

في مجال $\mathbb{R}$: $\frac{1}{x}$

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1- ا) $y = \frac{x+r}{x^2+r^2-1x+r} \quad (x-1)(x-1)(x+r)$

$$D_f = \mathbb{R} - \left\{ -r, \frac{1}{r}, 1 \right\}$$

$$\begin{array}{r} x^2+r^2-1x+r \quad | \quad x-1 \\ -x^2-r^2 \\ \hline 2x^2-1x+r \\ -2x^2-2x \\ \hline 3x+r \\ -3x-3r \\ \hline 0 \end{array} \quad \begin{array}{r} x-1 \\ x^2+1x-r \\ \hline x^2-1x+r \\ -2x^2-2x \\ \hline 3x+r \\ -3x-3r \\ \hline 0 \end{array}$$

ب) $y = \frac{x+r}{x^2+9x^2+10x+r} \quad (x+1)(x+1)(x+r)$

$$D_f = \mathbb{R} - \left\{ -r, -1, -\frac{1}{r} \right\}$$

$$\begin{array}{r} x^2+9x^2+10x+r \quad | \quad x+1 \\ -x^2-r^2 \\ \hline 10x^2+10x+r \\ -10x^2-10x \\ \hline 20x+r \\ -20x-20r \\ \hline 0 \end{array} \quad \begin{array}{r} x+1 \\ x^2+10x+r \\ \hline x^2+10x+r \\ -10x^2-10x \\ \hline 20x+r \\ -20x-20r \\ \hline 0 \end{array}$$

ج) $y = \frac{x+r}{x^2-r^2+r^2-1} \quad (x-1)(x^2-x+1)$

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

$$\begin{array}{r} x^2-r^2+r^2-1 \quad | \quad x-1 \\ -x^2-r^2 \\ \hline -2x^2+r^2-1 \\ +2x^2-2x \\ \hline -2x+r^2-1 \\ -2x+2 \\ \hline 0 \end{array} \quad \begin{array}{r} x-1 \\ x^2-x+1 \\ \hline x^2-x+1 \\ -2x^2+r^2-1 \\ \hline -2x+r^2-1 \\ +2x^2-2x \\ \hline 0 \end{array}$$

د) $y = \sqrt{\frac{x+r}{x^2-r^2+r^2-1}} \quad (x-1)(x^2-x+1) \Rightarrow \frac{x+r}{(x-1)(x^2-x+1)} \geq 0$

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

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

هـ) $y = \frac{r}{x^2-1} \quad (x-1)(x+1)$

$$D_f = \mathbb{R} - \{-r, 0, r, \infty\}$$

$$\begin{array}{l} x^2-1 = (x-1)(x+1) \\ x^2-1 = (x-1)(x+1) \end{array}$$

و) $y = \sqrt{[-x]-r} \quad [-x]-r \geq 0 \Rightarrow [-x] \geq r \quad D_f = (-\infty, -r]$

ز) $\frac{2x^2+4}{[x]^2-r[x]-r} \rightarrow ([x]-r)([x]+1)$

$$[x] \neq r \Rightarrow [r, r) \quad / \quad [x] \neq -1 \Rightarrow [-1, 0)$$

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

2- ا) $y = \sqrt{\left[x - \frac{1}{p}\right] + \left[x + \frac{r}{p}\right]} \rightarrow \left[x - \frac{1}{p}\right] + \left[x + \frac{r}{p}\right] \geq 0 \xrightarrow{+1} r\left[x + \frac{r}{p}\right] \geq 1$
 $\left[x + \frac{r}{p}\right] \geq \frac{1}{r} \Rightarrow \left[x + \frac{r}{p}\right] \geq 1 \rightarrow x + \frac{r}{p} \geq 1 \rightarrow x \geq \frac{1}{p}$ $D_f: \left[\frac{1}{p}, +\infty\right)$

ب) $y = \sqrt{\left[x - \frac{1}{p}\right] \left[-x + \frac{1}{p}\right]} \rightarrow \left[x - \frac{1}{p}\right] + \left[-x + \frac{1}{p}\right] \geq 0 \xrightarrow{a \in \mathbb{Z} \rightarrow [a] + [-a] = 0}$
 $x - \frac{1}{p} \in \mathbb{Z} \rightarrow x \in \mathbb{Z} + \frac{1}{p} \rightarrow D_f = \left\{x \mid x = k + \frac{1}{p}, k \in \mathbb{Z}\right\}$

4- ا) $y = \frac{\cot x + 1}{\tan x + 1} \rightarrow \tan x \neq -1$ $\cos x \neq 0$ $D_f = \mathbb{R} - \left\{k\pi + \frac{\pi}{2}, k\pi - \frac{\pi}{2}\right\}$

ب) $y = \sqrt{1 - t \sin^2 x} \rightarrow 1 - t \sin^2 x \geq 0 \rightarrow 1 \geq t \sin^2 x \rightarrow \frac{1}{t} \geq \sin^2 x \rightarrow$
 $-\frac{1}{\sqrt{t}} \leq \sin x \leq \frac{1}{\sqrt{t}}$ $D_f: \left[k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4}\right]$

5- ا) $y = \sqrt{t \sin x - 1} \rightarrow t \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{t}$ $D_f: \left[k\pi + \frac{\pi}{4}, k\pi + \frac{\pi}{4} + \frac{\pi}{t}\right]$

ب) $y = \sqrt{1 - t \cos x} \rightarrow 1 - t \cos x \geq 0 \rightarrow \frac{1}{t} \geq \cos x$ $D_f: \left[k\pi + \frac{\pi}{4}, k\pi + \frac{\pi}{4} + \frac{\pi}{t}\right]$

7- ا) $y = \arcsin(x^r + rx + 1)$ $-1 \leq x^r + rx + 1 \leq 1$
 $\frac{-r}{-1} - \frac{1}{-1} \rightarrow (x+r)(x+1) \geq 0 \rightarrow x(x+r) \leq 0$ $D_f: [-r, -r] \cup [-1, 0]$

ب) $\cos y = \sqrt{a - rx} \rightarrow -1 \leq \sqrt{a - rx} \leq 1 \rightarrow a - rx \leq 1$
 $-a \leq -rx \leq -1 \rightarrow \frac{a}{r} \geq x \geq r$ $D_f: \left[r, \frac{a}{r}\right]$

$$9- \text{ا) } y = \log_r (1 - \log_r^x) \quad x > 0 \quad (1) \quad 1 - \log_r^x > 0 \rightarrow 1 > \log_r^x \rightarrow x < r \quad (2)$$

$$1, 2 \rightarrow 0 < x < r \Rightarrow D_f = (0, r)$$

$$10- \text{ب) } y = \log_r (1 - \log_{1/r}^x) \quad x > 0 \quad (1) \quad 1 - \log_{1/r}^x > 0 \rightarrow 1 > \log_{1/r}^x \rightarrow x < 1/r \quad (2)$$

$$1, 2 \rightarrow 0 < x < 1/r \Rightarrow D_f = (0, 1/r)$$

$$10- \text{ا) } y = \sqrt{r^x x - x^r - 1} \quad \frac{x(r-x)}{r} - 1 > 0 \rightarrow r^{x(r-x)} > r^r$$

$$x(r-x) > r \rightarrow -x^2 + rx - r > 0 \rightarrow x^2 - rx + r < 0 \rightarrow (x-r)(x-1) < 0$$

$$\frac{1}{r} < x < r \quad D_f = [1, r]$$

$$11- \text{ب) } y = \left(\frac{rx + \omega}{rx + r} \right)!. \quad \frac{rx + \omega}{rx + r} \in \mathbb{N} \rightarrow x \in -\frac{r\omega - \omega}{r\omega - r} \Rightarrow$$

$$D_f = \left\{ x \mid x = \frac{\omega - rk}{rk - r}, k \in \mathbb{N} \right\}$$