

۲. افزایش عالی نوشتن

$f(x) = \sqrt{(a-x)x^2 + ax + b}$
 $D_f = [2, +\infty)$
 $2x + b \geq 0 \Rightarrow x \geq \frac{-b}{2} \Rightarrow x \geq 2$
 $\frac{-b}{2} = 2 \Rightarrow b = -4$

$x^2 + 2x + 2 - m^2 \Rightarrow \Delta \leq 0 \Rightarrow 4 - 8 + 4m^2 \leq 0 \Rightarrow -1 \leq m \leq 1 \Rightarrow 1 - (-1) = 2$

$[x] + [-x] \rightarrow \dots \rightarrow \text{تمام اعداد صحیح}$
 $x - x^2 \geq 0 \rightarrow -1 \leq x \leq 1 \Rightarrow (1)$
 $(1) \cap (2) = [-1, 1]$

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

الف) $|x-2| \geq 3 \Rightarrow x-2 \geq 3 \Rightarrow x \geq 5$
 $x-2 \leq -3 \Rightarrow x \leq -1$
 ب) $|x-2| \leq 4 \Rightarrow -4 \leq x-2 \leq 4 \Rightarrow -2 \leq x \leq 6 \Rightarrow [-2, 6]$

الف) $1 - x|x| \geq 0 \quad x|x| \leq 1 \quad \begin{cases} x^2 \leq 1 \Rightarrow x > 0 \Rightarrow x \leq 1 \\ 0 \leq 1 \Rightarrow x = 0 \\ -x^2 \leq 1 \Rightarrow x < 0 \end{cases} \Rightarrow x \leq 1$

$\Rightarrow x \leq 1$

ب) $3 - |x-5| \geq 0 \rightarrow -3 \leq |x-5| \leq 3 \rightarrow 2 \leq x \leq 8$

$\sqrt{3-|x-5|} \neq 1 \xrightarrow{\text{إزالة الجذر}} 3-|x-5| \neq 1 \rightarrow \begin{cases} |x-5| \neq 2 \\ x-5 \neq 2 \\ x-5 \neq -2 \end{cases} \Rightarrow x \neq 7, 3 \Rightarrow [2, 8] \setminus \{3, 7\}$

الف) $\cos x \neq 0 \rightarrow \mathbb{R} - \{k\pi + \frac{\pi}{2}\}$



ب) $2\cos x - 1 \neq 0 \quad \cos x \neq \frac{1}{2} \quad \mathbb{R} - \{2k\pi \pm \frac{\pi}{3}\}$



الف) $||x+1| - |x+3|| \xrightarrow{\text{إزالة القيمة المطلقة}} (x+1)^2 = (x+3)^2 \rightarrow x^2 - 2x - 8 = 0 \rightarrow \begin{cases} x = 4 \\ x = -2 \end{cases} \quad \mathbb{R} \setminus \{4, -2\}$

ب) $\frac{-\frac{5}{4}x}{+\frac{5}{4}x + 1} \Rightarrow (-\infty, -\frac{4}{5}] \cup [1, +\infty)$

$\log_{\frac{1}{2}}^{(x-1)} \geq 0 \quad \begin{cases} \log_2^{(x-1)} \leq 1 \rightarrow x-1 \leq 2 \rightarrow x \leq 3 \\ \log_2^{(x-1)} > 0 \rightarrow x-1 > 1 \rightarrow x > 2 \\ x-1 > 0 \rightarrow x > 1 \end{cases} \Rightarrow 2 < x \leq 3$

$2 < x \leq 3$

الف) $2\cos x + 1 > 0 \quad \cos x > -\frac{1}{2}$



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

ب) $\log_{\frac{x-1}{x+1}} \geq 0 \rightarrow \frac{x-1}{x+1} \geq 1 \rightarrow \frac{x-1-(x+1)}{x+1} > 0 \quad \frac{-2}{x+1} > 0 \rightarrow x < -1$

$\frac{x-1}{x+1} > 0 \rightarrow \frac{-1}{+\frac{5}{4}x + 1} \Rightarrow (-\infty, -1)$