

المطلوب: إيجاد القيم العظمى والصغرى لـ $f(x) = x^2 + 2x + 2 - m^2$ على المجال $[3, +\infty)$ حيث m ثابت.

$$a - 2 = 0 \Rightarrow a = 2$$

$$(2 - 2)x^2 + 4x + b = 0 \Rightarrow 4x(0) + 4x^2 + b = 0 \Rightarrow b = -4 \quad \text{جواب}$$

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

$$(x+1)^2 + 1 - m^2 \geq 0 \Rightarrow (x+1)^2 + 1 \geq m^2 \Rightarrow m^2 \leq (x+1)^2 + 1$$

$$m^2 \leq 1 \Rightarrow -1 \leq m \leq 1 \quad m_{\max} = 1 \quad m_{\min} = -1 \quad m_{\max} - m_{\min} = 1 - (-1) = 2 \quad \text{جواب}$$

$$f(x) = x^2 \geq 0 \Rightarrow x^2 \geq 0 \Rightarrow -2 \leq x \leq 2 \quad \text{المطلوب}$$

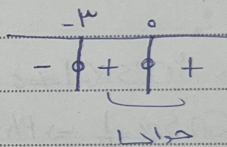
$$[x] + [-x] + 1 \neq 0 \Rightarrow [x] + [-x] \neq -1 \Rightarrow x \in \mathbb{W} \quad \text{إعداد صحيح}$$

$$\Rightarrow -2, -1, 0, 1, 2 \quad \text{جواب}$$

$$x^3 + 3x^2 \geq 0 \Rightarrow x^2(x+3) \geq 0$$

$$x^2 \geq 0 \text{ دائماً}$$

$$x = -3 \text{ و } x = 0$$



$$D_f = [-3, +\infty) \quad \text{جواب}$$

$$x^3 - 1 = (x-1)(x^2+x+1)$$

$$x^3 - 3x^2 = x^2(x-3)$$

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$$\Delta = 1 - 4 = -3 < 0$$

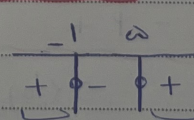
$$\Delta = 1 - 4 = -3 < 0$$

$$x^3 - 1 \geq 0 \Rightarrow x \geq 1 \quad \text{جواب}$$

$$|x-2| - 3 \geq 0 \Rightarrow x-2-3 \geq 0 \Rightarrow x \geq 5$$

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$$-x+2-3 \geq 0 \Rightarrow -1 \geq x$$

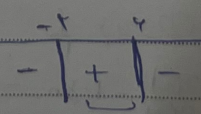


$$D_f = (-\infty, -1] \cup [5, +\infty)$$

$$f(x) = 14 - 2x \geq 0 \Rightarrow 14 - 2x \geq 0 \Rightarrow x \leq 7$$

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$$D_f = -2 \leq x \leq 7$$

$$\text{الف) } 1 - x|x| \geq 0 \Rightarrow 1 - x \cdot x \geq 0 \Rightarrow 1 - x^2 \geq 0 \Rightarrow 1 \geq x^2 \Rightarrow 1 \geq x \geq -1$$

$$\Rightarrow 1 - x - x \geq 0 \Rightarrow 1 + x^2 \geq 0 \Rightarrow x^2 \geq -1$$

$$D_f = -1 \leq x \leq 1$$

$$\text{ج) 1) } \sqrt{1-x-\omega} \geq 0 \Rightarrow 1+x-\omega \geq 0 \Rightarrow x \geq \omega$$

$$\Rightarrow \sqrt{1-x+\omega} \geq 0 \Rightarrow 1+x \geq 0 \Rightarrow x \geq -1$$

$$\text{2) } \sqrt{1-x-\omega} - 1 \neq 0 \Rightarrow \sqrt{1-x-\omega} \neq 1 \Rightarrow 1-x-\omega \neq 1 \Rightarrow x \neq -\omega$$

$$x \neq \omega \vee \Rightarrow \text{المجال هو } D_f = 2 \leq x \leq 1, x \neq \omega \vee$$

الف)

$$y = \frac{\sin^2 x - 1}{\cos x} \rightarrow \cos x \neq 0 \quad \omega_0^\circ, \omega_{180}^\circ = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$0 < \sin^2 x < 1 \Rightarrow -1 < \sin x < 1$$

$$\sin^2 x - 1 \leq 0 \Rightarrow \sin^2 x \leq 1$$

$$\sin^2 x - 1 \Rightarrow \sin^2 x + \cos^2 x - 1 \Rightarrow \sin^2 x - 1 = -\cos^2 x$$

$$\Rightarrow \frac{-\cos^2 x}{\cos x} = -\cos x \Rightarrow \text{المجال هو } D_f = R - \left\{ \frac{\pi}{2}, \frac{3\pi}{2} \right\}$$

ب)

$$y = \frac{\cos x}{1 - \cos x} \Rightarrow 1 - \cos x \neq 0 \Rightarrow 1 - \cos x \neq 1 \Rightarrow \cos x \neq 0$$

$$\cos x = 1 \Rightarrow \frac{\pi}{2}, \frac{3\pi}{2}$$

$$D_f = R - \left\{ \frac{\pi}{2}, \frac{3\pi}{2} \right\}$$

$$|2x+1| - |x+\omega| \neq 0 \Rightarrow 2x+1 = x+\omega \Rightarrow x = \omega$$

$$\Rightarrow 2x+1 = -x-\omega \Rightarrow 3x = -1-\omega \Rightarrow x = \frac{-1-\omega}{3}$$

$$D = R - \left\{ \frac{-1-\omega}{3} \right\}$$

$$|2x+1| - |x+\omega| \geq 0 \Rightarrow |2x+1| \geq |x+\omega| \xrightarrow{\text{المربع}} (2x+1)^2 \geq (x+\omega)^2$$

$$\Rightarrow (2x+1)^2 - (x+\omega)^2 \geq 0 \Rightarrow [(2x+1) - (x+\omega)][(2x+1) + (x+\omega)] \geq 0$$

$$(x-\omega)(3x+1+\omega) \geq 0 \Rightarrow \frac{-\omega}{3} \leq x \leq \frac{-1-\omega}{3} \Rightarrow D_f = \left(-\infty, \frac{-\omega}{3} \right] \cup \left[\frac{-1-\omega}{3}, +\infty \right)$$

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$$\text{1) } 1 < x < 10 \Rightarrow x > 1 \quad 0 < \log_{10} x < 1$$

$$1 < x < 10 \Rightarrow x < 10$$

$$x > 1 \Rightarrow 1 < x < 10 \Rightarrow 1 < x < 10$$

$$D = (1, 10)$$

$$1 < \cos x < 10 \Rightarrow \cos x > \frac{1}{10} \Rightarrow x \in \left(-\frac{\pi}{3}, \frac{\pi}{3} \right), K \in \mathbb{Z}$$

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$$\frac{x-1}{x+1} > 1 \Rightarrow \frac{x-1}{x+1} - 1 > 0 \Rightarrow \frac{x-1-x-1}{x+1} > 0 \Rightarrow \frac{-2}{x+1} > 0$$

$$x < -1 \Rightarrow x+1 < 0 \Rightarrow \frac{-2}{x+1} > 0$$

$$D_f = (-\infty, -1)$$

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