

1) $\sqrt{(a-1)x+ax+b} \rightarrow a \neq 1 \rightarrow \sqrt{rx+b} \rightarrow rx+b \geq 0$
 $\rightarrow \boxed{b \geq -a} \quad \text{نوع 1}$

2) $\sqrt{x^2+rx+r-m^2} \rightarrow \Delta \leq 0 \rightarrow x-x(r-m^2) \leq -x+rm^2 \leq 0$
 $\rightarrow m^2 \leq 1 \rightarrow -1 \leq m \leq 1 \rightarrow |1-(-1)|, \boxed{2} \quad \text{نوع 2}$

3) $f(x) = \frac{\sqrt{x-x^2}}{[x]+[-x]+1}$, $x \in \mathbb{Z} \rightarrow [x]+[-x]+1 = 1 \rightarrow \checkmark$
 $\rightarrow x-x^2 \geq 0 \rightarrow x \geq x^2 \rightarrow \boxed{-1 \leq x \leq 1} \quad \text{نوع 3}$

4) الف) $y = \sqrt{x^2+rx} = \sqrt{x(x+r)} \rightarrow x(x+c) \geq 0$
 $\rightarrow \frac{-c}{-1+1+1} \rightarrow \boxed{D_f = [-c, +\infty)} \quad \text{نوع 4}$

ب) $y = \sqrt{\frac{(x^2-1)(x^2-cx)}{x^2-1}} = \sqrt{\frac{(x-1)(x+1)(x-c)x}{(x-1)(x^2+1-x)}}$
 $\rightarrow \boxed{D_f = (-\infty, -1] \cup \{0\} \cup [c, +\infty)} \quad \text{نوع 5}$

5) الف) $y = \sqrt{|x-r|-c} \rightarrow |x-r|-c \geq 0 \rightarrow |x-r| \geq c$
 $\rightarrow \textcircled{1} x > r \rightarrow x-r \geq c \rightarrow x \geq r+c$
 $\rightarrow \textcircled{2} x < r \rightarrow r-x \geq c \rightarrow -1 \geq x$
 $\rightarrow \boxed{D_f = \mathbb{R} - (1, 2)} \quad \text{نوع 6}$

ب) $x-|r-m| \geq 0 \rightarrow x \geq |r-m|$
 $\rightarrow \boxed{D_f = [-2, 4]} \quad \text{نوع 7}$

$$6) \text{ الف) } 1 - n/n \geq 0 \rightarrow n > 0 \rightarrow 1 - n^r \geq 0 \rightarrow -1 \leq x \leq 1$$

$$\rightarrow n \leq 0 \rightarrow 1 + n^r \geq 0 \rightarrow \checkmark \rightarrow x \in (-\infty, 1]$$

$$\rightarrow \boxed{D_f: (-\infty, 1] \subset \mathbb{R}}$$

$$7) \frac{1}{\sqrt{c - |n - \delta|} - 1} = y \rightarrow \begin{cases} 0 < c - |n - \delta| \geq 0 \rightarrow c \geq |n - \delta| \\ \sqrt{c - |n - \delta|} \neq 1 \end{cases}$$

$$0 \rightarrow n \geq \delta \rightarrow c \geq n - \delta \rightarrow 1 \geq n / c \geq \delta \cdot n \rightarrow n \geq \tau$$

$$\rightarrow 2 \quad c - |n - \delta| \neq 1 \rightarrow |n - \delta| \neq \tau \rightarrow n \neq \{v, c\}$$

$$\boxed{D_f: [\tau, 1] - \{c, v\}}$$

$$7) \text{ الف) } y = \frac{\sin x - 1}{\cos x} \rightarrow \cos x \neq 0 \rightarrow \boxed{D_f: \mathbb{R} - \{k\pi + \frac{\pi}{2}\}} \subset \mathbb{R}$$

$$\rightarrow y = \frac{\cos x}{\sin x - 1} \rightarrow \sin x - 1 \neq 0 \rightarrow \sin x \neq \frac{1}{2} \rightarrow \boxed{D_f: \mathbb{R} - \{2k\pi \pm \frac{\pi}{6}\}}$$

$$8) \text{ الف) } y = \frac{n + c}{|2n + 1| - |n + c|} \rightarrow \frac{-c}{-n + \tau} \cdot \frac{-\frac{1}{2}}{n - \tau} \rightarrow y \neq 0$$

$$\rightarrow \begin{cases} -n + \tau \neq 0 \rightarrow n \neq \tau \quad \checkmark \\ -c \neq 0 \rightarrow n \neq -\frac{c}{2} \quad \checkmark \\ n - \tau \neq 0 \rightarrow n \neq \tau \quad \checkmark \end{cases} \rightarrow \boxed{D_f: \mathbb{R} - \{-\frac{c}{2}, \tau\}} \subset \mathbb{R}$$

$$\rightarrow |2n + 1| - |n + c| \geq 0 \xrightarrow{\text{فرضيات}} \begin{cases} -n + \tau \geq 0 \rightarrow \tau \geq n \rightarrow n \leq -c \\ -c - \tau \geq 0 \rightarrow -\frac{c}{2} \geq n \geq -c \quad \checkmark \\ n - \tau \geq 0 \rightarrow n \geq \tau \quad \checkmark \end{cases}$$

$$\boxed{D_f: (-\infty, -\frac{c}{2}] \cup [\tau, +\infty)} \subset \mathbb{R}$$

$$9) f(n) = \sqrt{\log_{f(n)}^{(r_{n-1})}} \rightarrow \textcircled{1} r_{n-1} > 0 \rightarrow \underline{n > \frac{1}{r}}$$

$$\rightarrow \textcircled{2} \log_{f(n)}^{(r_{n-1})} > 0 \rightarrow r_{n-1} > 1 \rightarrow \underline{n > 1}$$

$$\rightarrow \textcircled{3} \log_{f(n)}^{(r_{n-1})} \geq 0 \rightarrow \log_{f(n)}^{r_{n-1}} \leq 1 \rightarrow r_{n-1} \leq f(n) \rightarrow \underline{n \leq c}$$

$$\rightarrow \boxed{Df = (1, c]} \quad \left(\begin{matrix} \infty \\ c \end{matrix} \right)$$

$$10) \text{ii) } y: \log(r \cos n + 1) \rightarrow r \cos n + 1 > 0 \rightarrow \cos n > -\frac{1}{r}$$

$$\rightarrow \boxed{Df = \left(rK\pi - \frac{r\pi}{c}, rK\pi + \frac{r\pi}{c} \right)} \quad \left(\begin{matrix} \infty \\ c \end{matrix} \right)$$

$$\rightarrow y: \sqrt{\log_{f(n)}^{n-1}} \rightarrow \textcircled{1} n+1 \neq 0 \rightarrow \underline{n \neq -1}$$

$$\rightarrow \textcircled{2} \frac{n-1}{n+1} > 0 \rightarrow \frac{-1}{+} \frac{1}{+}$$

$$\textcircled{3} \log_{f(n)}^{n-1} \geq 0 \rightarrow \frac{n-1}{n+1} \geq 1 \rightarrow \frac{-r}{n+1} \geq 0 \rightarrow \underline{n < -1}$$

$$\rightarrow \boxed{Df = (-\infty, -1)} \quad \left(\begin{matrix} \infty \\ c \end{matrix} \right)$$