 4x - 1 = 0$$

$$y = \frac{4}{x^2 - 4|x-1| - 4x + 4}$$

$$D_f = \mathbb{R} - \{-1, 0, 1, 4\}$$

$$الف) y = \sqrt{-x-1}$$

$$[-x-1] \geq 1$$

$$-x-1 \geq 1 \Rightarrow x \leq -2$$

$$D_f = (-\infty, -2]$$

$$ب) y = \frac{2x^2 + 4}{[x]^2 - 2[x] - 3}$$

$$([x]^2 - 2[x] - 3) \rightarrow ([x]-3)([x]+1)$$

$$\begin{array}{l} [x] = 3 \Rightarrow 3 \leq x < 4 \\ [x] = -1 \Rightarrow -1 \leq x < 0 \end{array}$$

$$D_f = (-\infty, -1) \cup [0, 3) \cup [4, +\infty)$$

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

$$\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right] \geq 0 \Rightarrow \left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x} - \frac{1}{x}\right] \geq 0 \Rightarrow \left[x - \frac{1}{x}\right] + \left[x - \frac{1}{x} + 1\right] \geq 0$$

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

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

$$\left[x - \frac{1}{x}\right] + \left[\frac{1}{x} - x\right] \geq 0 \Rightarrow \left[x - \frac{1}{x}\right] + \left[-\left(x - \frac{1}{x}\right)\right] \geq 0 \Rightarrow \left[x - \frac{1}{x}\right] - \left[x - \frac{1}{x}\right] \geq 0$$

$$D_f = \{x | x = k + \frac{1}{x}, k \in \mathbb{Z}\}$$

$$\begin{cases} a \in \mathbb{Z} [a] \cdot [a] = 1 \\ a \in \mathbb{Z} [a] \cdot [a] = 1 \end{cases}$$

$$\text{الف) } y = \frac{\cos x + 1}{\tan x + 1}$$

$$\tan x + 1 \neq 0 \\ \sin x \neq -1$$



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

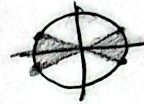
(9)

$$\text{ب) } y = \sqrt{1 - \sqrt{5} \sin x}$$

$$1 - \sqrt{5} \sin x \geq 0$$

$$\sin x \leq \frac{1}{\sqrt{5}}$$

$$|\sin x| \leq \frac{1}{\sqrt{5}}$$

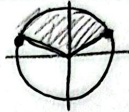


$$D_f = \left[k\pi + \frac{\pi}{9}, k\pi + \frac{7\pi}{9} \right] \\ k \in \mathbb{Z}$$

$$\text{ج) } y = \sqrt{\sqrt{5} \sin x - 1}$$

$$\sqrt{5} \sin x - 1 \geq 0$$

$$\sin x \geq \frac{1}{\sqrt{5}}$$



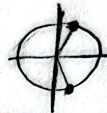
$$D_f = \left[k\pi + \frac{\pi}{9}, k\pi + \frac{8\pi}{9} \right]$$

(10)

$$\text{د) } y = \sqrt{1 - \sqrt{5} \cos x}$$

$$1 - \sqrt{5} \cos x \geq 0$$

$$\cos x \leq \frac{1}{\sqrt{5}}$$



$$D_f = \left[k\pi + \frac{\pi}{9}, k\pi + \frac{4\pi}{9} \right] \\ k \in \mathbb{Z}$$

$$\text{هـ) } y = \arcsin(x^2 + \sqrt{x} + 1)$$

$$-1 \leq x^2 + \sqrt{x} + 1 \leq 1$$

$$\begin{cases} x^2 + \sqrt{x} + 1 \geq -1 & x^2 + \sqrt{x} + 1 \leq 1 \\ (\sqrt{x} + 1)(x + 1) \geq 0 & x^2 + \sqrt{x} \leq 0 \end{cases} \quad (I)$$

(11)

$$\begin{aligned} & \frac{-1}{+} - \frac{1}{-} + \frac{1}{+} \quad (I) \quad \frac{-1}{+} - \frac{0}{-} + \frac{1}{+} \quad (II) \\ & \frac{-1}{+} - \frac{1}{-} + \frac{1}{+} \quad (I) \quad \frac{-1}{+} - \frac{0}{-} + \frac{1}{+} \quad (II) \end{aligned}$$

$$D_f = [-1, -\frac{1}{2}] \cup [-1, 0]$$

$$\text{و) } \cos y = \sqrt{2 - \sqrt{x}}$$

$$\begin{cases} 2 - \sqrt{x} \geq 0 & x \leq \frac{4}{\sqrt{5}} \\ -1 \leq \sqrt{2 - \sqrt{x}} \leq 1 \end{cases}$$

$$2 - \sqrt{x} \leq 1 \Rightarrow \sqrt{x} \geq 1 \Rightarrow x \geq 1$$

$$D_f = \left[\frac{1}{\sqrt{5}}, \frac{4}{\sqrt{5}} \right]$$

$$\text{الف) } y = \deg_x (1 - \deg_{\frac{x}{\sqrt{5}}})$$

$$\begin{cases} x > 0 \\ 1 - \deg_{\frac{x}{\sqrt{5}}} > 0 \end{cases}$$

$$\deg_{\frac{x}{\sqrt{5}}} < 1 \Rightarrow x < \sqrt{5}$$

$$D_f = (0, \sqrt{5})$$

(12)

$$\text{ب) } \deg_{\frac{x}{\sqrt{5}}} (1 - \deg_{\frac{x}{\sqrt{5}}})$$

$$\begin{cases} x > 0 \\ 1 - \deg_{\frac{x}{\sqrt{5}}} > 0 \end{cases}$$

$$\deg_{\frac{x}{\sqrt{5}}} < 1 \Rightarrow x < \frac{1}{\sqrt{5}}$$

$$D_f = (0, \frac{1}{\sqrt{5}})$$

$$\text{ج) } y = \sqrt{\frac{x - x^2}{x + 1}}$$

$$\frac{x - x^2}{x + 1} \geq 0$$

$$\frac{x - x^2}{x + 1} \geq 0 \Rightarrow x \geq 1$$

$$x - x^2 \geq 0 \Rightarrow x \leq 1$$

$$\frac{x - x^2}{x + 1} \geq 0 \Rightarrow \frac{(x + 1)(x - 1)}{x + 1} \geq 0 \Rightarrow x - 1 \geq 0 \Rightarrow x \geq 1$$

$$D_f = [1, \sqrt{5}]$$

(13)

$$\text{د) } y = \left(\frac{x + d}{x + f} \right)!$$

$$\frac{x + d}{x + f} \in \mathbb{W} \Rightarrow x + d \in \mathbb{W}(x + f)$$

$$x + d - \mathbb{W}(x + f) \in -d + \mathbb{W} \Rightarrow x \in \frac{-d + \mathbb{W}}{1 - \mathbb{W}}$$

$$D_f = \left\{ x \mid x = \frac{k - d}{-k + f}, k \in \mathbb{W} \right\}$$