

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

ب) $y = \sqrt{\frac{x^4 - x^3}{x^3 - x}} = \sqrt{\frac{x^3(x-1)}{x(x^2-1)}}$

$\begin{array}{c|ccc} -1 & 0 & 1 & 4 \\ \hline & \oplus & \oplus & \oplus \\ & - & + & - \end{array}$

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

$\begin{array}{c|ccc} -1 & 0 & 1 & 4 \\ \hline & \oplus & \oplus & \oplus \\ & + & + & + \end{array}$

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

الف) $y = \frac{x+1}{\sqrt{x+|x|}}$

$\sqrt{x+|x|} > 0 \Rightarrow \begin{cases} x = + \text{ (✓)} \\ x = - \text{ (✗)} \\ x = 0 \text{ (✗)} \end{cases}$

$D_f = (0, +\infty)$

ب) $y = \frac{1}{\sqrt{x|x|}}$

$x|x| > 0 \Rightarrow \begin{cases} x = + \text{ (✓)} \\ x = - \text{ (✗)} \\ x = 0 \text{ (✗)} \end{cases}$

$D_f = (0, +\infty)$

الف) $y = \sqrt{2 - [x]}$

$2 - [x] \geq 0$

$[x] \leq 2$

$D_f = (-\infty, 3)$

ب) $y = \frac{1}{\sqrt{2 - [x]}}$

$2 - [x] > 0$

$[x] < 2$

$D_f = (-\infty, 2)$

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

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

$2[x - \frac{1}{x}] \geq -1$

$[x - \frac{1}{x}] \geq -\frac{1}{2} \Rightarrow [x - \frac{1}{x}] \geq 0$

$\hookrightarrow \text{مقدار صحیح}$

$D_f = [\frac{1}{x}, +\infty)$

$x - \frac{1}{x} \geq 0 \Rightarrow x \geq \frac{1}{x}$

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

$[x - \frac{1}{x}] + [-x + \frac{1}{x}] = \begin{cases} 0 \Rightarrow x - \frac{1}{x} \in \mathbb{Z} \\ -1 \Rightarrow x - \frac{1}{x} \notin \mathbb{Z} \end{cases}$

$x - \frac{1}{x} \in \mathbb{Z}$

$x \in \mathbb{Z} + \frac{1}{x}$

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

الف) $y = \frac{r}{\sin x - 1}$

$\sin x - 1 \neq 0$

$\sin x \neq 1$

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

ب) $y = \frac{r}{r \sin^2 x - 1}$

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

$\sin^2 x \neq \frac{1}{r}$

$\sin x \neq \pm \sqrt{\frac{1}{r}}$

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

الف) $y = \sqrt{r \sin u - 1}$ $r \sin u - 1 \geq 0$ (✓) $\sin u \geq \frac{1}{r} \Rightarrow 2K\pi + \frac{\pi}{4} \leq u \leq 2K\pi + \frac{3\pi}{4}$ $D_f = \left[2K\pi + \frac{\pi}{4}, 2K\pi + \frac{3\pi}{4} \right]$	ب) $y = \sqrt{\cos u - 1}$ $\cos u - 1 \geq 0$ $\cos u \geq 1 \Rightarrow 2K\pi$ $D_f = \{2K\pi\}$	6
الف) $\cos y = x - 3$ $-1 \leq x - 3 \leq 1$ $2 \leq x \leq 4 \Rightarrow \begin{cases} x \leq 4 \Rightarrow -4 \leq x \leq 4 \\ x \geq 2 \Rightarrow -2 \leq x \leq 2 \end{cases}$ $D_f = [-4, -2] \cup [2, 4]$	ب) $y = \arcsin(x^2 + 3x + 1)$ $-1 \leq x^2 + 3x + 1 \leq 1$ $x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x = [-3, 0]$ $x^2 + 3x + 1 \geq -1 \Rightarrow x^2 + 3x + 2 \geq 0 \Rightarrow x = (-\infty, -2] \cup [-1, +\infty)$ $D_f = [-3, -2] \cup [-1, 0]$ جدول نقيض علامه باید تلبی 1, 1, 2	7
الف) $y = \sqrt{r - \log_p(x-2)}$ $x-2 > 0 \Rightarrow x > 2$ $r - \log_p(x-2) \geq 0 \Rightarrow \log_p(x-2) \leq r$ $x-2 \leq p^r \Rightarrow x \leq 11$ (✓) $D_f = (2, 11]$	ب) $y = \log(x^3 - x)$ $x^3 - x > 0 \Rightarrow x(x-1)(x+1) > 0$ $D_f = (-1, 0) \cup (1, +\infty)$	8
الف) $y = \frac{r}{f^{u+1}}$ $f^{u+1} \neq 0$ $D_f = \mathbb{R}$ $f^u \neq -1$ $\Rightarrow y = \frac{r}{f^u - 1}$ $D_f = \mathbb{R} - \{0\}$ $f^u - 1 \neq 0 \Rightarrow f^u \neq 1 \Rightarrow u \neq 0$	2) $y = \frac{r}{f^{u-2}}$ $D_f = \mathbb{R} - \{\log_f r\}$ $f^{u-2} \neq 0 \Rightarrow f^u \neq r \Rightarrow \log_f r = u$ $\Rightarrow y = \frac{r}{f^{u-2}}$ $D_f = \mathbb{R} - \{\log_f r\}$ $f^u \neq r \Rightarrow \log_f r = u$	9
الف) $y = (f^{u+1})!$ $f^{u+1} \in \mathbb{W} \Rightarrow u \in \frac{\mathbb{W}-1}{f}$ $D_f = \left\{ u \mid u = \frac{k-1}{f}, k \in \mathbb{W} \right\}$	ب) $y = \left(\frac{r^{u-2}}{f^{u-d}} \right)!$ $\frac{r^{u-2}}{f^{u-d}} \in \mathbb{W} \Rightarrow \frac{-d\mathbb{W} + r}{r - r\mathbb{W}}$ $D_f = \left\{ u \mid u = \frac{-dK + r}{r - rK}, K \in \mathbb{W} \right\}$	10