

الف) $\frac{x(x-4)}{x(x^2-1)} \geq 0$

$$\frac{-1 \quad 0 \quad 1 \quad 4}{- \quad + \quad + \quad - \quad +}$$

$$\begin{matrix} 0 & 1 \\ 0 & -1 \end{matrix}$$

$D_f = (-1, 0) \cup (0, 1) \cup [4, +\infty)$

ب) $\frac{x^3(x^2-1)}{x(x^2-1)} \geq 0$

$$\frac{-1 \quad 0 \quad 1}{+ \quad + \quad +}$$

$D_f = \mathbb{R} - \{0, -1\}$

الف) $x + |x| > 0$ $D_f = \mathbb{R} - [0, -\infty)$
 $|x| > -x$

ب) $x|x| > 0$ $D_f = \mathbb{R} - [0, -\infty)$

الف) $\sqrt{x} - [x] \geq 0 \rightarrow \sqrt{x} \geq [x]$ $D_f = (-\infty, 3)$

ب) $\sqrt{x} - [x] > 0 \rightarrow \sqrt{x} > [x]$ $D_f = (-\infty, 2)$

الف) $\sqrt{[x + \frac{1}{3}]} + [x - \frac{1}{3}] \geq 0$

$D_f = [\frac{1}{3}, +\infty)$

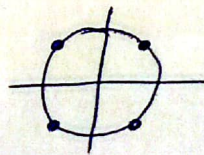
$\rightarrow [x - \frac{1}{3}] + 1 = [x + \frac{1}{3}] \rightarrow 2[x - \frac{1}{3}] + 1 \geq 0 \rightarrow [x - \frac{1}{3}] \geq 0 \rightarrow x \geq \frac{1}{3}$

ب) $[x - \frac{1}{3}] + [-x + \frac{1}{3}] \geq 0 \rightarrow x - \frac{1}{3} \in \mathbb{Z} \rightarrow D_f = \{x + \frac{1}{3} \mid x \in \mathbb{Z}\}$

الف) $\sin x - 1 = 0 \rightarrow \sin x = 1$  $D_f = \mathbb{R} - \{2K\pi + \frac{\pi}{2}\}$

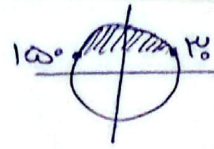
ب) $\sqrt{2} \sin^2 x - 1 = 0 \rightarrow \sin^2 x = \frac{1}{2}$

$\sin x = \pm \frac{\sqrt{2}}{2}$



$D_f = \mathbb{R} - \{\frac{K\pi}{2} + \frac{\pi}{4}\}$

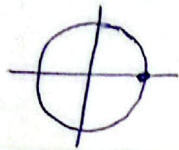
الف) $2 \sin x - 1 \geq 0 \rightarrow \sin x \geq \frac{1}{2}$



$D_f = \{2K\pi + \frac{\pi}{6}, 2K\pi + \frac{5\pi}{6}\}$

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ب) $\cos x \geq 1$



$D_f = \{2K\pi\}$

الف) $-1 \leq |x-3| \leq 1 \rightarrow |x| \leq 4 \rightarrow x = [-4, 4]$

$\hookrightarrow -1 \leq |x-3| \rightarrow 2 \leq |x| \rightarrow x = (-\infty, -2] \cup [2, +\infty)$

$D_f = [-4, -2] \cup [2, 4]$

ب) $-1 \leq x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0$
 $x^2 + 3x + 1 \geq -1 \rightarrow (x+1)(x+2) \geq 0$
 $x^2 + 3x + 2 \geq 0 \rightarrow (x+1)(x+2) \geq 0$
 $x \leq -2$ or $x \geq -1$
 $-3 \leq x \leq 0$
 $D_f = [-3, -2] \cup [-1, 0]$

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الف) $x-2 > 0 \rightarrow x > 2$

$D_f = (2, 11]$

$2 - (\log_3(x-2)) \geq 0 \rightarrow 2 \geq \log_3(x-2) \rightarrow 9 \geq x-2 \rightarrow 11 \geq x$

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ب) $x^3 - x > 0$

$x(x^2 - 1) > 0 \rightarrow \frac{-1}{-} \frac{0}{+} \frac{1}{-} \frac{+}{+} \rightarrow D_f = (-1, 0) \cup (1, +\infty)$

الف) $4^x + 1 = 0 \rightarrow 4^x = -1$ هیچگاه منفی نمی شود. $\rightarrow D_f = \mathbb{R}$

ب) $4^x - 1 = 0 \rightarrow 4^x = 1 \rightarrow x = 0 \rightarrow D_f = \mathbb{R} - \{0\}$

ج) $4^x - 2 = 0 \rightarrow 4^x = 2 \rightarrow x = \frac{1}{2} \rightarrow D_f = \mathbb{R} - \{\frac{1}{2}\}$

د) $4^x - 3 = 0 \rightarrow 4^x = 3 \rightarrow x = \log_4 3 \rightarrow D_f = \mathbb{R} - \{\log_4 3\}$

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الف) $4x+1 \in \mathbb{N} \rightarrow 4x \in \mathbb{N} + 1 \rightarrow x \in \frac{\mathbb{N}-1}{4}$

$D_f = \{x | x = \frac{K-1}{4}, K \in \mathbb{N}\}$

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ب) $\frac{3x-2}{2x-5} \in \mathbb{N} \rightarrow 3x-2 \in 2x\mathbb{N} - 5\mathbb{N} \rightarrow 3x-2 \in \mathbb{N} - 5\mathbb{N} + 2$

$D_f = \{x | x = \frac{-5K+2}{3-2K}, K \in \mathbb{N}\}$