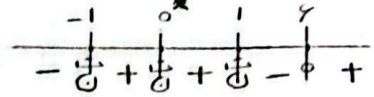


هول آفرین

الف) $y = \sqrt{\frac{x^2 - 2x}{x^2 - x}}$ $\rightarrow$ ریشه $= x(x-2) \rightarrow 0, 2$ $\rightarrow$ $-1, 0, 1, 2$

$\rightarrow$ ریشه $= x(x-1) \rightarrow 0, \pm 1$

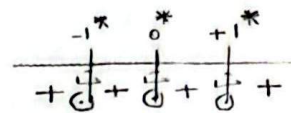


$D_f = (-1, 0) \cup (0, 1) \cup [2, +\infty)$

✓

ب) $y = \sqrt{\frac{x^3 - x^2}{x^2 - x}}$ $\rightarrow$ ریشه $= x^2(x-1) \rightarrow 0^*, \pm 1$ $\rightarrow$ $-1, 0^*, 1^*$

$\rightarrow$ ریشه $= x(x-1) \rightarrow 0, \pm 1$



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

الف) $y = \frac{x+1}{\sqrt{x+|x|}}$ $x+|x| > 0 \rightarrow |x| > -x \rightarrow D_f = \mathbb{R}^+$

ب) $y = \frac{1}{\sqrt{x|x|}}$ $x|x| > 0 \rightarrow D_f = \mathbb{R}^+$

✓

الف) $y = \sqrt{2-x}$ $2-x \geq 0 \rightarrow 2 \geq x \rightarrow x \leq 2 \rightarrow D_f = (-\infty, 2]$

✓

ب) $y = \frac{1}{\sqrt{2-x}}$ $2-x > 0 \rightarrow 2 > x \rightarrow x < 2 \rightarrow D_f = (-\infty, 2)$

الف) $y = \sqrt{\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right]}$ $\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right] \geq 0 \rightarrow 2\left[x + \frac{1}{x}\right] - 1 \geq 0$

$D_f = \left[\frac{1}{2}, +\infty\right)$ $2\left[x + \frac{1}{x}\right] \geq 1 \rightarrow \left[x + \frac{1}{x}\right] \geq \frac{1}{2} \rightarrow x + \frac{1}{x} \geq \frac{1}{2} \rightarrow x \geq \frac{1}{2}$

✓

ب) $y = \sqrt{\left[x - \frac{1}{x}\right] + \left[-x + \frac{1}{x}\right]} \rightarrow \sqrt{\left[x - \frac{1}{x}\right] + \left[-\left(x - \frac{1}{x}\right)\right]}$

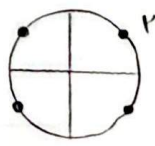
$D_f = \left\{x \mid x = k + \frac{1}{x}, k \in \mathbb{Z}\right\}$ $a \in \mathbb{Z} \quad [a] + [-a] = 0$
 $a \notin \mathbb{Z} \quad [a] + [-a] = -1 \rightarrow x - \frac{1}{x} \in \mathbb{Z}$

الف) $y = \frac{1}{\sin x - 1}$ $\sin x - 1 \neq 0 \rightarrow \sin x \neq 1 \rightarrow x \neq 90^\circ$

$D_f = \mathbb{R} - \left\{2k\pi + \frac{\pi}{2}\right\}$

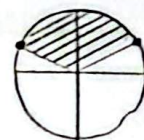
✓

ب) $y = \frac{1}{\sin^2 x - 1}$ $\sin^2 x \neq 1 \rightarrow \sin^2 x \neq \frac{1}{2} \rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2} \rightarrow x \neq 45^\circ, 135^\circ, 225^\circ, 315^\circ$



$D_f = \mathbb{R} - \left\{k\pi \pm \frac{\pi}{4}\right\}$

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



$$D_f = \left[rk\pi + \frac{\pi}{4}, rk\pi + \pi - \frac{\pi}{4} \right]$$

✓

$$ب) y = \sqrt{\cos x - 1} \quad \cos x - 1 \geq 0 \rightarrow \cos x \geq 1 \rightarrow D_f = \{rk\pi \mid k \in \mathbb{Z}\}$$

$$-1 \leq \cos x \leq 1$$

$$\cos x = 1 \rightarrow x = 0, 2\pi, \dots$$

$$الف) \cos y = |x| - r \quad -1 \leq |x| - r \leq 1$$

$$D_f = [r, r] \cup [-r, -r] \quad r \leq |x| \leq r \rightarrow r \leq x \leq r, -r \leq x \leq -r$$

✓

$$ب) y = \arcsin(x^r + r^3x + 1) \quad x^r + r^3x + 1 \leq 1 \rightarrow x^r + r^3x \leq 0$$

$$-1 \leq x^r + r^3x + 1 \leq 1 \rightarrow x^r + r^3x + 1 \geq -1 \rightarrow x^r + r^3x + 2 \geq 0$$

$$D_f = [-r, -r] \cup [-1, 0]$$

$$الف) y = \sqrt{r - \log_p(x-r)} \quad r - \log_p(x-r) \geq 0 \rightarrow r \geq \log_p(x-r) \rightarrow r \geq x-r$$

$$x-r > 0 \rightarrow x > r \rightarrow D_f = (r, 11]$$

$$ب) y = \log(x^r - x) \quad x^r - x > 0$$

✓

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

$$الف) y = \frac{r^x}{r^x + 1} \quad r^x + 1 \neq 0 \rightarrow r^x \neq -1 \rightarrow D_f = \mathbb{R}$$

$$ب) y = \frac{r^x}{r^x - 1} \quad r^x - 1 \neq 0 \rightarrow r^x \neq 1 \rightarrow x \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$$

$$ج) y = \frac{r^x}{r^x - r} \quad r^x - r \neq 0 \rightarrow r^x \neq r \rightarrow D_f = \mathbb{R} - \{\log_r r\}$$

$$د) y = \frac{r^x}{r^x - r^3} \quad r^x - r^3 \neq 0 \rightarrow r^x \neq r^3 \rightarrow D_f = \mathbb{R} - \{\log_r r^3\}$$

✓

$$الف) y = (rx+1)! \quad rx+1 \in \mathbb{N} \rightarrow x \in \frac{\omega-1}{r} \rightarrow D_f = \{x \mid x = \frac{k-1}{r}, k \in \mathbb{N}\}$$

$$ب) y = \left(\frac{r^x - r}{r^x - \omega} \right)! \quad \frac{r^x - r}{r^x - \omega} \in \mathbb{N} \rightarrow r^x - r = r^x \omega - \omega \rightarrow r^x - r^x \omega = r - \omega$$

$$x = \frac{r - \omega}{r - r\omega}$$

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

✓