

الف) $\frac{x+3}{(x+1)(x^2+4x+3)} \geq 0$ (ب) $\frac{x+3}{(x^2+5x+3)(x-1)}$

$x^2+4x+3 = (x+1)(x+3) \neq 0 \Rightarrow x \neq -1, -3$

$(x+1)(x^2+4x+3) \neq 0 \Rightarrow x \neq -1, -3$

$D: \mathbb{R} - \{-3, -1, \frac{1}{4}\}$

$\frac{x+3}{(x^2+5x+3)(x-1)} \geq 0$

$x^2+5x+3 = 0 \Rightarrow x = \frac{-5 \pm \sqrt{25-12}}{2} = \frac{-5 \pm \sqrt{13}}{2}$

$D: \mathbb{R} - \{-3, \frac{1}{4}\}$

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

$x^2-2x^2+x-1 = -x^2+x-1 = 0 \Rightarrow x = \frac{1 \pm \sqrt{1-4}}{2} = \frac{1 \pm \sqrt{-3}}{2}$

$(x^2-x+1)(x-1) \neq 0 \Rightarrow x \neq 1$

$D: (-\infty, 2] \cup (1, +\infty)$

$D: \mathbb{R} - \{1\}$

$x^2-5|x-1|-2x+5 \neq 0$

$x > 1 \rightarrow x^2-5x+5-2x+5 \neq 0 \rightarrow x^2-7x+10 \neq 0 \Rightarrow (x-2)(x-5) \neq 0 \Rightarrow x \neq \{2, 5\}$

$x < 1 \rightarrow x^2-5+5x-2x+5 \neq 0 \rightarrow x^2+3x \neq 0 \Rightarrow x(x+3) \neq 0 \Rightarrow x \neq \{-3, 0\}$

$D: \mathbb{R} - \{-3, 0, 2, 5\}$

الف) $|2x+1| - |x+3| \geq 0$ (ب) $|2x+1| - |x+3| \neq 0 \Rightarrow |2x+1| \neq |x+3|$

$|2x+1| \geq |x+3| \xrightarrow{\text{مربع}} 4x^2+4x+1 \geq x^2+6x+9 \Rightarrow 3x^2-2x-8 \geq 0$

$3x^2-2x-8 \geq 0 \Rightarrow D: (-\infty, -\frac{4}{3}] \cup [2, +\infty)$

$3x^2-2x-8 \neq 0 \Rightarrow x \neq \{-\frac{4}{3}, 2\}$

$D: \mathbb{R} - \{-\frac{4}{3}, 2\}$

الف) $1 - \log_{\frac{1}{4}} x > 0 \Rightarrow 1 > \log_{\frac{1}{4}} x \Rightarrow \log_4 x > 0 \Rightarrow x > 1$

$\frac{1}{4} < x \Rightarrow D: (\frac{1}{4}, +\infty)$

الف) $1 - \log_3 x > 0 \Rightarrow 1 > \log_3 x \Rightarrow \log_3 x < 1 \Rightarrow x < 3$

$x > 0 \Rightarrow D: (-\infty, 3)$

$$\log_{\log \Delta}^{(x-1)} \geq \log_{\Delta}^{x-1} \rightarrow x \leq 3 \quad (1)$$

$$\log_{\omega}^{x-1} > 0 \quad x-1 > 1 \quad x > 2 \quad x > 1 \quad (2) \quad D: (1) \cap (2) \cap (3) = (1, 3]$$

$$x-1 > 0 \quad x > 1 \quad x > \frac{1}{2} \quad (3)$$

$$\log \frac{x-1}{x+1} > 0$$

$$\frac{x-1}{x+1} > 0 \quad x=1$$

$$\begin{array}{c} -1 \quad 1 \\ + \quad - \quad + \end{array}$$

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

($\rightarrow$)

$$\cos x > 1 \quad \cos x > -1$$

$$\cos x > \frac{1}{2}$$

$$D: (2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3})$$

$$(a+x)x^2 + ax + b > 0 \quad a+x=0 \quad a=-x$$

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

$$x=3 \rightarrow -x(3)+b=0 \quad b=9$$

$$x^2 + 2x + 2 - m^2 > 0 \quad \text{بفرض } 1 \rightarrow b^2 - 4ac = 0 \rightarrow 4 - 4 + 4m^2 = 0 \quad 4m^2 = 4 \quad m = \pm 1$$

$$m_{\max} - m_{\min} = 1 - (-1) = 2$$

$$f(x) > 0 \quad f > x^2 \quad -x^2 < x < x \quad (1)$$

$$[x] + [-x] + 1 \neq 0$$

$$\begin{cases} x \in \mathbb{Z} & [x] + [-x] = 0 \xrightarrow{+1} = 1 \quad \checkmark \quad (2) \\ x \notin \mathbb{Z} & [x] + [-x] = -1 \xrightarrow{+1} = 0 \quad \times \end{cases}$$

$$(1) \cap (2) = \{-2, -1, 0, 1, 2\}$$

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