

$$f(x) = \sqrt{(a-x)^2 - ax + b} \xrightarrow{a=x} \sqrt{x^2 + b}$$

فرض کنیم x باید صفر شود
مساوی از حالت اول
خارج شود

$$\rightarrow a-x=0$$

$$\boxed{a=x}$$

$$x^2 + b = 0 \xrightarrow{x=0} x^2 + b = 0$$

$$y + b = 0$$

$$\boxed{b = -y}$$

$$f(x) = \sqrt{x^2 + 2x + 1 - m^2} \geq 0$$

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

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

چون $(x+1)^2 \geq 0$ پس کمترین مقدار
جایگزی است که $x = -1$ باشد

$$1 - m^2 \geq 0 \rightarrow m^2 \leq 1$$

$$-1 \leq m \leq 1$$

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

$$f(x) = \frac{5x - x^2}{[x] + [-x] + 1} \rightarrow \begin{cases} 5 - x^2 \geq 0 \\ x^2 \leq 5 \\ -2 \leq x \leq 2 \end{cases} \quad (1)$$

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

$$[x] + [-x] \neq -1 \rightarrow x \notin \mathbb{Z}$$

$$(2) \quad x \in \mathbb{Z} \text{ باید صفر شود}$$

$$(1) \cap (2) \rightarrow [-2, 2]$$

$$-2, -1, 0, 1, 2$$

$$\boxed{\text{مجموعه مقادیر}}$$

$$f(x) = \sqrt{x^3 + 3x^2} \geq 0 \rightarrow x^2(x+3) \geq 0 \rightarrow \begin{matrix} -3 & 0 & + \\ - & + & + \end{matrix} \quad D_f = [-3, +\infty)$$

$$y = \sqrt{\frac{(x^2-1)(x^3-3x^2)}{x^3-1}} \geq 0 \rightarrow \frac{(x-1)(x+1)x^2(x-3)}{(x-1)(x^2+x+1)} \geq 0 \rightarrow \frac{(x+1)(x-3)x^2}{(x^2+x+1)} \geq 0$$

$$\begin{matrix} -1 & 0 & 3 \\ + & - & - & + \end{matrix} \quad D_f = (-\infty, -1] \cup \{0\} \cup [3, +\infty) \quad \Delta < 0$$

$$f(x) = \sqrt{|x-2|-3} \geq 0 \rightarrow |x-2|-3 \geq 0 \rightarrow |x-2| \geq 3 \rightarrow \begin{cases} x-2 \geq 3 \rightarrow x \geq 5 \\ x-2 \leq -3 \rightarrow x \leq -1 \end{cases}$$

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

$$y = \sqrt{8 - |x-2|} \geq 0 \rightarrow 8 - |x-2| \geq 0 \rightarrow |x-2| \leq 8 \rightarrow -8 \leq x-2 \leq 8$$

$$\begin{cases} -4 \leq -x \leq 4 \\ -4 \leq x \leq 4 \end{cases}$$

$$D_f = [-4, 4]$$

$$y = \sqrt{1-x|x|} > 0 \rightarrow 1-x|x| > 0 \xrightarrow{|x|=x} 1-x^2 > 0 \rightarrow x^2 < 1 \rightarrow -1 < x < 1$$

$$\xrightarrow{|x|=-x} 1+x^2 > 0 \rightarrow x^2 > -1$$

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

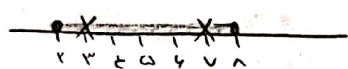
$$y = \frac{1}{\sqrt{x-|x-\alpha|-1}}$$

$$① x-|x-\alpha| > 0 \rightarrow |x-\alpha| < x \rightarrow -x \leq x-\alpha \leq x \rightarrow \boxed{-x \leq x \leq \alpha}$$

$$② \sqrt{x-|x-\alpha|} - 1 \neq 0 \rightarrow \sqrt{x-|x-\alpha|} \neq 1 \rightarrow x-|x-\alpha| \neq 1$$

$$\hookrightarrow |x-\alpha| \neq x-1 \rightarrow x-\alpha \neq x-1 \rightarrow \boxed{x \neq \alpha}$$

$$\hookrightarrow \alpha-x \neq 1 \rightarrow \boxed{x \neq \alpha-1}$$



$$\rightarrow D_f = [1, \alpha] - \{\alpha-1, \alpha\}$$

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

$$y = \frac{\sin^2 x - 1}{\cos x} \rightarrow \cos x \neq 0$$

$$\cos x \neq k\pi + \frac{\pi}{2}$$

$$D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}\}$$

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

$$\begin{cases} \cos x \neq k\pi + \frac{\pi}{2} \\ \cos x \neq k\pi - \frac{\pi}{2} \end{cases} \quad D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{2}\}$$

$$y = \frac{x+\epsilon}{|x+1|-|x+\epsilon|} \rightarrow |x+1|-|x+\epsilon| \neq 0 \rightarrow |x+1| \neq |x+\epsilon|$$

$$(x+1)^2 \neq (x+\epsilon)^2$$

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

$$((x+1)-(x+\epsilon))((x+1)+(x+\epsilon)) \neq 0$$

$$(x-\epsilon)(2x+1+\epsilon) \neq 0 \quad D_f = \mathbb{R} - \left\{-\frac{\epsilon}{2}, \frac{\epsilon}{2}\right\}$$

$$y = \sqrt{|x+1|-|x+\epsilon|} > 0$$

$$|x+1| > |x+\epsilon|$$

$$(x+1)^2 > (x+\epsilon)^2$$

$$(x+1)^2 - (x+\epsilon)^2 > 0$$

$$((x+1)-(x+\epsilon))((x+1)+(x+\epsilon)) > 0$$

$$(x-\epsilon)(2x+1+\epsilon) > 0$$

$$x < \epsilon$$

$$\hookrightarrow -\frac{\epsilon}{2}$$

$$\frac{-\frac{\epsilon}{2}}{2} < x < \frac{\epsilon}{2}$$

$$D_f = (-\infty, -\frac{\epsilon}{2}] \cup [\frac{\epsilon}{2}, +\infty)$$

$$f(x) = \int \log \log \log (x-1)$$

$$\frac{1}{x} \rightarrow \text{بين صغيرا اسد} \rightarrow 0 < \log_{\omega} (x-1) \leq 0$$

$$0 < \log_{\omega} (x-1)$$

$$(x-1) > 1$$

$$\textcircled{1} \quad x > 1$$

$$\log_{\omega} (x-1) \leq 1$$

$$x-1 \leq \omega$$

$$\textcircled{2} \quad x \leq \omega$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow 1 < x \leq \omega$$

$$D_f = (1, \omega]$$

$$\text{الف) } y = \log(x \cos x + 1) \rightarrow x \cos x + 1 > 0 \rightarrow \cos x > -\frac{1}{x} \quad \text{لو}$$

$$D_f = \mathbb{R} - \left[x_k \pi + \frac{x \pi}{x}, x_k \pi + \frac{x \pi}{x} \right]$$

$$\text{ب) } y = \int \log \frac{x-1}{x+1} \rightarrow \textcircled{1} \frac{x-1}{x+1} > 0 \rightarrow \frac{-1}{+} = - \rightarrow (-\infty, -1) \cup (1, +\infty)$$

$$\textcircled{2} \log \frac{x-1}{x+1} > 0 \rightarrow \frac{x-1}{x+1} > 1 \rightarrow \frac{x-1}{x+1} - 1 > 0 \rightarrow \frac{x-1-x-1}{x+1} > 0$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow D_f = (-\infty, -1)$$

$$(-\infty, -1) < \frac{-1}{+} = - < \frac{-x}{x+1} > 0$$