

با توجه به روش متغیر می توانیم عبارت دیگر سه مضاعف ۳ عددی و در مجموع عبارت زیر را در حالت یک سوی نسبت بگیریم تا به یک تابع خطی دست پیدا کنیم. آن ۳ است و به ازای هر عدد در این مجموعه ۳ نسبت است $\Rightarrow$ ضرب x^2 باید صفر نباشد $\Rightarrow$ $a-2=0 \Rightarrow a=2$ $\leftarrow$ عبارت های گوی $y = \sqrt{2x+b}$ $\leftarrow 2x+b=0 \Rightarrow$ برای $x=2$

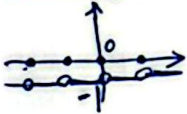
$$2(2)+b=0 \Rightarrow \boxed{b=-6}$$

$$ID_f = \mathbb{R} \Rightarrow x^2 + 2x + 2 - m^2 \geq 0 \quad \begin{cases} \text{I) } \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 = (2)^2 + (-4)(1)(2-m^2) = 0 \Rightarrow 4(m^2-1) = 0 \Rightarrow m = \pm 1 \\ \text{II) } \Delta < 0 \Rightarrow b^2 - 4ac < 0 \Rightarrow (2)^2 + (-4)(1)(2-m^2) < 0 \Rightarrow -4 + 4m^2 < 0 \Rightarrow 4m^2 < 4 \Rightarrow m^2 < 1 \end{cases}$$

$$\text{I} \cup \text{II} \rightarrow -1 < m < 1 \xrightarrow{\text{min } m = -1, \text{ max } m = 1} m_{\max} - m_{\min} = 1 - (-1) = \boxed{2}$$

$$\begin{aligned} \text{I) } 4 - m^2 \geq 0 &\Rightarrow m^2 \leq 4 \Rightarrow -2 \leq m \leq 2 \\ \text{II) } [n] + [-n] + 1 &\neq 0 \Rightarrow \underbrace{[n] + [-n]}_{=0} + 1 \neq 0 \Rightarrow 1 \neq 0 \Rightarrow x \neq \mathbb{R} \setminus \mathbb{Z} \Rightarrow x \in \mathbb{Z} \end{aligned} \quad \xrightarrow{\text{I} \cap \text{II}} ID_f = \{-2, -1, 0, 1, 2\}$$

نمودار صحیح وجود دارد



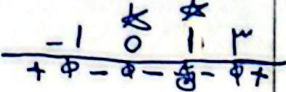
$$\text{الف) } x^3 + 3x^2 \geq 0 \Rightarrow x^2(x+3) \geq 0 \Rightarrow \frac{-3}{-3+3+} \Rightarrow ID_f = [-3, +\infty)$$

$$\text{ب) } \frac{(x^2-1)(x^2(x-3))}{x^3-1} \geq 0 \xrightarrow{\text{Simplify}} x^2 = 1 \rightarrow x = \pm 1$$

$$x^2 = 0 \rightarrow x = 0 \text{ (مضاعف ۳)}$$

$$x = 3$$

$$x^2 = 1 \rightarrow x = \pm 1$$

$$ID_f = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$$


$$\text{الف) } |x-2| - 3 \geq 0 \Rightarrow |x-2| \geq 3 \Rightarrow \begin{cases} x-2 \geq 3 \Rightarrow x \geq 5 \\ x-2 \leq -3 \Rightarrow x \leq -1 \end{cases} \rightarrow ID_f = (-\infty, -1] \cup [5, +\infty)$$

$$\text{ب) } 4 - |x-2| \geq 0 \Rightarrow |x-2| \leq 4 \Rightarrow \begin{cases} 2-x \leq 4 \Rightarrow x \geq -2 \\ 2-x \geq -4 \Rightarrow x \leq 6 \end{cases} \rightarrow ID_f = [-2, 6]$$

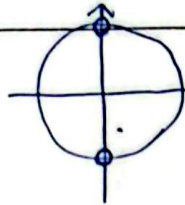
الف) $1 - |x| \geq 0 \Rightarrow |x| \leq 1 \xrightarrow{\text{مربع الطرفين}} \frac{0}{-x^2+2x-1} \Rightarrow D_f = (-\infty, 1]$

ب) $|x| \leq 1 \Rightarrow x^2 \leq 1 \Rightarrow x^2 - 1 \leq 0 \Rightarrow (x-1)(x+1) \leq 0 \Rightarrow D_f = [-1, 1]$

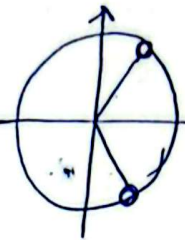
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د) $|x| \leq 1 \Rightarrow x^2 \leq 1 \Rightarrow x^2 - 1 \leq 0 \Rightarrow (x-1)(x+1) \leq 0 \Rightarrow D_f = [-1, 1]$

$$D_f = [1, 2] \cup \{3\}$$



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



ب) $2\cos x - 1 \neq 0 \Rightarrow \cos x \neq \frac{1}{2} \Rightarrow D_f = \mathbb{R} - \{2k\pi - \frac{\pi}{3}, 2k\pi + \frac{\pi}{3}\}$

الف) $|2x+1| - |x+3| \neq 0 \Rightarrow |2x+1| \neq |x+3| \Rightarrow (2x+1)^2 \neq (x+3)^2 \Rightarrow (2x+1)^2 - (x+3)^2 \neq 0 \Rightarrow (2x+1-x-3)(2x+1+x+3) \neq 0 \Rightarrow (x-2)(3x+4) \neq 0 \Rightarrow x \neq 2, x \neq -\frac{4}{3} \Rightarrow D_f = \mathbb{R} - \{2, -\frac{4}{3}\}$

ب) $|2x+1| - |x+3| \geq 0 \Rightarrow |2x+1| \geq |x+3| \Rightarrow (2x+1)^2 \geq (x+3)^2 \Rightarrow (2x+1-x-3)(2x+1+x+3) \geq 0 \Rightarrow (x-2)(3x+4) \geq 0 \Rightarrow D_f = (-\infty, -\frac{4}{3}] \cup [2, +\infty)$

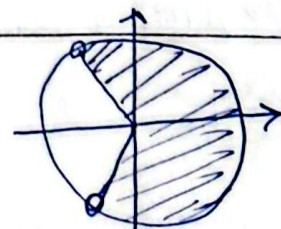
I) $2x-1 > 0 \Rightarrow 2x > 1 \Rightarrow x > \frac{1}{2}$

II) $\log_{10}(2x-1) > 0 \Rightarrow 2x-1 > 1 \Rightarrow 2x > 2 \Rightarrow x > 1$

III) $\log_{10} \log_{10}(2x-1) \geq 0 \Rightarrow \log_{10}(2x-1) \geq 1 \Rightarrow 2x-1 \geq 10 \Rightarrow 2x \geq 11 \Rightarrow x \geq \frac{11}{2}$

$\Rightarrow D_f = (1, +\infty)$

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



ب) $y = \sqrt{\log \frac{x-1}{x+1}} \Rightarrow I) \log \frac{x-1}{x+1} \geq 0 \Rightarrow \log \frac{x-1}{x+1} \geq 0 \Rightarrow \frac{x-1}{x+1} \geq 1 \Rightarrow x-1 \geq x+1 \Rightarrow -2 \geq 0$ (no solution)

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

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