

الف) $\frac{x^2 - 4x}{x^3 - x} \geq 0 \rightarrow \frac{x(x-4)}{x(x^2-1)} \xrightarrow{\text{ریشه}} 0, 4, -1, 1, 0$ $\frac{-1}{-0} + \frac{0}{0} + \frac{1}{0} + \frac{4}{-0} =$ $D_f = [4, +\infty) \cup (-1, 1) - \{0\}$

ب) $\frac{x^5 - x^3}{x^3 - x} \geq 0 \rightarrow \frac{x^3(x^2-1)}{x(x^2-1)} \xrightarrow{\text{ریشه}} 0, 1, -1, 0, -1, 0$ $\frac{-1}{+0} + \frac{0}{0} + \frac{1}{0} + \frac{1}{+0} + \frac{0}{0} =$ $D_f = \mathbb{R} - \{0, 1, -1\}$

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

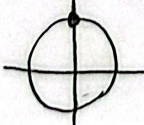
ب) $y = \frac{1}{\sqrt{x+1}} \rightarrow x+|x| > 0$ $\xrightarrow{\text{این رابطه هم برای عددهای مثبت فقط صادق است}}$ $D_f = \mathbb{R}^+$

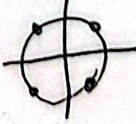
الف) $y - [x] \geq 0 \quad y \geq [x]$ $\xrightarrow{\text{همه اعداد قبل از ۳ صادق هستند}}$ $(-\infty, 3) = D_f$

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

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

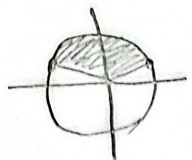
الف) $\sin x - 1 \neq 0$ $\sin x \neq 1$ $D_f = \mathbb{R} - \left\{2k\pi + \frac{\pi}{2}\right\}$ 

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) $Y \sin x - 1 \geq 0$

$Y \sin x \geq 1$

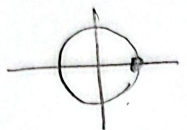
$\sin x \geq \frac{1}{Y}$



$D_f = [YK\pi + \frac{\pi}{Y}, YK\pi + \frac{5\pi}{Y}]$

ب-) $\cos x - 1 \geq 0$

$\cos x \geq 1$



$D_f = \{YK\pi\}$

الف) $-1 \leq |x| - 3 \leq 1$

$Y \leq x \leq 4$

$Y \leq |x| \leq 4$

$U \rightarrow D_f = [Y, 4] \cup [-4, -Y]$

ب-) $-1 \leq x^Y + Yx + 1 \leq 1$ $\rightarrow x^Y + Yx + 1 \leq 1 \rightarrow x^Y + Yx \leq 0 \rightarrow x(x + Y) \leq 0$ (I) $0, -Y$

$-1 \leq x^Y + Yx + 1 \rightarrow x^Y + Yx + 2 \leq 0 \rightarrow (x + 1)(x + Y) \leq 0$ (II) $-1, -Y$

$(I) \cap (II) = [-Y, -1] \cup [-1, 0]$ $D_f = [-Y, -1] \cup [-1, 0]$

الف) $Y - \log_Y(x - Y) \geq 0$

$x - Y > 0$ $(x > Y)$

$Y \geq \log_Y(x - Y)$

$9 \geq x - Y \rightarrow x \leq Y + 9$

$(11 \geq x)$

$D_f = (Y, 11]$

ب-) $Y = \log_Y(x^Y - x) \rightarrow x^Y - x > 0$

$x(x^Y - 1) \leq 0$

$-1, 0, 1$

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

الف) $x^Y + 1 \neq 0$ $x^Y \neq -1 \rightarrow$ مستحيل

$D_f = \mathbb{R}$

ب-) $x^Y - 1 \neq 0$ $x^Y \neq 1 \rightarrow x \neq 1$

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

ج-) $x^Y - Y \neq 0$ $x^Y \neq Y \rightarrow x \neq \sqrt[Y]{Y}$

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

د-) $x^Y - Y \neq 0$ $x^Y \neq Y \rightarrow x \neq \log_Y Y$

$D_f = \mathbb{R} - \{\log_Y Y\}$

الف) $x + 1 \in \mathbb{W}$

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

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

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

ب-) $\frac{Yx - Y}{Yx - \Delta} \in \mathbb{W}$

$Yx - Y \in Yx\mathbb{W} - \Delta\mathbb{W}$

$Yx - Yx\mathbb{W} \in Y - \Delta\mathbb{W}$

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

$D_f = \{x | x = \frac{Y - \Delta K}{Y - YK}, K \in \mathbb{W}\}$