

الف) $\sqrt{\frac{x^2-4x}{x^2-x}} \geq 0 \rightarrow \frac{x(x-4)}{x(x-1)} = \frac{x-4}{(x-1)(x+1)} \geq 0 \rightarrow 1-1-4-4$
 $\frac{-}{+} \frac{+}{-} \frac{-}{+} \frac{+}{-}$ $D = [-1, 0) \cup (0, 1] \cup [4, +\infty)$

ب) $\sqrt{\frac{x^3-x^2}{x^3-x}} = \sqrt{\frac{x^2(x-1)}{x(x-1)}} \rightarrow \sqrt{x} \rightarrow |x|$

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

الف) $x + |x| > 0$ $\begin{matrix} 0 \times \\ + \sqrt{ } \\ - \times \end{matrix}$ $(0, +\infty)$

ب) $x|x| > 0$ $\begin{matrix} 0 \times \\ + \sqrt{ } \\ - \times \end{matrix}$ $(0, +\infty)$

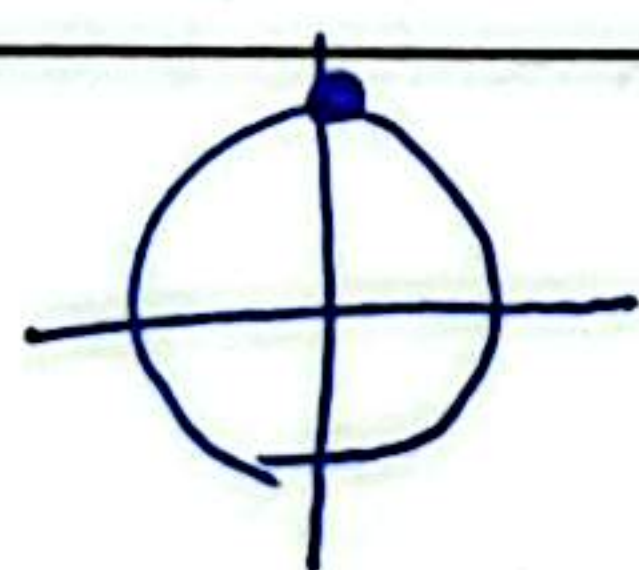
الف) $2 - [x] \geq 0 \rightarrow +[x] \leq 2 \rightarrow x < 3 \rightarrow (-\infty, 3) = D$

ب) $2 - [x] > 0 \rightarrow +[x] < 2 \rightarrow x < 2$
 $(-\infty, 2) = D$

الف) $[x - \frac{1}{3}] + [x + \frac{1}{3}] \geq 0 \rightarrow [x - \frac{1}{3}] + [x + 1 - \frac{1}{3}] \geq 0 \rightarrow [x - \frac{1}{3}] + [x - \frac{1}{3}] + 1 \geq 0$
 $2[x - \frac{1}{3}] \geq -1 \rightarrow [x - \frac{1}{3}] \geq -\frac{1}{2} \rightarrow x - \frac{1}{3} \geq 0 \rightarrow x \geq \frac{1}{3} \rightarrow D = (\frac{1}{3}, +\infty)$

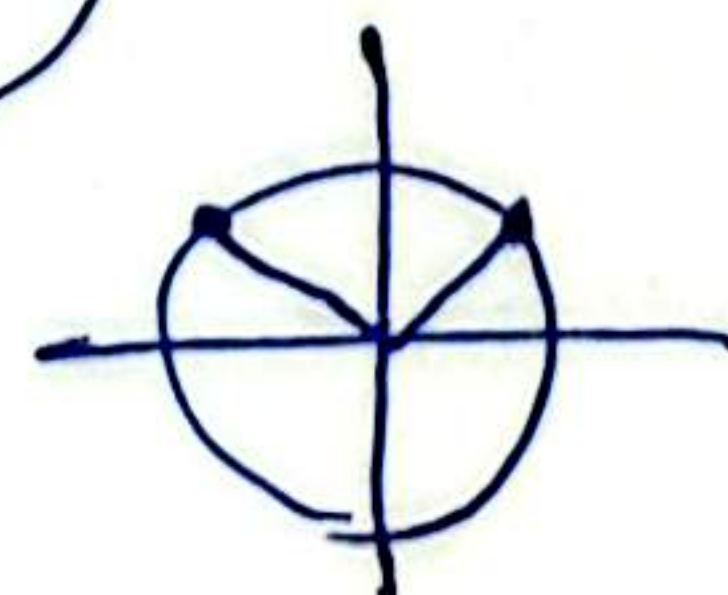
ب) $[x - \frac{1}{3}] + [-x + \frac{1}{3}] \geq 0 \rightarrow [x - \frac{1}{3}] + [-(x - \frac{1}{3})] \geq 0 \rightarrow [a] + [-a] \geq 0$
 $D = \{x \mid x = k + \frac{1}{3}, k \in \mathbb{Z}\}$

الف) $\frac{1}{\sin x - 1} \rightarrow \sin x \neq 1$



$\mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$

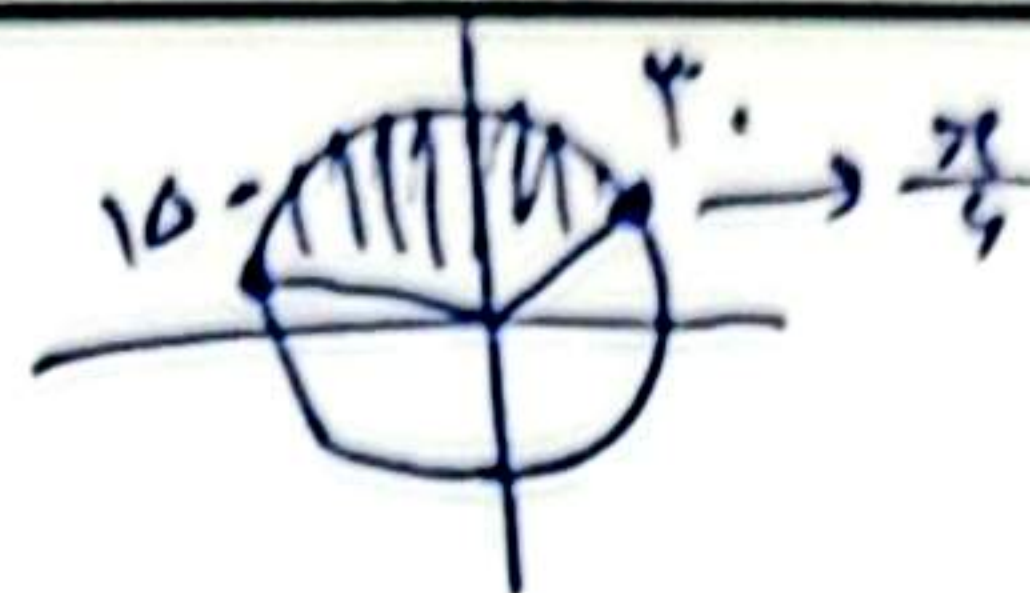
ب) $\frac{1}{2\sin^2 x - 1} \rightarrow 2\sin^2 x \neq \frac{1}{2} \rightarrow \sin x \neq \frac{\sqrt{1/2}}{\sqrt{2}} \rightarrow \sin x \neq \frac{\sqrt{2}}{2}$



$\mathbb{R} - \{2k\pi + \frac{\pi}{6}, 2k\pi + \pi - \frac{\pi}{6}\}$

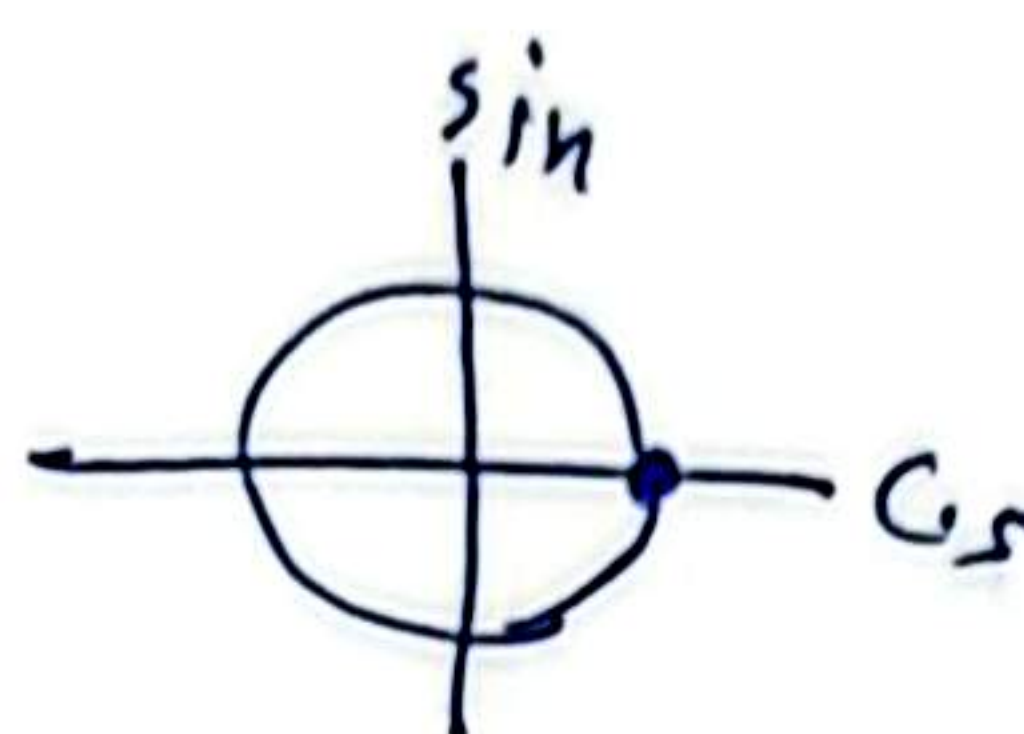
الف) $2 \sin x - 1 \geq 0 \rightarrow \sin x \geq \frac{1}{2}$

$D_f = [2k\pi + \frac{\pi}{6}, 2k\pi + \pi - \frac{\pi}{6}]$



ب) $\cos x - 1 \geq 0 \rightarrow \boxed{\cos x \geq 1}$

$(D_f = 2k\pi)$



الف) $-1 \leq |x-3| \leq 1 \rightarrow 2 \leq |x| \leq 4 \rightarrow -4 \leq x \leq -2$

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

ب) $-1 \leq x^2 + 3x + 1 \leq 1 \rightarrow -1 \leq x^2 + 3x + 1 \rightarrow 0 < x^2 + 3x + 2 \rightarrow 0 < (x+2)(x+1)$

$x^2 + 3x + 1 \leq 1 \rightarrow x(x+3) \leq 0 \rightarrow \frac{-3}{+1} \leq x \leq 0 \Rightarrow D_f = [-3, 0] \cup [-1, 0]$

الف) $x-2 > 0 \rightarrow \boxed{x > 2}$ } $2 - \log_2(x-2) \geq 0 \rightarrow \log_2(x-2) \leq 2$

$x-2 \leq 4 \rightarrow x \leq 6 \Rightarrow 2 < x \leq 6 \Rightarrow (2, 6]$

ب) $x^3 - x > 0 \rightarrow x(x^2 - 1) > 0 \rightarrow x(x-1)(x+1) > 0 \rightarrow \frac{-1}{-1} < x < \frac{1}{-1}$

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

الف) $\frac{3}{f^x + 1} \rightarrow f^x + 1 > 0$ جميع f^x موجبة وقت x صغير وتبقى موجبة $D_f = \mathbb{R}$

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

ج) $f^x \neq 2 \rightarrow x \neq \log_f 2$ $2 = \frac{1}{f} \rightarrow \mathbb{R} - \{\frac{1}{f}\}$

د) $f^x \neq 3 \rightarrow x \neq \log_f 3 \rightarrow \mathbb{R} - \{\log_f 3\}$

الف) $f^{x+1} = 0, 1, 2, 3, \dots \rightarrow D_f = \{-\frac{1}{f}, 0, \frac{1}{f}, \dots\}$

ب) $\frac{f^x - 2}{f^x - 5} \rightarrow f^x - 5 \neq 0 \rightarrow x \neq \frac{5}{f}$

$\frac{f^x - 2}{f^x - 5} = w \rightarrow f^x - 2 = w(f^x - 5) \rightarrow x(1 - w) = 1 - 5w \rightarrow x = \frac{1 - 5w}{1 - w}$
 $D_f = \left\{ \frac{1 - 5w}{1 - w} \mid w < 0, 1, \dots \right\}$