

$P(x) = \sqrt{(a-x)x^2 + ax + b}$ $\rightarrow D_P = [x, +\infty)$ $\rightarrow (a-x)x^2 + ax + b \geq 0$ $\rightarrow a-x=0$
 $a=x$
 $\Rightarrow x^2 + b \geq 0$ $\Rightarrow x \geq -\frac{b}{x}$ $\Rightarrow -\frac{b}{x} = x \Rightarrow \boxed{b = -4}$

$f(m) = \sqrt{m^2 + 2m + 2 - m^2}$ $\rightarrow D_f = \mathbb{R}$ $\Rightarrow$ $\Delta = 0$ $\Rightarrow$ $m^2 + 2m + 2 - m^2 = 0$ $\Rightarrow m^2 + 2m + 2 = 0$ $\Rightarrow m = -1 \pm i$
 $\Delta < 0$ $\Rightarrow$ $m^2 + 2m + 2 > 0$ $\Rightarrow m^2 + 2m + 1 > -1$ $\Rightarrow (m+1)^2 > -1$ $\Rightarrow m \in \mathbb{R}$
 $\Delta < 0$ $\Rightarrow$ $m^2 + 2m + 2 > 0$ $\Rightarrow m^2 + 2m + 1 > -1$ $\Rightarrow (m+1)^2 > -1$ $\Rightarrow m \in \mathbb{R}$
 $\Rightarrow -1 \leq m \leq 1$ $\Rightarrow$ $m = 1 - (-1) = 2$

$P(x) = \frac{\sqrt{\varepsilon - x^2}}{[x] + [x] + 1}$ $\Rightarrow$ $[x] + [-x] + 1 \neq 0$ $\Rightarrow [x] + [-x] + 1 \neq 0$ $\Rightarrow [x] + [-x] \neq -1$
 $\Rightarrow x \notin \mathbb{R} - \mathbb{Z} \Rightarrow x \in \mathbb{Z}$ $\Rightarrow D_P = \{-2, -1, 0, 1, 2\}$
 $\varepsilon - x^2 \geq 0 \Rightarrow x^2 \leq \varepsilon \Rightarrow -\sqrt{\varepsilon} \leq x \leq \sqrt{\varepsilon}$

$y = \sqrt{x^2 + 3x^2} = P(x) \rightarrow x^2 + 3x^2 \geq 0 \Rightarrow x^2(1+3) \geq 0 \Rightarrow x^2 \geq 0$
 $\Rightarrow D_P = [-2, +\infty)$
 $y = \sqrt{\frac{(x^2-1)(x^2-3x^2)}{x^2-1}} = g(x) \Rightarrow \frac{(x^2-1)(x^2-3x^2)}{x^2-1} \geq \frac{(x-1)(x+1)(x^2)(x-3)}{(x-1)(x^2+x+1)} \geq 0$
 $\Rightarrow D_g = (-\infty, -1] \cup [3, +\infty) \cup \{0\}$

$y = \sqrt{|x-2| - x} \Rightarrow |x-2| - x \geq 0 \Rightarrow |x-2| \geq x$
 $\Rightarrow D_P = (-\infty, -1] \cup [5, +\infty)$
 $y = \sqrt{\varepsilon - |x-2|} \Rightarrow \varepsilon - |x-2| \geq 0 \Rightarrow |x-2| \leq \varepsilon \Rightarrow -\varepsilon \leq x-2 \leq \varepsilon$
 $\Rightarrow -4 \leq -x \leq 4 \Rightarrow -2 \leq x \leq 2 \Rightarrow D_P = [-2, 2]$

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

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

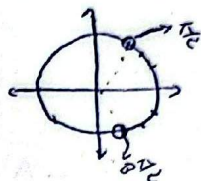
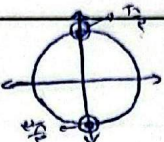
$$\Rightarrow D_f = (-\infty, 0) \cup [-1, 1] = (-\infty, 1]$$

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

$$\textcircled{2} \quad 1-x^2 \geq 0 \Rightarrow |x| \leq 1 \Rightarrow -1 \leq x \leq 1 \Rightarrow D_f = [-1, 1] - \{0\}$$

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

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



$$b) y = \frac{\cos x}{1 + \cos x} \Rightarrow 1 + \cos x \neq 0 \Rightarrow \cos x \neq -1 \Rightarrow x \neq \pi + 2k\pi$$

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

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

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

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

$$(x+1)^2 \geq (x+3)^2 \Rightarrow (x+1-x-3)(x+1+x+3) \geq 0 \Rightarrow (-2)(2x+4) \geq 0 \Rightarrow -2(2x+4) \geq 0 \Rightarrow -4x-8 \geq 0 \Rightarrow -4x \geq 8 \Rightarrow x \leq -2$$

$$\Rightarrow D_f = (-\infty, -2] \cup [2, +\infty)$$

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

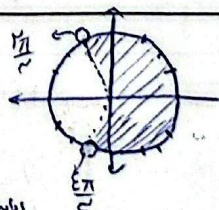
$$\Rightarrow x-1 \leq 0 \Rightarrow x \leq 1 \Rightarrow x \leq 1$$

$$\Rightarrow x-1 > 1 \Rightarrow x > 2 \Rightarrow x > 1$$

$$\Rightarrow D_f = (1, 2]$$

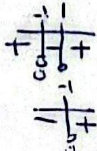
$$a) y = \log(\cos x + 1) \Rightarrow \cos x + 1 > 0 \Rightarrow \cos x > -1 \Rightarrow x \neq \pi + 2k\pi$$

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



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

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



$$\Rightarrow \begin{cases} (-\infty, -1) \cup (1, +\infty) \\ (-\infty, -1) \end{cases} \Rightarrow D_f = (-\infty, -1)$$