

$$f(x) = \sqrt{(a-x)x^2 + ax + b} \quad D_f = [r, +\infty) \quad \left\{ \begin{array}{l} \text{در } x \\ \text{یابوده} \end{array} \right. \Rightarrow a-x=0 \Rightarrow a=x \Rightarrow \sqrt{ax+b} \Rightarrow \sqrt{x^2+b} \Rightarrow x \geq -\frac{b}{x} \Rightarrow -\frac{b}{x} \Rightarrow \boxed{b=-6}$$

$$f(x) = \sqrt{x^2 + 2x + 1 - m^2} \quad D_f = \mathbb{R} \quad \left\{ \begin{array}{l} \text{همواره} \\ \Delta \geq 0 \end{array} \right. \Rightarrow 1 - 1 + 4m^2 \geq 0 \Rightarrow 1 - 1 + m^2 \geq 0 \Rightarrow 1 \leq m \leq 1 \Rightarrow \boxed{m \text{ هر عدد صحیح } \omega}$$

$$f(x) = \sqrt{1-x^2} \quad \left\{ \begin{array}{l} 1-x^2 \geq 0 \Rightarrow x^2 \leq 1 \Rightarrow -1 \leq x \leq 1 \\ [x] + [-x] + 1 \neq 0 \Rightarrow [x] + [-x] \neq -1 \Rightarrow x \in \mathbb{Z} \end{array} \right. \Rightarrow D_f = \{-1, -1, 0, 1, 1\} \Rightarrow \boxed{\text{اعداد صحیح } \omega}$$

است. ۱- حاصل $\mathbb{R} - \mathbb{Z}$ و ۲- حاصل $\mathbb{Z}$ و ۳- حاصل $\mathbb{Z}$

$$\begin{aligned} \text{الف)} \quad y &= \sqrt{x^3 + 3x^2} \Rightarrow x^3 + 3x^2 \geq 0 \Rightarrow x^2(x+3) \geq 0 \Rightarrow \begin{array}{l} x^2 \geq 0 \\ x+3 \geq 0 \end{array} \Rightarrow \boxed{D_f = [-3, +\infty)} \\ \text{ب)} \quad y &= \sqrt{\frac{(x^2-1)(x^3-3x^2)}{x^3-1}} \Rightarrow \frac{(x-1)(x+1)(x^2)(x-3)}{(x-1)(x^2+x+1)} \geq 0 \Rightarrow \begin{array}{l} x-1 \geq 0 \\ x+1 \geq 0 \\ x^2 \geq 0 \\ x-3 \geq 0 \end{array} \Rightarrow \boxed{D_f = (-\infty, -1] \cup [3, +\infty) \cup \{0\}} \end{aligned}$$

۱- همواره ۲- و ۳- در اعداد حقیقی ندارد

$$\begin{aligned} \text{الف)} \quad y &= \sqrt{|x-2|-3} \Rightarrow |x-2|-3 \geq 0 \Rightarrow |x-2| \geq 3 \Rightarrow \begin{array}{l} x-2 \geq 3 \Rightarrow x \geq 5 \\ x-2 \leq -3 \Rightarrow x \leq -1 \end{array} \Rightarrow \boxed{D_f = (-\infty, -1] \cup [5, +\infty)} \\ \text{ب)} \quad y &= \sqrt{1-|x-2|} \Rightarrow 1-|x-2| \geq 0 \Rightarrow |x-2| \leq 1 \Rightarrow \begin{array}{l} x-2 \leq 1 \Rightarrow x \leq 3 \\ x-2 \geq -1 \Rightarrow x \geq 1 \end{array} \Rightarrow \boxed{D_f = [1, 3]} \end{aligned}$$

$$\text{الف)} \quad y = \sqrt{1-x|x|} \Rightarrow 1-x|x| \geq 0 \Rightarrow \begin{array}{l} 1-x|x| \geq 0 \Rightarrow x^2 \leq 1 \Rightarrow -1 \leq x \leq 1 \\ 1-x|x| \geq 0 \Rightarrow x^2 \leq 1 \end{array} \Rightarrow \boxed{D_f = (-\infty, 1]} \quad \text{همواره به قدر است}$$

$$\begin{aligned} \text{ب)} \quad y &= \frac{1}{\sqrt{1-x-\omega}-1} \Rightarrow \begin{array}{l} 1-x-\omega \geq 0 \Rightarrow |x-\omega| \leq 1 \Rightarrow -1 \leq x-\omega \leq 1 \\ \sqrt{1-x-\omega}-1 \neq 0 \Rightarrow \sqrt{1-x-\omega} \neq 1 \Rightarrow 1-x-\omega \neq 1 \Rightarrow |x-\omega| \neq 2 \Rightarrow x \neq \omega+2 \end{array} \Rightarrow \boxed{D_f = [\omega, 1] - \{\omega+2\}} \end{aligned}$$

$$\begin{aligned} \text{الف)} \quad y &= \frac{\sin^2 x - 1}{\cos x} \Rightarrow \cos x \neq 0 \Rightarrow \boxed{D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}\}} \\ \text{ب)} \quad y &= \frac{\cos x}{1-\cos x} \Rightarrow 1-\cos x \neq 0 \Rightarrow \cos x \neq 1 \Rightarrow \boxed{D_f = \mathbb{R} - \{2k\pi + \frac{2\pi}{3}, 2k\pi - \frac{2\pi}{3}\}} \end{aligned}$$

الف) $y = \frac{x-3}{|2x+1| - |x+3|} \Rightarrow |2x+1| - |x+3| \neq 0 \Rightarrow |2x+1| \neq |x+3|$ هر دو طرف نامتقارن است پس به توان ۲ می رسانیم

$$(2x+1)^2 \neq (x+3)^2 \Rightarrow 4x^2 + 4x + 1 \neq x^2 + 6x + 9 \Rightarrow 3x^2 - 2x - 8 \neq 0 \Rightarrow (x-4)(x+\frac{2}{3}) \neq 0$$

$$\Rightarrow \left. \begin{array}{l} ① \frac{x}{3} = 2 \\ ② \frac{x}{3} = -\frac{2}{3} \end{array} \right\} \Rightarrow D_f = \mathbb{R} - \left\{ \frac{-2}{3}, 2 \right\}$$

ب) $y = \sqrt{|2x+1| - |x+3|} \Rightarrow |2x+1| - |x+3| \geq 0 \Rightarrow |2x+1| \geq |x+3|$ هر دو طرف نامتقارن است پس به توان ۲ می رسانیم

$$(2x+1)^2 \geq (x+3)^2 \Rightarrow 4x^2 + 4x + 1 \geq x^2 + 6x + 9 \Rightarrow 3x^2 - 2x - 8 \geq 0 \Rightarrow (x-4)(x+\frac{2}{3}) \geq 0$$

$$\Rightarrow \left. \begin{array}{l} ① \frac{x}{3} = 2 \\ ② \frac{x}{3} = -\frac{2}{3} \end{array} \right\} \Rightarrow \frac{-\frac{2}{3}}{+} \quad \frac{2}{-} \quad \frac{+}{+} \Rightarrow D_f = (-\infty, -\frac{2}{3}] \cup [2, +\infty)$$

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

$$\left. \begin{array}{l} ① 2x-1 \geq 0 \Rightarrow x \geq \frac{1}{2} \\ ② \log_{\log_{\omega} \omega}^{(2x-1)} \geq 0 \Rightarrow 2x-1 \geq 1 \Rightarrow x \geq 1 \\ ③ \log_{\frac{1}{\omega}} \log_{\omega}^{(2x-1)} \geq 0 \Rightarrow \log_{\omega}^{(2x-1)} \leq 1 \Rightarrow \omega \geq 2x-1 \Rightarrow x \leq \frac{\omega+1}{2} \end{array} \right\} \Rightarrow D_f = [1, \frac{\omega+1}{2}]$$

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

ب) $y = \sqrt{\log \frac{x-1}{x+1}}$

$$\left. \begin{array}{l} ① \frac{x-1}{x+1} \geq 0 \Rightarrow \frac{-1}{+} \quad \frac{+}{-} \quad \frac{+}{+} \Rightarrow (-\infty, -1) \cup (1, +\infty) \\ ② \log \frac{x-1}{x+1} \geq 0 \Rightarrow \frac{x-1}{x+1} \geq 1 \Rightarrow \frac{x-1}{x+1} - 1 \geq 0 \Rightarrow \frac{x-1 - (x+1)}{x+1} \geq 0 \Rightarrow \frac{-2}{x+1} \geq 0 \Rightarrow \frac{-1}{+} \quad \frac{+}{-} \quad \frac{+}{+} \Rightarrow (-\infty, -1) \end{array} \right\} \Rightarrow D_f = (-\infty, -1)$$