

الف) $\frac{x^3 + 1x^2 - 1x + 1}{-x^3 + 1x^2}$ $\xrightarrow{\text{برویش و سب}} \frac{x-1}{x^2 + 5x - 3} \rightarrow y = \frac{(x+3)}{(x-1)(x^2 + 5x - 3)} = \frac{(x+3)}{(x-1)(x+3)(x-\frac{1}{5})} \rightarrow D_f = \mathbb{R} - \{1, -\frac{1}{5}\}$

ب) $\frac{x^3 + 9x^2 + 10x + 1}{x^3 + 1x^2}$ $\xrightarrow{\text{برویش و سب}} \frac{x+1}{x^2 + 7x + 3} \rightarrow y = \frac{x+3}{(x+1)(x^2 + 7x + 3)} = \frac{(x+3)}{(x+1)(x+3)(x+\frac{1}{4})} \rightarrow D_f = \mathbb{R} - \{-1, -\frac{1}{4}, -\frac{1}{5}\}$

الف) $\frac{x^4 - 1x^3 + 1x^2 - 1}{-x^2 + 1x}$ $\xrightarrow{\text{برویش و سب}} \frac{x-1}{x^2 - x + 1} \rightarrow y = \frac{x+3}{(x-1)(x^2 - x + 1)} \rightarrow D_f = \mathbb{R} - \{1\}$

ب) $\frac{\text{صفت تقسیم در صفت الف}}{\text{صفت الف}} \rightarrow y = \frac{(x+3)}{(x-1)(x^2 - x + 1)} \xrightarrow{\text{ریشه است}} \frac{(x+3)}{(x-1)} \gg \frac{-3}{+ \frac{1}{4} - \frac{1}{5} +} \rightarrow D_f = (-\infty, -3] \cup (1, +\infty)$

$x \gg 1 \rightarrow \frac{2}{x^2 - 5x + 5 - 1x + 5} = \frac{2}{x^2 - 6x + 10} = \frac{2}{(x-3)(x-5)} \rightarrow D_f = \mathbb{R} - \{3, 5\}$ I

$x \ll 1 \rightarrow \frac{2}{x^2 + 5x - 5 - 1x + 5} = \frac{2}{x^2 + 4x} = \frac{2}{x(x+4)} \rightarrow D_f = \mathbb{R} - \{0, -4\}$ II

$I \cup II \rightarrow D_f = \mathbb{R} - \{3, 5, 0, -4\}$

الف) $[-x] - 2 \gg 0 \rightarrow [-x] \gg 2 \rightarrow \begin{matrix} -x \gg 2 \\ x \ll -2 \end{matrix} \rightarrow D_f = (-\infty, -2]$

ب) $[x] = \frac{2 \pm \sqrt{4+12}}{2} = \frac{2 \pm 4}{2} \Rightarrow \begin{cases} [x] = 3 \\ [x] = -1 \end{cases}$

$\rightarrow [x] = 3 \rightarrow [3, 4)$ I

$\rightarrow [x] = -1 \rightarrow [-1, 0)$ II

$\mathbb{R} - (I \cup II) \rightarrow D_f = (-\infty, -1) \cup (0, 3) \cup [4, +\infty)$

الف) $[x - \frac{1}{x}] + [x + \frac{1}{x}] \gg 0$

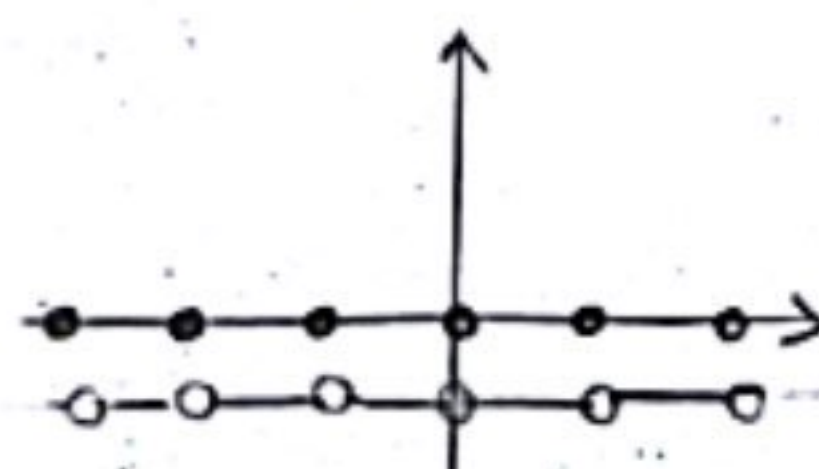
$[x - \frac{1}{x} + 1] + [x + \frac{1}{x}] \gg 1$

$2[x + \frac{1}{x}] \gg 1$

$[x + \frac{1}{x}] \gg \frac{1}{2}$

$x + \frac{1}{x} \gg 1 \rightarrow x \gg \frac{1}{x} \rightarrow D_f = [\frac{1}{2}, +\infty)$

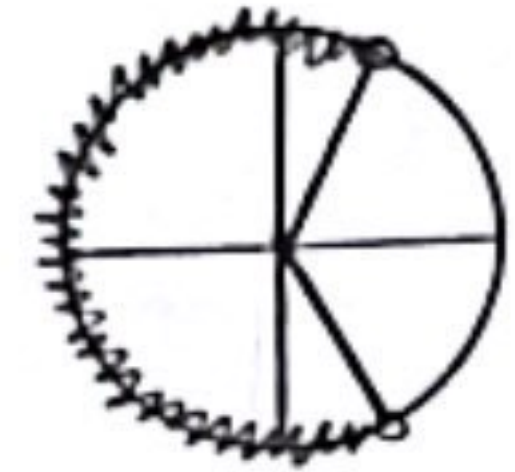
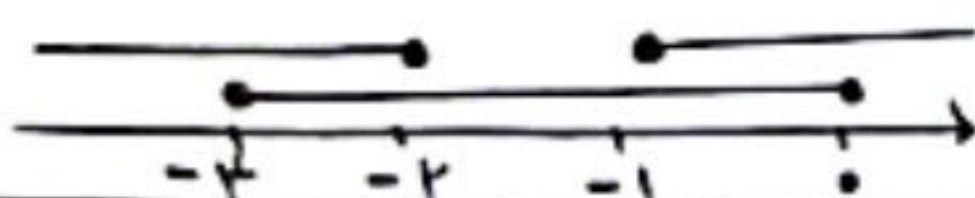
ب) $x - \frac{1}{x} = a \rightarrow \sqrt{[a] + [-a]}$



$a \in \mathbb{Z} \rightarrow [a] + [-a] = 0$

$a \in \mathbb{Z} \rightarrow [a] + [-a] = -1$ زیر اعداد صحیح

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

الف) $\tan x + 1 \neq 0$ $\begin{cases} \tan x \neq -1 \rightarrow \\ \sin x \neq 0 \\ \cos x \neq 0 \end{cases}$  $D_f = \mathbb{R} - \left\{ k\pi, k\pi + \frac{\pi}{2}, k\pi - \frac{\pi}{2} \right\}$	ب) $1 - k \sin^2 x > 0$ $k \sin^2 x < 1$ $\sin^2 x < \frac{1}{k}$ $-\frac{1}{\sqrt{k}} < \sin x < \frac{1}{\sqrt{k}}$  $\rightarrow D_f = \left[k\pi - \frac{\pi}{\sqrt{k}}, k\pi + \frac{\pi}{\sqrt{k}} \right]$	6
الف) $k \sin x - 1 > 0$ $\sin x > \frac{1}{k} \rightarrow \frac{1}{k} < \sin x < 1$  $D_f = \left[k\pi + \frac{\pi}{k}, k\pi + \frac{\pi}{2} \right]$	ب) $1 - k \cos x > 0$ $\cos x < \frac{1}{k} \rightarrow -1 < \cos x < \frac{1}{k}$  $D_f = \mathbb{R} - \left(k\pi - \frac{\pi}{k}, k\pi + \frac{\pi}{k} \right)$	7
الف) $-1 < x^2 + kx + 1 < 1$ $x^2 + kx + 1 > 0$ $(x+1)(x+1) > 0$ $\begin{array}{c} -1 \quad -1 \\ + \quad - \quad - \quad + \end{array}$  $\Rightarrow D_f = [-k-1] \cup [-1, \infty)$	ب) $-1 < \sqrt{\omega - kx} < 1$ $\rightarrow \omega - kx < 1 \rightarrow kx > \omega - 1 \rightarrow x > \frac{\omega - 1}{k}$ $\rightarrow \omega - kx > 0 \rightarrow kx < \omega \rightarrow x < \frac{\omega}{k}$ $D_f = \left[\frac{\omega - 1}{k}, \frac{\omega}{k} \right]$	8
الف) $x > 0$ $1 - \log_k x > 0 \rightarrow \log_k x < 1 \rightarrow x < k$ $\rightarrow D_f = (0, k)$	ب) $x > 0$ $1 - \log_{\frac{1}{k}} x > 0 \rightarrow \log_{\frac{1}{k}} x < 1$ $\rightarrow x > \frac{1}{k}$ $\rightarrow D_f = \left(\frac{1}{k}, +\infty \right)$	9
الف) $kx - x^2 > 0$ $x^2 - kx < 0$ $x(x - k) < 0$ $\begin{array}{c} 0 \quad k \\ + \quad - \quad + \end{array}$ $\rightarrow D_f = [0, k]$	ب) $\frac{kx + \omega}{kx + k} \in \omega$ $x = -\frac{k\omega - \omega}{k\omega - k}$ $D_f = \left\{ x \mid x = \frac{\omega - k}{k - k}, k \in \omega \right\}$	10

$\rightarrow D_f = [1, k]$