

۱- $y = \frac{x+3}{(x-1)(2x^2+8x-3)} = \frac{(x+3)}{(x-1)(x+3)(2x-1)} \Rightarrow D_f = \mathbb{R} - \{-3, \frac{1}{2}, 1\}$ (الف)

$y = \frac{(x+3)}{(x+1)(2x^2+7x+3)} = \frac{(x+3)}{(x+1)(2x+1)(x+3)} \Rightarrow D_f = \mathbb{R} - \{-1, -\frac{1}{2}, -3\}$

۲- (الف) $y = \frac{x+3}{(x-1)(x^2-x+1)}$ $\Rightarrow D_f = \mathbb{R} - \{1\}$

$y = \sqrt{\frac{(x+3)}{(x-1)(x^2-x+1)}}$ $\Rightarrow \frac{x}{x+1} - \frac{1}{x+1} \Rightarrow D_f = \mathbb{R} - \{-3, 1\}$

۳- $x^2 - 8|x-1| - 2x + 2 = 0$ if $x \geq 1 \Rightarrow x^2 - 8x + 10 = 0 \Rightarrow x = 4, 2$
if $x < 1 \Rightarrow x^2 + 3x = 0 \Rightarrow x = 0, -3 \Rightarrow D_f = \mathbb{R} - \{-3, 0, 2, 4\}$

۴- (الف) $y = \sqrt{[-x]-2} \Rightarrow [-x] \geq 2 \Rightarrow -x \geq 2 \Rightarrow x \leq -2 \Rightarrow D_f = (-\infty, -2]$

(ب) $[x]^2 - 2[x] - 3 = 0 \Rightarrow [x] = 3, -1$

$\Rightarrow x \in [3, 4), [-1, 0) \Rightarrow D_f = \mathbb{R} - \{[-1, 0) \cup [3, 4)\}$

۵- (الف) $y = \sqrt{[x+\frac{1}{2}]-1} + [x+\frac{1}{2}] = \sqrt{2[x+\frac{1}{2}]-1} \Rightarrow [x+\frac{1}{2}] \geq \frac{1}{2}$

$\Rightarrow x + \frac{1}{2} \geq 1 \Rightarrow x \geq \frac{1}{2} \Rightarrow D_f = [\frac{1}{2}, +\infty)$

(ب) $(x - \frac{1}{x}) \in \mathbb{Z} \Rightarrow y = \sqrt{[x] + [-x]} \Rightarrow k \in \mathbb{Z} \Rightarrow x - \frac{1}{x} \in \mathbb{Z}$

$\Rightarrow D_f = \{x \mid x = k + \frac{1}{k}, k \in \mathbb{Z}\}$

۶- (الف) $\sin x, \cos x \neq 0, \tan x \neq -1 \Rightarrow D_f = \mathbb{R} - \{k\frac{\pi}{4}, k\pi - \frac{\pi}{4}\}$

(ب) $y = \sqrt{1 - \sin^2 x} \Rightarrow 1 - \sin^2 x \geq 0 \Rightarrow \sin^2 x \leq 1 \Rightarrow -\frac{1}{2} \leq \sin x \leq \frac{1}{2}$

$\Rightarrow \frac{3\pi}{4} \leq x \leq \frac{5\pi}{4}, -\frac{\pi}{4} \leq x \leq \frac{\pi}{4} \Rightarrow D_f = [k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4}]$

الف) $y = \sqrt{r \sin x - 1} \geq 0 \Rightarrow r \sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{r} \Rightarrow Df = \left[2K\pi + \frac{\pi}{4}, 2K\pi + \frac{3\pi}{4} \right] \cup$

ب) ~~.....~~

~~.....~~ $y = \sqrt{1 - r \cos x} \geq 0 \Rightarrow \cos x \leq \frac{1}{r} \Rightarrow Df = \left[2K\pi + \frac{3\pi}{4}, 2K\pi + \frac{5\pi}{4} \right]$

الف) $y = \arcsin(x^r + r^{x+1}) \Rightarrow -1 \leq x^r + r^{x+1} \leq 1$ — A

$\Rightarrow 0 \leq x^r + r^{x+1}, \quad 0 \geq x^r + r^x \Rightarrow -r \leq x \leq 0 \wedge r - (-r - 1)$

$\Rightarrow Df = [-r, -r] \cup [r, 0]$

ب) $\cos y = \sqrt{\delta - rx} \Rightarrow -1 \leq \sqrt{\delta - rx} \leq 1 \Rightarrow \delta - rx \geq 0, \quad \delta - rx \leq 1$
 $\Rightarrow x \leq \frac{\delta}{r}, \quad \Rightarrow r \leq x$

$\Rightarrow x \geq r \wedge x \leq \frac{\delta}{r} \Rightarrow [r, \frac{\delta}{r}]$

الف) $x > 0, \quad 1 - \log \frac{x}{r} > 0 \Rightarrow \log \frac{x}{r} < 1 \Rightarrow x < r, \quad Df = (0, r)$ — A

ب) $x > 0, \quad 1 - \log \frac{x}{r} > 0 \Rightarrow \log \frac{x}{r} < 1 \Rightarrow x > \frac{1}{r} \Rightarrow Df = (\frac{1}{r}, +\infty)$

الف) $r^{x-x^r} - 1 \geq 0 \Rightarrow r^{x-x^r} \geq 1 \Rightarrow x - x^r \geq 0$ — 10
 $\Rightarrow x - x^r - r \geq 0 \Rightarrow -(x-1)(x-r) \geq 0 \Rightarrow \frac{1}{r} \leq x \leq r \Rightarrow Df = [r, (1, r)]$

ب) $y = \left(\frac{rx + \delta}{rx + \epsilon} \right)!$ $\Rightarrow \frac{rx + \delta}{rx + \epsilon} \in \mathbb{N} \Rightarrow x \in \frac{rx - \delta}{rx - \epsilon}$

$\Rightarrow Df = \left\{ x \mid x = \frac{\epsilon K + \delta}{rK - \epsilon}, \quad K \in \mathbb{N} \right\}$