

$$f(x) = \sqrt{(a-2)x^2 + ax + b} \quad D_f = [2, +\infty)$$

حالت اول $a-2 \neq 0$

$$\begin{cases} (x-2)^2 \longrightarrow D = \mathbb{R} \\ -(x-2)^2 \longrightarrow D = \{2\} \end{cases} \quad X$$

حالت دوم $a-2 = 0 \rightarrow a=2 \rightarrow f(x) = \sqrt{2x+b} \xrightarrow{\text{if } x=2} \boxed{b=-4}$

$$f(x) = \sqrt{x^2 + 2x + 2 - m^2} \quad D_f = \mathbb{R}$$

$$x^2 + 2x + 2 - m^2 \geq 0 \rightarrow \underbrace{(x+1)^2 + 1 - m^2}_{\text{همواره نامنفی}} \geq 0 \xrightarrow{\text{if } x=-1} 1 - m^2 \geq 0 \rightarrow \boxed{-1 \leq m \leq 1}$$

$m_{\min} = -1$
 $m_{\max} = 1$

$\boxed{1 - (-1) = 2}$ اختلاف بین

$$f(x) = \frac{\sqrt{\varepsilon - x^2}}{[x] + [-x] + 1}$$

$$\begin{cases} \varepsilon - x^2 \geq 0 \rightarrow -\sqrt{\varepsilon} \leq x \leq \sqrt{\varepsilon} \\ [x] + [-x] + 1 \neq 0 \xrightarrow{\text{if}} \begin{cases} x \in \mathbb{Z} & [x] + [-x] = 0 \checkmark \Rightarrow x \in \mathbb{Z} \\ x \notin \mathbb{Z} & [x] + [-x] = -1 \times \end{cases} \end{cases}$$

$$\rightarrow D_f = \{-\sqrt{\varepsilon}, -1, 0, 1, \sqrt{\varepsilon}\} \Rightarrow \boxed{\text{مجموعه خالی}}$$

الف) $y = \sqrt{x^3 + 3x^2}$

$$x^3 + 3x^2 \geq 0 \xrightarrow{\text{همواره نامنفی}} x^2(x+3) \geq 0 \rightarrow x+3 \geq 0 \rightarrow x \geq -3$$

$$\rightarrow D_f = [-3, +\infty)$$

ب) $y = \sqrt{\frac{(x^2-1)(x^2-3x^2)}{x^2-1}}$

$$\frac{-1}{+} \frac{+1}{-} \frac{+1}{-} \frac{+1}{+} \rightarrow D_f = (-\infty, -1] \cup [3, +\infty)$$

الف) $y = \sqrt{|x-2|-3}$

$$|x-2|-3 \geq 0 \rightarrow |x-2| \geq 3 \begin{cases} x-2 \geq 3 \rightarrow x \geq 5 \\ x-2 \leq -3 \rightarrow x \leq -1 \end{cases}$$

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

ب) $y = \sqrt{\varepsilon - |2-x|}$

$$\varepsilon - |2-x| \geq 0 \rightarrow |2-x| \leq \varepsilon \rightarrow -\varepsilon \leq 2-x \leq \varepsilon \rightarrow -2 \leq x \leq 4$$

$$\rightarrow D_f = [-2, 4]$$

$$y = \sqrt{1-x|x|} \quad 1-x|x| \geq 0 \rightarrow x|x| \leq 1 \xrightarrow{\text{if}} \begin{cases} x \geq 0 \rightarrow x \leq 1 \\ x \leq 0 \rightarrow -x \leq 1 \end{cases}$$

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

$$y = \frac{1}{\sqrt{3-|x-5|-1}} \quad \begin{cases} 3-|x-5| \geq 0 \rightarrow |x-5| \leq 3 \rightarrow 2 \leq x \leq 8 \\ \sqrt{3-|x-5|} \neq 1 \xrightarrow{\text{if}} 3-|x-5| \neq 1 \rightarrow |x-5| \neq 2 \end{cases} \begin{cases} x \neq 7 \\ x \neq 3 \end{cases}$$

$$\rightarrow D_f = [2, 3) \cup (3, 7) \cup (7, 8]$$

$$\text{الف) } y = \frac{\sin^2 x - 1}{\cos x} \quad \cos x \neq 0 \quad \bigoplus \rightarrow D_f = \mathbb{R} - \left\{k\pi + \frac{\pi}{2}\right\}$$

$$\text{ب) } y = \frac{\cos x}{2\cos x - 1} \quad 2\cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{2} \quad \bigoplus \rightarrow D_f = \mathbb{R} - \left\{2k\pi \pm \frac{\pi}{3}\right\}$$

$$\text{الف) } y = \frac{x+3}{|2x+1| - |x+3|} \quad |2x+1| - |x+3| \neq 0 \rightarrow |2x+1| \neq |x+3|$$

$$\begin{cases} 2x+1 \neq x+3 \rightarrow x \neq 2 \\ 2x+1 \neq -(x+3) \rightarrow x \neq -\frac{4}{3} \end{cases}$$

$$\rightarrow D_f = \mathbb{R} - \left\{-\frac{4}{3}, 2\right\}$$

$$\text{ب) } y = \sqrt{|2x+1| - |x+3|} \quad |2x+1| - |x+3| \geq 0 \xrightarrow{\text{if}} (2x+1)^2 - (x+3)^2 \geq 0$$

$$\rightarrow ((2x+1) - (x+3))((2x+1) + (x+3)) \geq 0$$

$$\rightarrow (x-2)(3x+4) \geq 0 \rightarrow x \leq -\frac{4}{3}, x \geq 2$$

$$\rightarrow D_f = (-\infty, -\frac{4}{3}] \cup [2, +\infty)$$

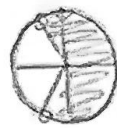
$$f(x) = \sqrt{\log_{\frac{1}{2}} \log_{\frac{1}{2}}^{(x-1)}}$$

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

$$\rightarrow D_f = (1, 3]$$

الف) $y = \log(r \cos x + 1)$

$$r \cos x + 1 > 0 \rightarrow \cos x > -\frac{1}{r}$$



$$\rightarrow D_f = \left(2k\pi - \frac{\pi}{r}, 2k\pi + \frac{\pi}{r} \right)$$

ب) $y = \sqrt{\log \frac{x-1}{x+1}}$

$$\left\{ \begin{array}{l} \log \frac{x-1}{x+1} \geq 0 \xrightarrow{\text{if}} \begin{cases} x > 0 & x-1 \geq 1 \rightarrow x \geq 2 \quad / \\ -1 < x < 0 & x-1 \leq -1 \rightarrow x \leq -2 \quad \times \end{cases} \\ \frac{x-1}{x+1} > 0 \quad \frac{-1}{+} \frac{+}{-} \frac{+}{-} \frac{+}{+} \end{array} \right.$$

$$\rightarrow D_f = [2, +\infty)$$