

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

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

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

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

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

$$\Rightarrow \left. \begin{array}{l} ① \frac{x}{3} = 2 \\ ② \frac{-x}{3} \end{array} \right\} \Rightarrow \frac{-\frac{2}{3}}{+} \quad \frac{2}{-} \quad \frac{4}{+} \Rightarrow D_f = (-\infty, -\frac{2}{3}] \cup [2, +\infty)$$

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

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