

۲-۲-۲

الف) $\frac{x^2 - 4x}{x^2 - x} \geq 0 \rightarrow \frac{x(x-4)}{x(x-1)} \xrightarrow{\text{ریشه}} \begin{matrix} 0, 4 \\ -1, 0 \end{matrix}$ $\frac{-1}{-} + \frac{0}{+} + \frac{1}{-} + \frac{4}{-} =$ $D_f = [4, +\infty) \cup (-1, 1) - \{0\}$

ب) $\frac{x^3 - x^2}{x^2 - x} \geq 0 \rightarrow \frac{x x (x-1)}{x(x-1)} \xrightarrow{\text{ریشه}} \begin{matrix} 0, 1 \\ -1, 0 \end{matrix}$ $\frac{-1}{+} + \frac{0}{+} + \frac{1}{+} + \frac{1}{+} =$ $D_f = \mathbb{R} - \{0, 1\}$

الف) $x = \frac{x+1}{\sqrt{x+1}} \rightarrow x + |x| \geq 0$ $x > -|x|$ $\xrightarrow{\text{چنین رابطه‌ای فقط برای اعداد مثبت صدق می‌کند}}$ $D_f = \mathbb{R}^+$

ب) $y = \frac{1}{\sqrt{x+1}} \rightarrow x + |x| > 0$ $\xrightarrow{\text{این رابطه هم برای اعداد مثبت فقط صدق می‌کند}}$ $D_f = \mathbb{R}^+$

الف) $y - [x] \geq 0 \quad y \geq [x]$ $\xrightarrow{\text{همه اعداد قبل از ۳ صدق می‌کنند}}$ $(-\infty, 3) = D_f$

ب) $y - [x] > 0 \quad y > [x]$ $\xrightarrow{\text{همه اعداد قبل از ۲ صدق می‌کنند}}$ $(-\infty, 2) = D_f$

الف) $\left[x - \frac{1}{y}\right] + \left[x + \frac{y}{y}\right] \geq 0 \rightarrow \left[x + \frac{y}{y} + 1\right] + \left[x + \frac{y}{y}\right] \rightarrow y \left[x + \frac{y}{y}\right] - 1 \geq 0$ $y \left[x + \frac{y}{y}\right] \geq 1 \rightarrow \left[x + \frac{y}{y}\right] \geq \frac{1}{y}$ $\xrightarrow{\text{این عدد صحیح است}}$ $x + \frac{y}{y} \geq 1 \quad x \geq \frac{1}{y}$ $D_f = \left[\frac{1}{y}, +\infty\right)$

ب) $\left[x - \frac{1}{y}\right] + \left[\frac{1}{y} - x\right] \geq 0$ $\xrightarrow{\text{قرینه هم هستند}}$ $\text{if } \begin{cases} a \in \mathbb{Z} & [a] + [-a] = 0 \\ a \notin \mathbb{Z} & [a] + [-a] = -1 \end{cases} \rightarrow x - \frac{1}{y} \in \mathbb{Z}$ $D_f = \left\{x \mid x = k + \frac{1}{y}, k \in \mathbb{Z}\right\}$

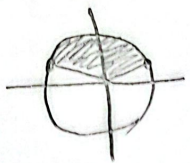
الف) $\sin x - 1 \neq 0$ $\sin x \neq 1$ $D_f = \mathbb{R} - \left\{2k\pi + \frac{\pi}{2}\right\}$

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

الف) $y \sin x - 1 \geq 0$

$y \sin x \geq 1$

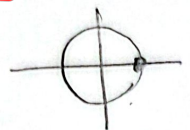
$\sin x \geq \frac{1}{y}$



$D_f = \left[yk\pi + \frac{\pi}{y}, yk\pi + \frac{5\pi}{y} \right]$

ب) $\cos x - 1 > 0$ ✓

$\cos x > 1$



$D_f = \{ yk\pi \}$

الف) $-1 \leq |x| - 3 \leq 1$

$y \leq |x| \leq 4$

$y \leq x \leq 4$
 $-y \geq x \geq -4$

$\cup \rightarrow D_f = [y, 4] \cup [-4, -y]$

ب) $-1 \leq x^y + yx + 1 \leq 1$ ✓ $x^y + yx + 1 \leq 1 \rightarrow x^y + yx \leq 0 \rightarrow x(x+y) \xrightarrow{\text{نقطة}} \textcircled{I} 0, -y$

$-1 \leq x^y + yx + 1 \rightarrow x^y + yx \geq -2 \rightarrow x(x+y) \xrightarrow{\text{نقطة}} \textcircled{II} -1, -y$
 $\frac{-y}{-y} \textcircled{I} \quad \frac{-y-1}{-y-1} \textcircled{II} \quad (I) \cap (II) = \xrightarrow{\text{نقطة}} D_f = [-y, -y] \cup [-1, 0]$

الف) $y - \log_y(x-y) \geq 0$

$x-y > 0 \quad (x > y)$

$y \geq \log_y(x-y)$

$y \geq x-y \rightarrow (1) \geq x$

$D_f = (y, 1]$

ب) $y = \log(x^y - x) \rightarrow x^y - x > 0$ ✓ $x(x^{y-1} - 1) \leq 0$ $D_f = (-1, 0) \cup (1, +\infty)$
 $\frac{-1}{-1} \textcircled{I} \quad \frac{0}{0} \textcircled{II} \quad \frac{1}{1} \textcircled{III}$

الف) $x^x + 1 \neq 0 \quad x^x \neq -1 \rightarrow \text{مستحيل}$

$D_f = \mathbb{R}$

ب) $x^x - 1 \neq 0 \quad x^x \neq 1 \rightarrow x = 0 = 1$

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

ج) $x^x - y \neq 0 \quad x^x \neq y \rightarrow x = \frac{1}{y} = y$ ✓

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

د) $x^x - y \neq 0 \quad x^x \neq y \rightarrow x \neq \log_y y \quad D_f = \mathbb{R} - \{\log_y y\}$

الف) $x+1 \in \mathbb{W}$

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

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

$\rightarrow D_f = \{x | x = \frac{k-1}{f}, k \in \mathbb{W}\}$

ب) $\frac{yx-y}{y-x} \in \mathbb{W}$

$yx-y \in yx\mathbb{W} - \Delta\mathbb{W}$

$yx-yx\mathbb{W} \in y - \Delta\mathbb{W}$

$x \in \frac{y - \Delta\mathbb{W}}{y - y\mathbb{W}}$

$D_f = \{x | x = \frac{y - \Delta k}{y - yk}, k \in \mathbb{W}\}$