

$$a) y = \sqrt{1-x^2} \Rightarrow |x| \leq 1 \Rightarrow \begin{cases} 1-x^2 & x \geq 0 \\ 1+x^2 & x < 0 \end{cases}$$

$$\Rightarrow 1-x^2 \geq 0 \Rightarrow x^2 \leq 1 \Rightarrow -1 \leq x \leq 1$$

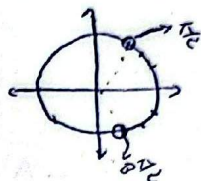
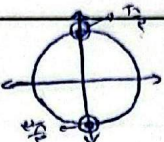
$$\Rightarrow D_f = (-\infty, 0) \cup [-1, 1] = (-\infty, 1]$$

$$b) y = \frac{1}{\sqrt{x-1} - 1} \quad \textcircled{1} \quad \sqrt{x-1} \neq 1 \Rightarrow x-1 \neq 1 \Rightarrow x \neq 2 \Rightarrow \begin{cases} x-1 \neq 1 \Rightarrow x \neq 2 \\ x-1 \neq -1 \Rightarrow x \neq 0 \end{cases}$$

$$\textcircled{2} \quad x-1 \geq 0 \Rightarrow |x-1| \leq \sqrt{x-1} \Rightarrow -\sqrt{x-1} \leq x-1 \leq \sqrt{x-1} \Rightarrow x \leq 1$$

$$\Rightarrow D_f = [1, 1] - \{2, 0\}$$

$$a) y = \frac{\sin^2 x - 1}{\cos x} \Rightarrow \cos x \neq 0 \Rightarrow x \neq \frac{\pi}{2}, \frac{3\pi}{2} \Rightarrow D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}\}$$



$$b) y = \frac{\cos x}{1 + \cos x} \Rightarrow 1 + \cos x \neq 0 \Rightarrow \cos x \neq -1 \Rightarrow x \neq \pi$$

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

$$a) y = \frac{x^2}{|x+1| - |x+3|} \Rightarrow |x+1| - |x+3| \neq 0 \Rightarrow |x+1| \neq |x+3|$$

$$\Rightarrow \begin{cases} x+1 \neq x+3 \Rightarrow x \neq 1 \\ x+1 \neq -(x+3) \Rightarrow x \neq -2 \end{cases} \Rightarrow D_f = \mathbb{R} - \{1, -2\}$$

$$b) y = \sqrt{|x+1| - |x+3|} \Rightarrow |x+1| - |x+3| \geq 0 \Rightarrow |x+1| \geq |x+3|$$

$$(x+1)^2 \geq (x+3)^2 \Rightarrow (x+1-x-3)(x+1+x+3) \geq 0 \Rightarrow (-2)(2x+4) \geq 0 \Rightarrow x \leq -1 \Rightarrow D_f = (-\infty, -1] \cup [1, +\infty)$$

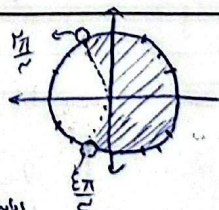
$$f(x) = \sqrt{\log_{\frac{1}{e}} \log_{\frac{1}{e}} (x-1)} \quad \textcircled{1} \quad x-1 > 0 \Rightarrow x > 1$$

$$\Rightarrow x-1 \leq e \Rightarrow x \leq e+1 \Rightarrow x \leq 4$$

$$\Rightarrow x-1 > 1 \Rightarrow x > 2 \Rightarrow x > 1 \Rightarrow D_f = (1, 4]$$

$$a) y = \lg(\cos x + 1) \Rightarrow \cos x + 1 > 0 \Rightarrow \cos x > -1 \Rightarrow x \neq \pi$$

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



$$b) y = \sqrt{\log \frac{x-1}{x+1}} \quad \textcircled{1} \quad \lg \frac{x-1}{x+1} \geq 0$$

$$\textcircled{2} \quad \frac{x-1}{x+1} > 0 \Rightarrow x > 1$$

$$\frac{x-1}{x+1} \geq 1 \Rightarrow x-1 \geq x+1 \Rightarrow -2 \geq 0 \Rightarrow \text{no solution}$$

$$\frac{x-1}{x+1} \leq 0 \Rightarrow x-1 \leq 0 \Rightarrow x \leq 1$$

$$\Rightarrow D_f = (-\infty, -1) \cup (1, +\infty)$$

$$\Rightarrow D_f = (-\infty, -1)$$