

الف) $\frac{x+3}{2x^3+3x^2-11x+3} \rightarrow (x-1)(2x^2+5x-3) \rightarrow (x-1)(2x-1)(x+3)$
 $D_f = \mathbb{R} - \{-3, \frac{1}{2}, 1\}$

ب) $\frac{x+3}{2x^3+9x^2+10x+3} \rightarrow (x+1)(2x^2+7x+3) \rightarrow (x+1)(2x+1)(x+3)$
 $D_f = \mathbb{R} - \{-3, -1, -\frac{1}{2}\}$

الف) $\frac{x+3}{x^3-2x^2+2x-1} \rightarrow (x-1)(x^2-x+1)$
 $D_f = \mathbb{R} - \{1\}$

ب) $y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}}$
 $D_f = (-\infty, -1] \cup (1, +\infty)$

$x^2 - 5|x-1| - 2m + 5$
 $x > 0 \quad x^2 - 5x + 5 - 2m + 5 \quad x^2 - 5x + 10 = 0 \quad (x-2)(x-5) = 0$
 $x < 0 \quad x^2 + 5x - 5 - 2m + 5 \quad x^2 + 5x = 0 \quad x(x+5) = 0$
 $D_f = \mathbb{R} - \{-2, 0, 2, 5\}$

الف) $[-x] - 2 \geq 0 \quad [-x] \geq 2 \quad -x \geq 2 \quad x \leq -2$
 $D_f = (-\infty, -2]$

ب) $[x]^2 - 2[x] - 3 \neq 0 \xrightarrow{[x]=t} t^2 - 2t - 3 = 0$
 $[x] = -1 \quad x = [-1, 0)$
 $[x] = 3 \quad x = [3, 4)$
 $D_f = \mathbb{R} - [-1, 0) \cup [3, 4)$

الف) $[x + \frac{1}{x}] + [x + \frac{1}{x}] \geq 0 \quad [x + \frac{1}{x} - 1] + [x + \frac{1}{x}] \geq 0$
 $2[x + \frac{1}{x}] \geq 1 \quad [x + \frac{1}{x}] \geq \frac{1}{2} \quad x \geq \frac{1}{x} \quad D_f = [\frac{1}{x}, +\infty)$

ب) $[x - \frac{1}{x}] + [-(x - \frac{1}{x})] \rightarrow \begin{cases} a \in \mathbb{Z} & [a] + [-a] = 0 \\ a \notin \mathbb{Z} & [a] + [-a] = -1 \end{cases} \Rightarrow x - \frac{1}{x} \in \mathbb{Z}$
 $D_f = \{x \mid x = k + \frac{1}{k}, k \in \mathbb{Z}\}$

الف) $\tan n + 1 \neq 0$ $\tan n \neq -1$ $D_f, \mathbb{R} - \{K\pi - \frac{\pi}{4}\}$ 	6
ب) $1 - r \sin n \geq 0$ $r \sin n \leq 1$ $\sin n \leq \frac{1}{r}$ $-\frac{1}{r} \leq \sin n \leq \frac{1}{r}$  $D_f = [K\pi, K\pi + \frac{\pi}{4}] \cup [K\pi, K\pi - \frac{\pi}{4}]$	7
الف) $r \sin n - 1 \geq 0$ $r \sin n \geq 1$ $\sin n \geq \frac{1}{r}$ $D_f = [K\pi + \frac{\pi}{4}, K\pi + \frac{5\pi}{4}]$  ب) $1 - r \cos n \geq 0$ $r \cos n \leq 1$ $\cos n \leq \frac{1}{r}$  $D_f = \mathbb{R} - (K\pi - \frac{\pi}{r}, K\pi + \frac{\pi}{r})$	8
الف) $-1 \leq \sqrt{x^2 + rx + 1} \leq 1$ $x^2 + rx + 1 \geq -1$ $x^2 + rx + 2 \geq 0$ $(x+1)(x+r) \geq 0$ $\begin{matrix} x < -1 & -1 & r & x > r \end{matrix}$ $\frac{-r}{r+1} \leq x \leq \frac{r}{r+1}$ I $x^2 + rx + 1 \leq 1$ $x^2 + rx \leq 0$ $x(x+r) \leq 0$ $\begin{matrix} x < 0 & 0 & -r & x < -r \end{matrix}$ $\frac{-r}{r+1} \leq x \leq \frac{r}{r+1}$ II $I \cap II \Rightarrow D_f = (-\infty, -r] \cup [1, \infty)$ ب) $-1 \leq \sqrt{-rx} \leq 1$ $\sqrt{-rx} \leq 1 \Rightarrow -rx \leq 1 \Rightarrow rx \geq -1$ $\Delta - rx \geq 0 \Rightarrow rx \leq \Delta \Rightarrow x \leq \frac{\Delta}{r} \quad I$ $\sqrt{-rx} \geq -1 \Rightarrow -rx \geq 1 \Rightarrow rx \leq -1$ $\Delta - rx \geq 0 \Rightarrow rx \leq \Delta \Rightarrow x \leq \frac{\Delta}{r} \quad II$ $I \cap II \Rightarrow D_f = \emptyset$	9
الف) $x > 0 \quad I$ $1 - \log \frac{x}{r} > 0$ $\log \frac{x}{r} < 1$ $x < r \quad II \Rightarrow I \cap II =$ $D_f = (0, r)$ ب) $x > 0 \quad I$ $1 - \log \frac{x}{\frac{1}{r}} > 0$ $\log \frac{x}{\frac{1}{r}} < 1$ $x < \frac{1}{r} \quad II \Rightarrow$ $I \cap II = (0, \frac{1}{r}) = D_f$	10
الف) $r^{n-n^r} - 1 \geq 0$ $r^{n-n^r} = 1$ $-x^r + rx - r = 0$ $x^r - rx + r = 0$ $(x-r)(x-1) = 0$ $\begin{matrix} x < r & r & x > r \end{matrix}$ $\frac{1}{r} \leq x \leq 1$ $D_f = [1, r]$ ب) $\frac{r^{n+\Delta}}{r^{n+\Delta}} \in \mathbb{W}$ $x \in -\frac{\Delta W - \Delta}{\frac{rW - r}{r - rW}} \Rightarrow D_f = \{x/n = \frac{\Delta K - \Delta}{r - rK}, K \in \mathbb{W}\}$	11

(1)

$$\begin{aligned}
 & \text{1) } \frac{x^r + rx^r - 1n + r}{-x^r + rx^r} \cdot \frac{(n-1)}{(x^r + \omega x - r)} \quad \frac{rx^r}{n} \leq \frac{rx^r}{n} (n-1) \leq rx^r - rx^r \\
 & \frac{\omega x^r - 1n + r}{-\omega x^r + \omega x} \quad \frac{\omega x^r}{n} \leq \omega x (n-1) \leq \omega x^r - \omega x \\
 & \frac{-rx + r}{+rx - r} \quad \frac{-rx}{n} \leq -r(n-1) \leq -rx + r \\
 & \quad \quad \quad x^r + \omega x - r = 0 \\
 & \quad \quad \quad (x+4)(x-1) \\
 & \quad \quad \quad \hookrightarrow \frac{-4}{r} \leq \frac{1}{r} \quad \hookrightarrow \frac{1}{r} \leq \frac{4}{r}
 \end{aligned}$$

$$\begin{aligned}
 & \text{2) } \frac{rx^r + 9x^r + 10x + r}{-rx^r - rx^r} \cdot \frac{(n+1)}{(x^r + vx + r)} \quad \frac{rx^r}{n} \leq \frac{rx^r}{n} (n+1) \leq rx^r + rx^r \\
 & \frac{vx^r + 10x + r}{-vx^r - vx} \quad \frac{vx^r}{n} \leq vx(n+1) \leq vx^r + vx \\
 & \frac{rx + r}{-rx - r} \quad \frac{rx}{n} \leq r(n+1) \leq rx + r
 \end{aligned}$$

$$\begin{aligned}
 & \text{3) } \frac{x^r - rx^r + rx - 1}{-x^r + x^r} \cdot \frac{(n-1)}{(x^r - n + 1)} \quad \frac{x^r}{n} \leq \frac{x^r}{n} (n-1) \leq x^r - x^r \\
 & \frac{-x^r + rx - 1}{+x^r - n} \quad \frac{-x^r}{n} \leq -x(n-1) \leq -x^r + n \\
 & \frac{n-1}{-n+1}
 \end{aligned}$$

(2)