

الف) $y = \sqrt{\frac{x^2-4x}{x^3-x}} \rightarrow \frac{x^2-4x}{x^3-x} \geq 0 \rightarrow \frac{x(x-4)}{x(x-1)(x+1)} \geq 0$
 $\rightarrow x = -1, 0, 4 \rightarrow \frac{-1}{-1} + \frac{0}{0} + \frac{1}{1} - \frac{1}{1} +$
 $D = (-1, 0) \cup (0, 4) \cup [4, +\infty)$

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

الف) $y = \frac{x+1}{\sqrt{x+|x|}} \rightarrow x+|x| > 0 \rightarrow \frac{+}{-} \frac{\sqrt{}}{x} \rightarrow D = (0, +\infty)$

ب) $y = \frac{1}{\sqrt{x|x|}} \rightarrow x|x| > 0 \rightarrow \frac{+}{-} \frac{\sqrt{}}{x} \rightarrow D = (0, +\infty)$

الف) $y = \sqrt{2-[x]} \rightarrow 2-[x] \geq 0 \rightarrow [x] \leq 2 \rightarrow x < 3$
 $D = (-\infty, 3)$

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

الف) $y = \sqrt{[x-\frac{1}{x}] + [x+\frac{1}{x}]} \rightarrow [x-\frac{1}{x}] + [x+\frac{1}{x}] \geq 0$
 $D = [\frac{1}{x}, +\infty)$
 $\xrightarrow{x-\frac{1}{x}+1} x \geq \frac{1}{x} \leftarrow x-\frac{1}{x} \geq 0 \xrightarrow{\text{مربع کردن}} [x-\frac{1}{x}] \geq -\frac{1}{x}$
 $\xrightarrow{a \in \mathbb{Z}} [x] + [-x] = 0$

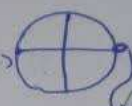
ب) $y = \sqrt{[x-\frac{1}{x}] + [-x+\frac{1}{x}]} \rightarrow [-(x-\frac{1}{x})] \Rightarrow x-\frac{1}{x} \in \mathbb{Z}$
 $\Rightarrow x \in \mathbb{Z} + \frac{1}{x}$

الف) $y = \frac{2}{\sin x - 1} \rightarrow \sin x \neq 1 \rightarrow x \neq \frac{\pi}{2} + 2k\pi$
 $D = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$

ب) $y = \frac{2}{2\sin^2 x - 1} \rightarrow 2\sin^2 x \neq 1 \rightarrow \sin^2 x \neq \frac{1}{2} \rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2} \rightarrow x \neq k\pi \pm \frac{\pi}{4}$
 $D = \mathbb{R} - \{k\pi \pm \frac{\pi}{4}\}$

ج) $y = \sqrt{r \sin x - 1} \rightarrow r \sin x - 1 \geq 0 \rightarrow r \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{r}$

 $D = [2k\pi + \frac{\pi}{r}, 2k\pi + \frac{\pi}{r}]$

د) $y = \sqrt{\cos x - 1} \rightarrow \cos x \geq 1 \rightarrow \cos x = 1 \rightarrow$  $D = \{2k\pi\}$

هـ) $\cos y = |x| - r \rightarrow -1 \leq |x| - r \leq 1 \rightarrow r \leq |x| \leq r+1$
 $D = [-r-1, -r] \cup [r, r+1]$

و) $y = \arcsin(x^2 + rx + 1) \rightarrow \begin{cases} x^2 + rx + 1 \leq 1 \rightarrow x(x+r) \leq 0 \\ x^2 + rx + 1 \geq -1 \rightarrow x^2 + rx + 2 \geq 0 \end{cases}$
 $x = 0, -r$
 $D = [-r, 0] \cup [0, 1]$

ز) $y = \sqrt{r - \log_r(x-r)} \rightarrow \begin{cases} x-r \geq 0 \rightarrow x \geq r \\ r - \log_r(x-r) \geq 0 \rightarrow \log_r(x-r) \leq r \rightarrow (x-r) \leq r^r \end{cases}$
 $D = (r, 1+r^r]$

ح) $y = \log(x^2 - x) \rightarrow x^2 - x > 0 \rightarrow x(x-1) > 0 \rightarrow x(x-1)(x+1) > 0$
 $D = (-1, 0) \cup (1, +\infty)$

ط) $y = \frac{r}{r^x + 1} \rightarrow r^x \neq -1 \checkmark \rightarrow D = \mathbb{R}$

ث) $y = \frac{r}{r^x - 1} \rightarrow r^x \neq 1 \rightarrow x \neq 0 \rightarrow D = \mathbb{R} - \{0\}$

ج) $y = \frac{r}{r^x - r} \rightarrow r^x \neq r \rightarrow r^x \neq r \rightarrow rx \neq 1 \rightarrow x \neq \frac{1}{r} \rightarrow D = \mathbb{R} - \{\frac{1}{r}\}$

د) $y = \frac{r}{r^x - r} \rightarrow r^x \neq r \rightarrow x \neq \log_r r \rightarrow D = \mathbb{R} - \{\log_r r\}$

هـ) $y = (r^x + 1)! \rightarrow r^x + 1 \in \mathbb{N} \rightarrow x \in \frac{\mathbb{N} - 1}{r}$

$D = \{x/x = \frac{k-1}{r}, k \in \mathbb{N}\}$

و) $y = (\frac{rx-r}{rx-a})!$
 $\frac{rx-r}{rx-a} \in \mathbb{N} \rightarrow rx-r = r\mathbb{N}x - a/\mathbb{N}$

$D = \{x/x = \frac{a\mathbb{N} - r}{r\mathbb{N} - r}, k \in \mathbb{N}\}$
 $x \in \frac{a\mathbb{N} - r}{r\mathbb{N} - r} \leftarrow rx - r\mathbb{N}x = -a\mathbb{N} + r$