

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

اینجا باشد $\begin{matrix} a-2=0 \\ a=2 \end{matrix}$

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

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$[x] + [-x] \rightarrow \begin{matrix} \leftarrow \rightarrow \\ \leftarrow \rightarrow \end{matrix} \xrightarrow{+1} \begin{matrix} \leftarrow \rightarrow \\ \leftarrow \rightarrow \end{matrix} \rightarrow \text{تمام اعداد صحیح} \textcircled{1}$
 $x - x^2 \geq 0 \rightarrow -2 \leq x \leq 2 \Rightarrow \textcircled{2}$

$\textcircled{1} \cap \textcircled{2} \Rightarrow [-2, 2] \Rightarrow 4$

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

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

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الف) $|x-2| \geq 3 \Rightarrow \begin{matrix} x-2 \geq 3 \Rightarrow x \geq 5 \\ x-2 \leq -3 \Rightarrow x \leq -1 \end{matrix}$

ب) $|x-2| \leq 4 \Rightarrow \begin{matrix} 2-x \leq 4 \rightarrow x \geq -2 \\ 2-x \geq -4 \rightarrow x \leq 6 \end{matrix} \Rightarrow -2 \leq x \leq 6 \Rightarrow [-2, 6]$

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

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

$\sqrt{3-|x-5|} \neq 1 \xrightarrow{\text{إلغاء الجذر}} 3-|x-5| \neq 1 \rightarrow \begin{cases} |x-5| \neq 2 \\ x-5 \neq 2 \\ x-5 \neq -2 \end{cases} \left. \begin{matrix} x \neq 7, 3 \end{matrix} \right\} \Rightarrow [2, 8] - \{3, 7\}$

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

ب) $\frac{-\frac{4}{3}x}{x^2 - 4} \Rightarrow (-\infty, -\frac{4}{3}] \cup [2, +\infty)$

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

الف) $2\cos x + 1 > 0 \quad \cos x > -\frac{1}{2} \quad (2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3})$



ب) $\log \frac{x-1}{x+1} \geq 0 \rightarrow \frac{x-1}{x+1} \geq 1 \rightarrow \frac{x-1-(x+1)}{x+1} > 0 \quad \begin{matrix} \frac{-2}{x+1} > 0 \rightarrow x < -1 \\ \frac{x-1}{x+1} > 0 \rightarrow \frac{-1}{x+1} < 0 \end{matrix} \left. \begin{matrix} \end{matrix} \right\} (-\infty, -1)$