

الف) $y = \frac{x+3}{2x^2+3x-1}$ $\xrightarrow{2x^2+3x-1=0}$ $\Rightarrow x=1 \Rightarrow h=0 \Rightarrow h_2(x-1)(2x^2+5x-3)$
 $\rightarrow (x-1)(x+3)(2x-1) \rightarrow h \neq 0 \Rightarrow x \neq 1, -3, \frac{1}{2}$

ب) $y = \frac{x+3}{2x^2+9x^2+1.9+3}$ $\xrightarrow{2x^2+9x^2+1.9+3=0}$ $\Rightarrow x=1 \rightarrow h=0$
 $(x+1)(2x^2+7x+3) \rightarrow (x+1)(x+3)(2x+1) \Rightarrow h \neq 0 \Rightarrow x \neq -1, -3, -\frac{1}{2}$

الف) $y = \frac{x+3}{x^2-2x^2+2x-1}$ $\xrightarrow{1+2-2-1=0}$ $\rightarrow x=1 \Rightarrow h=0$
 $\Rightarrow x(x-1)(x^2-x+1) = h$
 $\xrightarrow{\Delta=0} \Rightarrow$ ریشه ندارد
 ب) $\sqrt{\frac{x+3}{x^2-2x^2+2x-1}}$ $\rightarrow \frac{-3}{\frac{1}{x}-\frac{1}{x}+1} \rightarrow (-\infty, -3] \cup (1, +\infty)$
 $\xrightarrow{(x-1)(x^2-x+1)}$ ریشه ندارد

$y = \frac{2}{x^2-5x+5-2x+5}$ $\xrightarrow{x=2}$ $x^2-5x+5-2x+5 = x^2-7x+10 = (x-2)(x-5) = h$
 $\rightarrow h \neq 0 \rightarrow x \neq 2, x \neq 5$
 $x \leq 1 \Rightarrow x^2+5x-5-2x+5 \Rightarrow x^2+3x = y \Rightarrow x(x+3) = y$
 $\Rightarrow y \neq 0 \Rightarrow x \neq 0, -3$
 $\Rightarrow D_F = \mathbb{R} - \{0, -3, 2, 5\}$

$y = \frac{x+3}{|2x+1|-|x+3|}$ $\rightarrow |2x+1|-|x+3| \neq 0 \rightarrow |2x+1| \neq |x+3|$
 $\Rightarrow 4x^2+1+4x \neq x^2+9+6x \Rightarrow 3x^2-2x-8 \neq 0$
 $\Rightarrow (x-4)(x+2) \neq 0 \Rightarrow x \neq \frac{4}{3}, -\frac{2}{3} \Rightarrow x \neq 2, -2$
 $y = \sqrt{|2x+1|-|x+3|} \Rightarrow |2x+1|-|x+3| \geq 0 \Rightarrow |2x+1| \geq |x+3|$
 $\Rightarrow 4x^2+1+4x \geq x^2+9+6x \Rightarrow 3x^2-2x-8 \geq 0 \Rightarrow (x-\frac{4}{3})(x+2) \geq 0$
 $\Rightarrow D_F = (-\infty, -2] \cup [\frac{4}{3}, +\infty)$

$y = \log_2(1-\log_2^x)$ $\xrightarrow{1) x > 0}$
 $\xrightarrow{2) 1-\log_2^x > 0} \log_2^x < 1 \Rightarrow x < 2$
 $\xrightarrow{1 \& 2} D_F = (0, 2)$
 $y = \log_2(1-\log_2^{\frac{1}{x}})$ $\xrightarrow{1) x > 0}$
 $\xrightarrow{2) 1-\log_2^{\frac{1}{x}} > 0} 1 > \log_2^{\frac{1}{x}} \rightarrow x > \frac{1}{2}$
 $\xrightarrow{1 \& 2} D_F = (\frac{1}{2}, +\infty)$

$$f(x) = \sqrt{\log_{\log_2}^{r_{n-1}}} \Rightarrow \begin{array}{l} 1) r_{n-1} > 0 \rightarrow x > \frac{1}{e} \\ 2) \log_{\delta}^{r_{n-1}} > 0 \rightarrow r_{n-1} > 1 \rightarrow x > 1 \\ 3) \log_{\delta}^{\log_{\delta}^{r_{n-1}}} \geq 0 \rightarrow \log_{\delta}^{r_{n-1}} \leq 1 \rightarrow r_{n-1} \leq \omega \end{array}$$

$$\rightarrow r_n \leq 4 \Rightarrow x \leq 7$$

$$y_2 \log(r \cos \theta + 1) \Rightarrow r \cos \theta + 1 > 0 \rightarrow \cos \theta > -\frac{1}{r}$$

$$\rightarrow D_F z \left(rK\pi - \frac{\pi}{r}, rK\pi + \frac{\pi}{r} \right)$$

$$y_2 \sqrt{\log \frac{a_1-1}{a_1+1}} \Rightarrow 1) \frac{a_1-1}{a_1+1} > 0 \Rightarrow \frac{-1}{+} \frac{+}{-} \frac{+}{+}$$

$$\begin{aligned} f(x) &= \sqrt{(a+x)^2 + a^2 + b} \rightarrow D_f = (-\infty, \gamma) \rightarrow a + \gamma = 0 \Rightarrow a = -\gamma \\ &\rightarrow -\gamma x + b \geq 0 \rightarrow \frac{b}{\gamma} \geq x \rightarrow D_f = (-\infty, \frac{b}{\gamma}) \\ &\rightarrow \frac{b}{\gamma} = \gamma \Rightarrow b = \gamma^2 \end{aligned}$$

$$f(u) = \sqrt{u^r + ru + r - m^r} \xrightarrow{D_F \geq R} u^r + ru + r - m^r \rightarrow \Delta \leq 0$$

$$\rightarrow f - f(r - m^r) \leq 0 \Rightarrow f - 1 + fm^r \leq 0 \Rightarrow fm^r \leq 1$$

$$\rightarrow m^r \leq 1 \rightarrow -1 \leq m \leq 1 \rightarrow m_{\max} - m_{\min} = 1 - (-1) = \boxed{2}$$

$$f(n) = \frac{\sqrt{f-n^2}}{[n] + [-n] + 1} \rightarrow \begin{array}{l} 1) f-n^2 \geq 0 \Rightarrow -\sqrt{f} \leq n \leq \sqrt{f} \\ 2) [n] + [-n] + 1 \neq 0 \end{array}$$

$$\left. \begin{array}{l} n \in \mathbb{Z} \Rightarrow [n] - [-n] + 1 = 1 \checkmark \\ n \notin \mathbb{Z} \Rightarrow [n] - [-n] - 1 + 1 = 0 \times \end{array} \right\} \Rightarrow n \in \mathbb{Z}$$

$$\text{III. } \xrightarrow{f \cap \mathbb{Z}} n \in \{-\sqrt{f}, -1, 0, 1, \sqrt{f}\} \rightarrow D_f = \{-\sqrt{f}, -1, 0, 1, \sqrt{f}\}$$