

الف) $y = \sqrt{4 - \sqrt{2-x}}$ $\rightarrow \begin{cases} 2-x \geq 0 \rightarrow x \leq 2 \\ 4 - \sqrt{2-x} \geq 0 \rightarrow \sqrt{2-x} \leq 4 \rightarrow 2-x \leq 14 \rightarrow x \geq -12 \end{cases}$

$D_f = [-12, 2]$

ب) $y = \sqrt{9 - \sqrt{x-2}}$ $\rightarrow \begin{cases} x-2 \geq 0 \rightarrow x \geq 2 \\ 9 - \sqrt{x-2} \geq 0 \rightarrow \sqrt{x-2} \leq 9 \rightarrow x-2 \leq 81 \rightarrow x \leq 83 \end{cases}$

$D_f = [2, 83]$

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الف) $y = \sqrt{4 - 2x^2}$ $\rightarrow 4 - 2x^2 \geq 0 \rightarrow 4 \geq 2x^2 \rightarrow 2 \geq x^2 \rightarrow \sqrt{2} \geq x \geq -\sqrt{2}$

$D_f = [-\sqrt{2}, \sqrt{2}]$

ب) $y = \sqrt{3|x|-9}$ $\rightarrow 3|x|-9 \geq 0 \rightarrow 3|x| \geq 9 \rightarrow |x| \geq 3 \rightarrow \begin{cases} x \geq 3 \\ x \leq -3 \end{cases}$

$D_f = (-\infty, -3] \cup [3, +\infty)$

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الف) $y = \sqrt{\frac{|x|+1}{|x|-3}}$ $\rightarrow |x|-3 \neq 0 \rightarrow |x| \neq 3 \rightarrow x \neq \{\pm 3\}$

$D_f = \mathbb{R} - \{\pm 3\}$

ب) $y = \sqrt{\frac{\sqrt{x}+1}{\sqrt{x}-3}}$ $\rightarrow \begin{cases} x \geq 0 \\ \sqrt{x}-3 \neq 0 \rightarrow \sqrt{x} \neq 3 \rightarrow x \neq 9 \end{cases}$

$D_f = [0, +\infty) - \{9\}$

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الف) $y = \frac{\sqrt{9-|x|}}{|x|+2}$ $\rightarrow 9-|x| \geq 0 \rightarrow 9 \geq |x| \rightarrow -3 \leq x \leq 3$

$D_f = [-3, 3]$

ب) $y = \frac{\sqrt{4-x^2}}{|x|-1}$ $\rightarrow \begin{cases} |x|-1 \neq 0 \rightarrow |x| \neq 1 \rightarrow x \neq \pm 1 \\ 4-x^2 \geq 0 \rightarrow x^2 \leq 4 \rightarrow -2 \leq x \leq 2 \end{cases}$

$D_f = [-2, 2] - \{\pm 1\}$

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الف) $y = \frac{x+1}{\sqrt{x+|x|}}$ $\rightarrow \begin{cases} x+|x| \geq 0 \\ \sqrt{x+|x|} \neq 0 \rightarrow x+|x| \neq 0 \end{cases}$

$D_f = \mathbb{R}^+$

ب) $y = \frac{1}{\sqrt{x|x|}}$ $\rightarrow \begin{cases} x|x| \geq 0 \\ \sqrt{x|x|} \neq 0 \rightarrow x|x| \neq 0 \rightarrow x \neq 0 \end{cases}$

$D_f = \mathbb{R}^+$

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$$\text{الف) } y = \sqrt{r - [x]} \rightarrow r - [x] \geq 0 \rightarrow [x] \leq r \rightarrow x < c$$

$$D_f = (-\infty, c)$$

$$\text{ب) } y = \frac{1}{\sqrt{r - [x]}} \rightarrow \begin{cases} r - [x] \geq 0 \rightarrow [x] \leq r \rightarrow x < c \\ \sqrt{r - [x]} \neq 0 \rightarrow r - [x] \neq 0 \rightarrow [x] \neq r \rightarrow x \neq [r, c) \end{cases}$$

$$D_f = (-\infty, r)$$

$$\text{الف) } y = \frac{1}{x[x]} \rightarrow x[x] \neq 0 \rightarrow \begin{cases} x \neq 0 \\ [x] \neq 0 \rightarrow x \neq [0, 1) \end{cases}$$

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

$$\text{ب) } y = \frac{1}{\sqrt{-x[x]}} \rightarrow \begin{cases} -x[x] \geq 0 \rightarrow x[x] \leq 0 \rightarrow x \leq 1 \\ \sqrt{-x[x]} \neq 0 \rightarrow x[x] \neq 0 \rightarrow x \neq [0, 1) \end{cases}$$

$$D_f = \emptyset$$

$$\text{الف) } y = \sqrt{[x - \frac{1}{c}] + [x + \frac{r}{c}]} \rightarrow [x - \frac{1}{c}] + [x + \frac{r}{c}] \geq 0 \rightarrow [x + \frac{r}{c} - 1] + [x + \frac{r}{c}] \geq 0$$

$$r[x + \frac{r}{c}] \geq 1 \rightarrow [x + \frac{r}{c}] \geq \frac{1}{r} \rightarrow x + \frac{r}{c} \geq 1 \rightarrow x \geq \frac{1}{c} \rightarrow D_f = [\frac{1}{c}, +\infty)$$

$$\text{ب) } y = \sqrt{[x - \frac{1}{c}] + [-(x - \frac{1}{c})]} \rightarrow [x - \frac{1}{c}] + [-(x - \frac{1}{c})] \geq 0 \rightarrow x - \frac{1}{c} \in \mathbb{Z} \rightarrow x = z + \frac{1}{c}$$

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

$$\text{الف) } y = \frac{1}{r \sin^r x - 1} \rightarrow r \sin^r x - 1 \neq 0 \rightarrow r \sin^r x \neq 1 \rightarrow \sin^r x \neq \frac{1}{r}$$

$$\rightarrow \sin x \neq \pm \sqrt[r]{\frac{1}{r}} \rightarrow D_f = \mathbb{R} - \left\{ \frac{k\pi}{r} + \frac{\pi}{r} \right\}$$

$$\text{ب) } y = \frac{\cot x + 1}{\tan x + 1} \rightarrow \begin{cases} x \neq \frac{k\pi}{r} \\ \tan x + 1 \neq 0 \rightarrow \tan x \neq -1 \rightarrow x \neq k\pi - \frac{\pi}{4} \end{cases}$$

$$\rightarrow D_f = \mathbb{R} - \left\{ \frac{k\pi}{r}, k\pi - \frac{\pi}{4} \right\}$$

$$\text{الف) } y = \sqrt{r \sin x - 1} \rightarrow r \sin x - 1 \geq 0 \rightarrow r \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{r}$$

$$\rightarrow D_f = \left[rK\pi + \frac{\pi}{4}, rK\pi + \frac{3\pi}{4} \right]$$

$$\text{ب) } y = \sqrt{1 - r \cos x} \rightarrow 1 - r \cos x \geq 0 \rightarrow r \cos x \leq 1 \rightarrow \cos x \leq \frac{1}{r}$$

$$\rightarrow D_f = \left[rK\pi + \frac{\pi}{c}, rK\pi + \frac{3\pi}{c} \right]$$