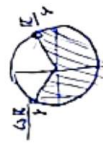
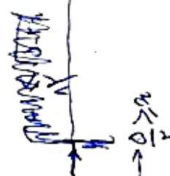


۱	الف) $D_f = \mathbb{R} - \{1, \frac{1}{2}, -\frac{1}{2}\}$ ب) $\Delta = 49 - 4(2)(3) = 1$ $\Delta = 1 - 4 < 0$ $D_f = \mathbb{R} - \{-\frac{1}{2}, -1, \frac{1}{2}\}$
۲	الف) $x^3 - 2x^2 + 3x - 1 \neq 0 \rightarrow (x-1)(x^2 - x + 3) = 0$ ب) $f(x) = \sqrt{\frac{x+3}{x^3 - 2x^2 + 3x - 1}}$ $\Delta = 1 - 4 < 0$ $D_f = \mathbb{R} - \{1\}$ $\Delta = 1 - 4 < 0$ $D_f = (1, +\infty)$
۳	الف) $x^3 - 2 x-1 - 2x + 2 > 0$ ب) $x^3 + 3x$ $\Delta = 9 - 4(1)(1) = 5$ $D_f = (-\infty, -\frac{1}{2}] \cup [\frac{1}{2}, +\infty)$ $D_f = \mathbb{R} - (-\frac{1}{2}, \frac{1}{2}) \cup (1, 2)$
۴	الف) $[-n] - 2 > 0 \rightarrow [-n] > 2$ ب) $y = \frac{\omega x^2 + 1}{[x]^2 - 1}$ $\Delta = 4 - 4(1)(1) = 0$ $D_f = (-\infty, -1] \cup [1, +\infty)$
۵	الف) $y = [n - \frac{1}{2}] + [n + \frac{1}{2}] \rightarrow [n - \frac{1}{2}] + [n + \frac{1}{2}] > 0$ ب) $[n - \frac{1}{2}] + [n + \frac{1}{2}]$ $\Delta = 4 - 4(1)(1) = 0$ $D_f = [1, +\infty)$

6	الف) $\tan x + 1 \neq 0 \rightarrow \cot x = -1 \rightarrow x = \frac{3\pi}{4}, \frac{5\pi}{4}$ $D_f = IR - \left\{ \frac{3\pi}{4}, \frac{5\pi}{4} \right\}$ ب) $\sqrt{1 - \sin x} \rightarrow 1 - \sin x \geq 0 \rightarrow \frac{1}{2} \geq \sin x \rightarrow \sin x \leq \frac{1}{2}$ $D_f = IR \setminus \left(\frac{\pi}{6}, \frac{5\pi}{6} \right) \cup \left(\frac{7\pi}{6}, \frac{11\pi}{6} \right)$  $D_f = IR - \left(\frac{\pi}{6}, \frac{5\pi}{6} \right) \cup \left(\frac{7\pi}{6}, \frac{11\pi}{6} \right)$
7	الف) $f(x) = \sqrt{1 - \sin x} \rightarrow \sin x \geq \frac{1}{2}$ $D_f = \left[\frac{\pi}{6}, \frac{5\pi}{6} \right] \cup \left[\frac{7\pi}{6}, \frac{11\pi}{6} \right]$  ب) $f(x) = \sqrt{1 - \cos x} \rightarrow \cos x \leq \frac{1}{2}$ $D_f = IR - \left(\frac{\pi}{3}, \frac{5\pi}{3} \right)$ 
8	الف) $y = \arcsin(x + x_n + 1) \rightarrow -1 \leq x + x_n + 1 \leq 1 \rightarrow -2 \leq x + x_n \leq 0 \rightarrow x \leq -x_n$ $D_f = [-x_n, 0]$ ب) $\cos x = \sqrt{\omega - x_n} \rightarrow \begin{cases} 0 \leq x_n \leq 1 \rightarrow \omega - x_n \leq 1 \rightarrow x \leq x_n \\ \omega - x_n \geq 0 \rightarrow \omega \geq x_n \end{cases}$ $D_f = (-\infty, x_n]$ 
9	الف) $f(x) = \log_r \left(\frac{1 - \log_r x}{x} \right) \rightarrow \begin{cases} x > 0 \\ 1 - \log_r x > 0 \rightarrow \log_r x < 1 \rightarrow x < r \end{cases}$ $D_f = (0, r)$ ب) $f(x) = \log_r \left(\frac{1 - \log_r x}{x} \right) \rightarrow \begin{cases} x > 0 \\ 1 - \log_r x > 0 \rightarrow \log_r x < 1 \rightarrow x > \frac{1}{r} \end{cases}$ $D_f = \left(\frac{1}{r}, +\infty \right)$
10	الف) $\sum_{k=1}^n r^k = r \rightarrow r(n - r^k) > r \rightarrow r(n - r^k) > r \rightarrow (n - r^k)(n - 1) < 0$ $D_f = IR \setminus D_g = [1, r]$ ب) $x = \frac{f_w - \omega}{-r_w + r} \rightarrow \begin{cases} r_w - r > 0 \rightarrow r_w > r \rightarrow x < \frac{f_w - \omega}{-r_w + r} \\ r_w - r < 0 \rightarrow r_w < r \rightarrow x > \frac{f_w - \omega}{-r_w + r} \end{cases}$ 