

۱) $f(x) = \sqrt{(a-2)x^2 + ax + b} \rightarrow a=2 \rightarrow f(x) = \sqrt{2x+b}$
 $x=3 \rightarrow \sqrt{4+b} = 0 \rightarrow b = -4$

۲) $f(x) = \sqrt{x^2 + 2x + 2 - m^2} \rightarrow x^2 + 2x + 2 - m^2 \geq 0$
 $\Delta \leq 0 \rightarrow 4 - 4(2 - m^2) \leq 0 \rightarrow m^2 - 1 \leq 0 \rightarrow m \geq -1$
 $m \leq 1$
 $-1 \leq m \leq 1$
 $1 - (-1) = (2)$

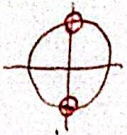
۳) $4 - x^2 \geq 0 \rightarrow -2 \leq x \leq 2$
 $[x] + [-x] \neq -1 \rightarrow x \in \mathbb{Z} \rightarrow x = \{-2, -1, 0, 1, 2\} \rightarrow$
 $g(x) = [x] + [-x] + 1$
 if $x \in \mathbb{Z} \rightarrow g(x) = 0 + 1 = 1$
 if $x \in \mathbb{Z}' \rightarrow g(x) = -1 + 1 = 0$

۴) الف) $\sqrt{x^3 + 3x^2} \rightarrow x^3 + 3x^2 \geq 0 \rightarrow x^2(x+3) \geq 0$
 $D_f = [-3, +\infty)$
 ب) $\sqrt{\frac{(x^2-1)(x^3-3x^2)}{x^3-1}} \rightarrow \sqrt{\frac{(x+1)(x-1)(x^2)(x-3)}{x^2(x-1)}}$
 $D_f = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$

الف) $y = \sqrt{|x-2| - 3} \rightarrow |x-2| - 3 \geq 0 \rightarrow |x-2| \geq 3$
 $x-2 \geq 3 \rightarrow x \geq 5$
 $x-2 \leq -3 \rightarrow x \leq -1$
 $D_f = (-\infty, -1] \cup [5, +\infty)$
 ب) $y = \sqrt{4 - |2-x|} \rightarrow 4 - |2-x| \geq 0 \rightarrow 4 \geq |2-x|$
 $-4 \leq x-2 \leq 4 \rightarrow -2 \leq x \leq 6$
 $D_f = [-2, 6]$

الف) $y = \sqrt{1 - x|x|} \rightarrow 1 - x|x| \geq 0 \rightarrow x|x| \leq 1 \rightarrow x \oplus = x^2$
 $\rightarrow x \ominus = -x^2$
 $x^2 \leq 1 \rightarrow 0 \leq x \leq 1$
 $D_f = (-\infty, 1]$

ب) $y = \frac{1}{\sqrt{3 - |x-1|} - 1} \rightarrow \sqrt{3 - |x-1|} \neq 1 \rightarrow 3 - |x-1| \neq 1 \rightarrow |x-1| \neq 2$
 $\rightarrow 3 - |x-1| \geq 0 \rightarrow |x-1| \leq 3 \rightarrow -2 \leq x \leq 4$
 $x \neq -1, 3$

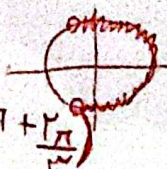
الف) $y = \frac{\sin^2 x - 1}{\cos x} \rightarrow \cos x \neq 0$

 $D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}\}$

ب) $y = \frac{\cos x}{2\cos x - 1} \rightarrow 2\cos x - 1 \neq 0 \rightarrow 2\cos x \neq 1 \rightarrow \cos x \neq \frac{1}{2}$

 $D_f = \mathbb{R} - \{2k\pi \pm \frac{\pi}{3}\}$

الف) $y = \frac{x+3}{|2x+1| - |x+3|} \rightarrow |2x+1| \neq |x+3|$
 $\rightarrow 2x+1 \neq x+3 \rightarrow x \neq 2$
 $\rightarrow 2x+1 = -(x+3) \rightarrow 3x = -4 \rightarrow x \neq -\frac{4}{3}$
 $D_f = \mathbb{R} - \{-\frac{4}{3}, 2\}$
 ب) $y = \sqrt{|2x+1| - |x+3|} \rightarrow |2x+1| - |x+3| \geq 0 \rightarrow |2x+1| \geq |x+3|$
 $\rightarrow 2x+1 \geq x+3 \rightarrow x \geq 2$
 $\rightarrow 2x+1 \leq -(x+3) \rightarrow 3x \leq -4 \rightarrow x \leq -\frac{4}{3}$
 $D_f = (-\infty, -\frac{4}{3}] \cup [2, \infty)$

$f(x) = \sqrt{\log_{\log_{\Delta}^{(x-1)}} \log_{\Delta}^{(x-1)}}$
 $\log_{\Delta}^{(x-1)} > 0 \rightarrow \log_{\Delta}^{(x-1)} \leq 1 \rightarrow x-1 \leq \Delta \rightarrow x \leq \Delta+1$
 $\log_{\Delta}^{(x-1)} > 0 \rightarrow x-1 > 1 \rightarrow x > 2$
 $D_f = (2, \Delta+1]$

الف) $y = \log(2\cos x + 1) \rightarrow 2\cos x + 1 > 0 \rightarrow \cos x > -\frac{1}{2}$

 $D_f = (2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3})$

ب) $y = \sqrt{\log \frac{x-1}{x+1}} \rightarrow \frac{x-1}{x+1} > 0$
 $\log \frac{x-1}{x+1} \geq 0 \rightarrow \frac{x-1}{x+1} \geq 1 \rightarrow \frac{-2}{x+1} \geq 0$
 $D_f = (-\infty, -1)$