

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

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

$y = \frac{x+1}{\sqrt{x+|x|}}$ $x+|x| > 0$ $|x| > -x$ $D_f = \mathbb{R}^+ \cup (0, +\infty)$

$\frac{1}{\sqrt{x+|x|}}$ $x+|x| > 0$ $D_f = \mathbb{R}^+ \cup (0, +\infty)$

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

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

الف) $y = \sqrt{[x-\frac{1}{2}] + [x+\frac{1}{2}]}$ $[x-\frac{1}{2}] + [x+\frac{1}{2}] \geq 0$ $[x-\frac{1}{2}] + [x-\frac{1}{2}+1] \geq 0$
 $2[x-\frac{1}{2}] + 1 \geq 0$ $[x-\frac{1}{2}] \geq -\frac{1}{2}$ $\xrightarrow{\text{این دو معادله را منفرجه کنیم}} [x-\frac{1}{2}] \geq 0$ $x-\frac{1}{2} \geq 0$ $x \geq \frac{1}{2}$
 $D_f = \{x | x = k + \frac{1}{2}, k \in \mathbb{Z}\}$ $D_f = [\frac{1}{2}, +\infty)$

ب) $\sqrt{[x-\frac{1}{2}] + [-x+\frac{1}{2}]} \rightarrow y = \sqrt{[x-\frac{1}{2}] + [-(x-\frac{1}{2})]} \geq 0 \rightarrow \begin{cases} a \in \mathbb{Z} \Rightarrow [a], [-a] = 0 \checkmark \\ a \notin \mathbb{Z} \Rightarrow [a], [-a] = -1 \times \end{cases}$ $x-\frac{1}{2} \in \mathbb{Z}$

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



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



$$الف) y = \sqrt{r \sin x - 1}$$

$$r \sin x - 1 \geq 0 \quad \sin x \geq \frac{1}{r}$$

$$D_f = \left[rk\pi + \frac{\pi}{r}, rk\pi + \frac{\pi}{r} \right]$$



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$$ب) y = \sqrt{\cos x - 1}$$

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

$$\cos x \geq 1$$

$$D_f = \{rk\pi, k \in \mathbb{Z}\}$$

$$الف) \cos y = |x| - 2$$

$$-1 \leq |x| - 2 \leq 1$$

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

$$-1 \leq x \leq 1$$

$$D_f = \{-2, -1\} \cup \{1, 2\}$$

$$ب) \arcsin(x^2 + x + 1)$$

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

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

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

$$x(x+1) \leq 0 \quad (I)$$

$$x^2 + x + 1 \geq -1$$

$$x^2 + x + 2 \geq 0$$

$$(x+1)(x+2) \geq 0 \quad (II)$$

$$\frac{-1}{2} \leq x \leq 0 \quad (I)$$

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$$\frac{-1}{2} \leq x \leq 0 \quad (II)$$

$$\Rightarrow D_f = (I) \cap (II) = [-\frac{1}{2}, 0]$$

$$y = \sqrt{r - \log_r(x-r)}$$

$$\begin{cases} x-r > 0 \rightarrow x > r \\ r - \log_r(x-r) \geq 0 \end{cases}$$

$$\log_r(x-r) \leq r$$

$$\Rightarrow D_f = (r, 11]$$

$$x-r \leq 9 \quad x \leq 11$$

$$y = \log(x^2 - x) \rightarrow x^2 - x > 0$$

$$x(x-1) > 0$$

$$x(x+1)(x-1) > 0$$

$$\frac{-1}{2} < x < 1$$

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

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$$الف) y = \frac{r}{r^x + 1}$$

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

$$r^x \neq -1$$

$$x \neq -1$$

$$D_f = \mathbb{R}$$

$$ب) y = \frac{r}{r^x - 1}$$

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

$$r^x \neq 1$$

$$x \neq 0$$

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

$$ج) y = \frac{r}{r^x - r}$$

$$r^x - r \neq 0$$

$$r^x \neq r$$

$$x \neq 1$$

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

$$د) \frac{r}{r^x - r}$$

$$r^x - r \neq 0$$

$$r^x \neq r$$

$$x \neq \log_r r$$

$$D_f = \mathbb{R} - \{\log_r r\}$$

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$$الف) y = (\varepsilon x + 1)!$$

$$\varepsilon x + 1 \in \mathbb{W}$$

$$\varepsilon x \in \mathbb{W} - 1$$

$$x \in \frac{\mathbb{W} - 1}{\varepsilon}$$

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

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$$ب) y = \left(\frac{\varepsilon x - r}{\varepsilon x - \varepsilon} \right)!$$

$$\frac{\varepsilon x - r}{\varepsilon x - \varepsilon} \in \mathbb{W}$$

$$x = \frac{\varepsilon - \mathbb{W}}{\varepsilon - r}$$

$$D_f = \left\{ x \mid x = \frac{\varepsilon - \mathbb{W}}{\varepsilon - r}, k \in \mathbb{W} \right\}$$

1.