

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

حالت اول: $a-x \neq 0 \rightarrow \begin{cases} (x-x)^2 \rightarrow D = \mathbb{R} \\ -(x-x)^2 \rightarrow D = \{x\} \end{cases} \quad X$

حالت دوم: $a-x = 0 \rightarrow a=x \rightarrow f(x) = \sqrt{2x+b} \xrightarrow{\text{if } x=x} \boxed{b=-9}$

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

$x^2 + 2x + 2 - m^2 \geq 0 \rightarrow (x+1)^2 + 1 - m^2 \geq 0$
 if $x=-1$ $1 - m^2 \geq 0 \rightarrow -1 \leq m \leq 1$
 $m_{\min} = -1$ $m_{\max} = 1$
 اختلاف بین $1 - (-1) = 2$

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

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

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

الف) $y = \sqrt{2x^3 + 3x^2}$

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

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

ب) $y = \sqrt{\frac{(x^2-1)(x^2-3x)}{x^2-1}}$
 $n^2 - m^2 = (n-m)(n+m) = 0$
 $n^2 - 3n = n(n-3) = 0$
 $n=0$ $n=3$
 $D_f = (-\infty, -1] \cup [3, +\infty) \cup \{0\}$

الف) $y = \sqrt{|x-2|-3}$

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

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

ب) $y = \sqrt{\varepsilon - |x-2|}$

$\varepsilon - |x-2| \geq 0 \rightarrow |x-2| \leq \varepsilon \rightarrow -\varepsilon \leq x-2 \leq \varepsilon \rightarrow 2-\varepsilon \leq x \leq 2+\varepsilon$
 $\rightarrow D_f = [2-\varepsilon, 2+\varepsilon]$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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الف) $y = \log(r \cos x + 1)$

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



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

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$y = \sqrt{\log \frac{x-1}{x+1}}$

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

$\frac{x-1}{x+1} \geq 1 \rightarrow x-1 \geq x+1 \rightarrow -2 \geq 2 \rightarrow x \leq -1$

$\frac{x-1}{x+1} \geq 1 \rightarrow x \leq -1$

if $\log \frac{x-1}{x+1} \geq 0 \rightarrow \begin{cases} x > 0 & x-1 \geq 1 \rightarrow x \geq 2 \checkmark \\ -1 < x < 0 & x-1 \leq 1 \rightarrow x \leq 2 \times \end{cases}$

$x \geq 2$

$\rightarrow D_f = [2, +\infty)$
 $D_f = (-\infty, -1]$

$$4- \text{ب}) \frac{(x^2-1)(x^2-x^2)}{(x^2-1)} \geq 0 \rightarrow \frac{(n-1)(n+1)(n^2)(n-1)}{(n-1)(n^2+n+1)} \geq 0$$

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

$\begin{array}{ccccccc} & -1 & & 0 & & 3 & \\ & | & & | & & | & \\ + & 0 & - & 0 & - & 0 & + \end{array}$

$$10- \text{ب}) \frac{n-1}{n+1} > 0 \rightarrow \boxed{n > 1 \text{ و } n < -1}$$

$$\log_{10} \frac{n+1}{n-1} \geq 0 \rightarrow \frac{n-1}{n+1} \geq 1 \rightarrow \frac{n-1}{n+1} - 1 \geq 0 \rightarrow \frac{n-1-n-1}{n+1} \geq 0 \rightarrow \frac{-2}{n+1} \geq 0$$

$$n+1 < 0 \rightarrow \boxed{n < -1} \rightarrow Df = (-\infty, -1)$$