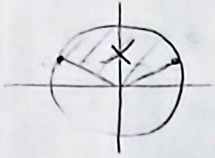


الف) $\frac{x^2 - 4x}{x^2 - x} \geq 0$ $x^2 - x = 0$ $x(x-4) \leq 0$ $x(x^2 - 1) \leq 0$ $x(x-1)(x+1) \leq 0$ $x \leq 0$ $x \leq 4$ $x \leq 1$ $x \leq -1$ $x \in (-1, 0) \cup (0, 4) \cup [4, +\infty)$	ب) $\frac{x^5 - 2x^2}{x^2 - x} \geq 0$ $x(x^2 - 1) \leq 0$ $x(x-1)(x+1) \leq 0$ $x \leq 0$ $x \leq 1$ $x^2(x^2 - 1) \leq 0$ $x^2(x-1)(x+1) \leq 0$ $x^2 \leq 0$ $x \leq \pm 1$ $D_f \subseteq \mathbb{R} - \{-1, 0, 1\}$	۱
ان) $x + x > 0$ $x > -x$ $D_f \subseteq \mathbb{R}^+$ ⊕ ✓ ⊖ ✗ ⊙ ✗	ب) $x x > 0$ $D_f \subseteq \mathbb{R}^+$ ⊕ ✓ ⊖ ✗ ⊙ ✗	۲
ان) $2 - [x] \geq 0$ $2 \geq [x]$ $x \leq 2$ $D_f = (-\infty, 2)$	ب) $2 - [x] > 0$ $2 > [x]$ $x < 2$ $(-\infty, 2) = D_f$	۳
ان) $\left(\left[x - \frac{1}{k} \right] + \left[x + \frac{k}{k} \right] \geq 0 \right)^{+1}$ $2 \left[x + \frac{k}{k} \right] \geq 1$ $\left[x + \frac{k}{k} \right] \geq \frac{1}{2}$ $\left[x + \frac{k}{k} \right] \geq 1$ $x \geq \frac{1}{k}$ $\left[\frac{1}{k}, +\infty \right) = D_f$	ب) $\left[x - \frac{1}{k} \right] + \left[-\left(x - \frac{1}{k} \right) \right] \geq 0$ $x - \frac{1}{k} \in \mathbb{Z}$ $x \in \mathbb{Z} + \frac{1}{k}$ $D_f = \{x \mid x = k + \frac{1}{k}, k \in \mathbb{Z}\}$	۴
ان) $y = \frac{2}{\sin x - 1}$ $\sin x \neq 1$ $D_f \subseteq \mathbb{R} - \{2\pi k + \frac{\pi}{2}\}$	ب) $2 \sin^2 x \neq 1$ $\sin^2 x \neq \frac{1}{2}$ $\sin x \neq \pm \frac{1}{\sqrt{2}} \rightarrow \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} \leq \pm \frac{\sqrt{2}}{\sqrt{2}}$ $D_f \subseteq \mathbb{R} - \{2\pi k + \frac{\pi}{4}\}$	۵

$$\text{الف) } r \sin x - 1 \geq 0$$

$$r \sin x \geq 1$$

$$\sin x \geq \frac{1}{r}$$



$$D_f = \left[2k\pi + \frac{\pi}{r}, 2k\pi + \frac{5\pi}{r} \right]$$

$$\text{ب) } \cos x - 1 \geq 0$$

$$\cos x \geq 1 \quad \leadsto \quad -1 \leq \cos x \leq 1 \quad \leadsto \quad \underline{\cos x = 1}$$

$$\cos x = 1$$

$$D_f = \{ 2k\pi \}$$



6

$$\text{الف) } -1 \leq |x| - r \leq 1$$

$$+r \left\{ \right.$$

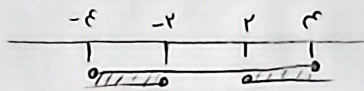
$$r \leq |x| \leq r + 1$$

$$r \leq |x| \quad |x| \leq r + 1$$

$$x \geq r \quad -r \leq x \leq r$$

$$x \leq -r$$

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

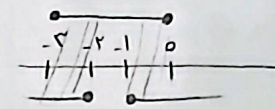


$$\text{ب) } -1 \leq x^2 + rx + 1 \leq 1$$

$$-1 \leq x^2 + rx + 1 \leq 1 \quad \xrightarrow{+1} \quad 0 \leq (x+1)(x+r)$$

$$x^2 + rx + 1 \leq 1 \quad \xrightarrow{-1} \quad x(x+r) \leq 0$$

$$\text{①} \quad \text{②} \quad [-r, 0]$$



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

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$$\text{الف) } r - \log_r(x-r) \geq 0$$

$$r \geq \log_r(x-r)$$

$$x-r > 0 \quad x-r \leq 9$$

$$x > r \quad x \leq 11$$

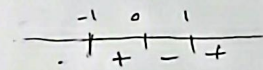
$$[(r, 11)] = D_f$$

$$\text{ب) } x^2 - x > 0$$

$$x(x-1) > 0$$

$$x(x+1)(x-1) > 0$$

$$\text{①} \quad \text{②} \quad \text{③}$$



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

8

$$\text{الف) } \varepsilon^{x+1} \neq 0$$

$$\varepsilon^x = -1$$

$$D_f = \mathbb{R}$$

$$\text{ب) } \varepsilon^{x-1} \neq 0$$

$$\varepsilon^x = 1$$

$$D_f = \mathbb{R} - \{0\}$$

$$\text{ج) } \varepsilon^x = r$$

$$D_f = \mathbb{R} - \{ \log_r r \}$$

$$\text{د) } \varepsilon^x \leq r$$

$$D_f = \mathbb{R} - \{ \log_r r \}$$

9

$$\text{الف) } \varepsilon_{x+1} \in W$$

$$\varepsilon_x \in W-1$$

$$x \in \frac{W-1}{\varepsilon}$$

$$\{x \mid x \in \frac{k-1}{\varepsilon}, k \in W\} = D_f$$

$$\text{ب) } \frac{\varepsilon_{x-r}}{\varepsilon_{x-0}} \in W$$

$$\varepsilon_{xW-0W} = \varepsilon_{x-r}$$

$$\varepsilon_{xW-rx} \leq 0W-r$$

$$x(\varepsilon_{xW-r}) \leq 0W-r$$

$$x \in \frac{0W-r}{\varepsilon_{xW-r}}$$

$$\xrightarrow{\text{ب)}}$$

$$\{x \mid x \in \frac{0W-r}{\varepsilon_{xW-r}}, k \in W\} = D_f$$

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