

الف) $\frac{x+3}{(x-1)(x^2+5x-3)}$ $D = \mathbb{R} - \{1, \frac{1}{2}, -3\}$
 $\hookrightarrow x=1 \quad \hookrightarrow x = -\frac{1}{2}, -3$

ب) $\frac{x+3}{(x+1)(x^2+7x+3)}$ $D = \mathbb{R} - \{-1, -\frac{1}{2}, -3\}$
 $\hookrightarrow x = -\frac{1}{2} \quad \hookrightarrow x = -\frac{1}{2}, -3$

الف) $\frac{x+3}{(x-1)(x^2-x+1)}$ $D = \mathbb{R} - \{1\}$
 همواره مثبت

ب) $\frac{x+3}{(x-1)(x^2-x+1)} \geq 0$ $D = (-\infty, -3] \cup (1, +\infty)$
 $\hookrightarrow x = -3$ $\hookrightarrow x = 1$ $\hookrightarrow x = 1$ $\hookrightarrow x = 1$

۱ حالت $\rightarrow |x-1| \rightarrow x-1 \rightarrow x^2-2x+1 \rightarrow x^2-2x+1 \neq 0$
 $(x-2)(x-1) \neq 0$
 $x \neq 2, 1$

۲ حالت $\rightarrow |x-1| \rightarrow -x+1 \rightarrow x^2+2x-1 \rightarrow x^2+2x-1 \neq 0$
 $x(x+2) \neq 0$
 $x \neq 0, -2$
 $D = \mathbb{R} - \{2, 0, -3\}$

الف) $[-x] \geq 2$ $x \leq -2$ $D = (-\infty, -2]$

ب) $[x] \rightarrow t$
 $t^2-2t-3 \neq 0$ $[x] \neq 3, -1$ $\rightarrow [x] \neq -1$ $D = \mathbb{R} - [-1, 0) - [3, 4)$
 $(t-3)(t+1) \neq 0$ $t \neq 3, -1$ $[x] \neq 3$ $D = \mathbb{R} - (1, 2) \cup [3, 4)$
 $x \neq 3$ $x \notin [3, 4)$

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

ب) $[x] - \frac{1}{x} + \frac{1}{x} [-x] \geq 0$ $D = \mathbb{Z}$
 $[x] + [-x] \geq 0$ $x \in \mathbb{Z}$

الف) $\tan \alpha \neq -1$

$\alpha \neq \frac{\pi}{4}, \frac{5\pi}{4}$

$D = (k\frac{\pi}{4}, k\frac{5\pi}{4}) \cup (k\frac{3\pi}{4}, k\frac{7\pi}{4})$

ب) $1 - 4\sin^2 \alpha \geq 0$

$4\sin^2 \alpha \leq 1 \Rightarrow -\frac{1}{2} \leq \sin \alpha \leq \frac{1}{2}$
 $\sin^2 \alpha \leq \frac{1}{4}$

$D = [k\pi, k\pi + k\frac{\pi}{6}]$

الف) $4\sin \alpha - 1 \geq 0 \Rightarrow \sin \alpha \geq \frac{1}{4} \Rightarrow D = [k\frac{\pi}{4}, k\frac{5\pi}{4}]$

ب) $1 - 2\cos \alpha \geq 0 \Rightarrow \cos \alpha \leq \frac{1}{2} \Rightarrow D = [k\frac{\pi}{3}, k\frac{5\pi}{3}]$

$-1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x + 1 \leq 1 \Rightarrow x(x+3) \leq 0 \Rightarrow -3 \leq x \leq 0$

$-1 \leq x^2 + 3x + 1 \Rightarrow 0 \leq x^2 + 3x + 2 \Rightarrow x \leq -2 \text{ or } x \geq -1$

$D = [-3, -2] \cup [-1, 0]$

ب) $\cos y \in [-1, 1] \Rightarrow 0 \leq 5 - 2x \leq 1$
 $5 - 2x \geq 0 \Rightarrow -5 \leq -2x \leq -4 \Rightarrow 2.5 \leq x \leq 2$

$D = [2, 2.5]$

الف) $1 - \log_2 x > 0 \Rightarrow 1 > \log_2 x \Rightarrow \log_2 2 > \log_2 x \Rightarrow x < 2 \xrightarrow{x > 0} D = (0, 2)$

ب) $1 - \log_2 x > 0$

$\log_{\frac{1}{2}} x > \log_{\frac{1}{2}} 2 \Rightarrow x > \frac{1}{2} \xrightarrow{x > 0} D = (\frac{1}{2}, +\infty)$

الف) $x^2 - 2x - 1 \geq 0 \Rightarrow x^2 - 2x \geq 1$

$D = [1, 3]$

$x^2 - 2x \geq 3 \Rightarrow x^2 - 2x - 3 \geq 0 \Rightarrow (x-3)(x+1) \geq 0 \Rightarrow x \leq -1 \text{ or } x \geq 3$

ب) $\frac{3x+5}{2x+4} \geq 0 \Rightarrow x = -2$
 $2x+4 \neq 0 \Rightarrow x \neq -2$

$D = (-\infty, -2) \cup (-2, +\infty)$