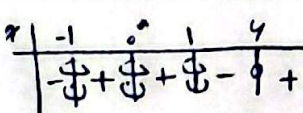
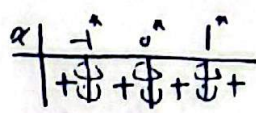


فصل پنجم

الف) $y = \sqrt{\frac{x^2-2x}{x^2-x}} \Rightarrow y = \sqrt{\frac{x(x-2)}{x(x-1)(x+1)}} \Rightarrow$  $Df = (-1, 0) \cup (0, 1) \cup [2, +\infty)$

ب) $y = \sqrt{\frac{x^5-x^3}{x^2-x}} \Rightarrow y = \sqrt{\frac{x^3(x-1)(x+1)}{x(x-1)(x+1)}} \Rightarrow$  $Df = \mathbb{R} - \{0, 1, -1\}$

الف) $y = \frac{x+1}{\sqrt{x+|x|}} \Rightarrow x+|x| > 0 \Rightarrow x > -|x| \Rightarrow Df = (0, +\infty) \cap \mathbb{R}^+$

ب) $y = \frac{1}{\sqrt{x|x|}} \Rightarrow x|x| > 0 \Rightarrow Df = \mathbb{R}^+$

الف) $y = \sqrt{2-[x]} \Rightarrow 2-[x] \geq 0 \Rightarrow [x] \leq 2 \Rightarrow Df = (-\infty, 2)$

ب) $y = \frac{1}{\sqrt{2-[x]}} \Rightarrow 2-[x] > 0 \Rightarrow [x] < 2 \Rightarrow Df = (-\infty, 2)$

الف) $y = \sqrt{\left[x - \frac{1}{3}\right] + \left[x + \frac{2}{3}\right]} \Rightarrow y = \sqrt{2\left[x + \frac{1}{3}\right] - 1} \Rightarrow 2\left[x + \frac{1}{3}\right] - 1 \geq 0 \Rightarrow \left[x + \frac{1}{3}\right] \geq \frac{1}{2} \Rightarrow x + \frac{1}{3} \geq 1 \Rightarrow x \geq \frac{2}{3} \Rightarrow Df = \left[\frac{2}{3}, +\infty\right)$

ب) $y = \sqrt{\underbrace{\left[x - \frac{1}{3}\right]}_0 + \underbrace{\left[-x + \frac{1}{3}\right]}_{-0}} \Rightarrow x - \frac{1}{3} \in \mathbb{Z} \Rightarrow x \in \mathbb{Z} + \frac{1}{3} \Rightarrow Df = \{x \mid x = k + \frac{1}{3}, k \in \mathbb{Z}\}$

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

ب) $y = \frac{3}{1 \pm \sin^2 x} \Rightarrow 1 \pm \sin^2 x \neq 0 \Rightarrow \sin^2 x \neq \frac{1}{4} \Rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2} \Rightarrow Df = \mathbb{R} - \left\{\frac{k\pi}{4} \pm \frac{\pi}{4}\right\}$ 

الف) $y = \sqrt{2 \sin x - 1} \Rightarrow 2 \sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{2}$  $Df = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$

ب) $y = \sqrt{\cos x - 1} \Rightarrow \cos x - 1 \geq 0 \Rightarrow \cos x \geq 1 \Rightarrow$  $Df = \{2k\pi\}$

$-1 < \cos x < 1$ (2) ✓

الف) $\cos y = |x| - 3 \Rightarrow -1 \leq |x| - 3 \leq 1 \Rightarrow 2 \leq |x| \leq 4$ $\begin{cases} 2 \leq x \leq 4 \\ -4 \leq x \leq -2 \end{cases}$ $Df = [-4, -2] \cup [2, 4]$

ب) $y = \arcsin(x^2 + 3x + 1) \Rightarrow \begin{cases} x^2 + 3x + 1 \geq -1 \\ x^2 + 3x + 1 \leq 1 \end{cases} \Rightarrow \begin{cases} x^2 + 3x + 2 \geq 0 \\ x^2 + 3x \leq 0 \end{cases}$

$x^2 + 3x + 2 \geq 0 \Rightarrow (x+2)(x+1) \geq 0 \Rightarrow x \leq -2 \text{ or } x \geq -1$ (1)

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

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

الف) $y = \sqrt{2 - \log_p(x+1)} \Rightarrow x+1 > 0 \Rightarrow x > -1$ $Df = (-1, 11]$

$2 - \log_p(x+1) \geq 0 \Rightarrow \log_p(x+1) \leq 2 \Rightarrow x+1 \leq p^2 \Rightarrow x \leq 11$ (2) ✓

ب) $y = \log(x^2 - x) \Rightarrow x^2 - x > 0 \Rightarrow x(x-1) > 0 \Rightarrow x < 0 \text{ or } x > 1$

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

الف) $y = \frac{p}{x^2 + 1} \Rightarrow x^2 + 1 \neq 0 \Rightarrow x^2 \neq -1 \Rightarrow Df = \mathbb{R}$

ب) $y = \frac{p}{x-1} \Rightarrow x-1 \neq 0 \Rightarrow x \neq 1 \Rightarrow Df = \mathbb{R} - \{1\}$

ج) $y = \frac{p}{x^2 - 1} \Rightarrow x^2 - 1 \neq 0 \Rightarrow x \neq \pm 1 \Rightarrow Df = \mathbb{R} - \{\log_k^{\pm 1}\}$ (2) ✓

د) $y = \frac{p}{x^2 - p} \Rightarrow x^2 - p \neq 0 \Rightarrow x \neq \pm \sqrt{p} \Rightarrow Df = \mathbb{R} - \{\log_k^{\pm \sqrt{p}}\}$

الف) $y = (kx+1)! \Rightarrow kx+1 \in \mathbb{N} \Rightarrow kx \in \mathbb{N} - 1 \Rightarrow x \in \frac{\mathbb{N}-1}{k} \Rightarrow Df = \{x | x = \frac{k-1}{k}, k \in \mathbb{N}\}$

ب) $y = \left(\frac{px-1}{rx-d}\right)! \Rightarrow \frac{px-1}{rx-d} \in \mathbb{N} \Rightarrow x = \frac{dw-1}{rw-p}$ $\nearrow \frac{ax-b}{cx-d} = y \Rightarrow x = \frac{dy-b}{cy-d}$

$Df = \{x | x = \frac{dk-1}{rk-p}, k \in \mathbb{N}\}$