

الف) $\frac{x(x-4)}{x(x^2-1)} \geq 0$

$$\frac{-1 \quad 0 \quad 1 \quad 4}{- \quad + \quad + \quad - \quad +}$$

دانشه $D = (-1, 0) \cup (0, 1) \cup [4, +\infty)$

ب) $\frac{x^3(x^2-1)}{x(x^2-1)} \geq 0$

$$\frac{-1 \quad 0 \quad 1}{+ \quad + \quad +}$$

$D = \mathbb{R} - \{-1, 0, 1\}$

الف) $x + |x| > 0$
 $|x| > -x$

$D = \mathbb{R}^+$

ب) $x|x| > 0$

$D = \mathbb{R}^+$

الف) $2 - [x] \geq 0$
 $2 \geq [x]$

$D = (-\infty, 2)$

ب) $2 - [x] > 0$
 $2 > [x]$

$D = (-\infty, 2)$

الف) $[x - \frac{1}{x}] + [x + \frac{1}{x}] \geq 0$

$[x - \frac{1}{x}] + [x - \frac{1}{x} + 1] \geq 0$

$[x - \frac{1}{x}] + [x - \frac{1}{x}] + 1 \geq 0$

$2[x - \frac{1}{x}] + 1 \geq 0 \rightarrow [x - \frac{1}{x}] \geq -\frac{1}{2}$

ب) $[x - \frac{1}{x}] + [-x + \frac{1}{x}] \geq 0$

$[x - \frac{1}{x}] \geq [-(x - \frac{1}{x})]$

$x - \frac{1}{x} \geq 0$

$x \geq \frac{1}{x} \quad D = [\frac{1}{x}, +\infty)$

الف) $\sinh x - 1 \neq 0$
 $\sinh x \neq 1$

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

$x - \frac{1}{x} \geq 0$
 $x \geq \frac{1}{x} \quad D = [\frac{1}{x}, +\infty)$

ب) $\sqrt{\sinh x - 1} \neq 0$
 $\sinh x \neq \pm \sqrt{\frac{e^x + e^{-x}}{2} - 1}$

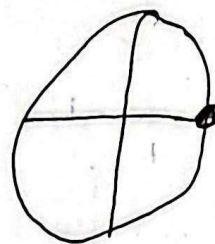
$D = \mathbb{R} - \left\{ k\pi \pm \frac{\pi}{4} \right\}$

ا) $r \sin x - 1 \geq 0$
 $\sin x \geq \frac{1}{r}$



$$D = \left[2k\pi + \frac{\pi}{4}, 2k\pi + \frac{3\pi}{4} \right]$$

ب) $\cos x - 1 \geq 0$
 $\cos x \geq 1$



$$D = [2k\pi]$$

ا) $\cos x = |x| - r$

$$-1 \leq |x| - r \leq 1$$

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

$$\begin{cases} r \leq |x| \\ |x| \leq r+1 \end{cases} \rightarrow \begin{cases} x \geq r \\ x \leq -r \end{cases}$$

$$|x| \leq \varepsilon \rightarrow -\varepsilon \leq x \leq \varepsilon$$

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

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

$$x^2 + \frac{1}{x^2} + 1 \geq 0$$

$$(x+1)(x+1) \geq 0 \quad ; \quad x(x+\frac{1}{x}) \leq 0$$

$$+ \quad - \quad - \quad + \quad +$$

$$+ \quad - \quad - \quad + \quad +$$

$$D = [-1, 0] \cup [-\frac{1}{r}, -\frac{1}{r}]$$

ا) $r - \log_p(x-r) \geq 0$

$$\log_p = r \geq \log_p(x-r)$$

$$x-r \leq r$$

$$x \leq 11$$

$$\textcircled{2} \quad x-r > 0$$

$$x > r$$

$$D = (r, 11]$$

ب) $x^2 - x > 0$

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

$$- \quad 1 \quad 0 \quad 1 \quad +$$

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

ا) $r^x + 1 \neq 0$

$$r^x \neq -1$$

$$D = \mathbb{R}$$

ب) $r^x - 1 \neq 0$

$$r^x \neq 1$$

$$x \neq 0$$

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

ج) $r^x - r \neq 0$

$$r^x \neq r$$

$$x \neq \log_p r$$

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

د) $r^x - r \neq 0$

$$r^x \neq r$$

$$x \neq \log_p r$$

$$D = \mathbb{R} - \log_p r$$

ا) $r+1 \in W$

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

$$D = \left\{ x \mid x = \frac{r+1}{r}, r \in W \right\}$$

ب) $\frac{r^x - r}{r^x - 1} \in W$

$$r^x - r = r^x W - \Delta W$$

$$x(r^x - r) = r - \Delta W$$

$$x = \frac{r - \Delta W}{r^x - r}$$

$$D = \left\{ x \mid x = \frac{r - \Delta k}{r^x - r k}, k \in W \right\}$$