

الف) $n^3 - n > 0 \quad n(n-1)(n+1) > 0 \rightarrow \begin{cases} n \neq 0 \\ n \neq -1 \\ n \neq 1 \end{cases} \quad \frac{n^3(n-1)}{n(n-1)(n+1)} > 0 \quad \frac{-1 \quad 0 \quad 1}{+ \quad + \quad +}$

$D_f = (-1, 0) \cup (0, 1) \cup [1, +\infty)$

ب) $\frac{n^3(n-1)}{n(n-1)} = \frac{n^3(n-1)(n+1)}{n(n-1)(n+1)} \quad \frac{-1 \quad 0 \quad 1}{+ \quad + \quad +} \quad D_f = \mathbb{R} - \{-1, 0, 1\}$

نمره را در اول بدایم طرح صفری قرار

الف) $n + |n| > 0 \rightarrow |n| > -n \rightarrow \text{فقط اعداد مثبت} \rightarrow D_f = (0, +\infty)$

ب) $n|n| > 0 \rightarrow |n| > 0 \rightarrow \text{فقط اعداد مثبت} \rightarrow D_f = (0, +\infty)$

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

ب) $y - [x] > 0 \quad y > [x] \quad D_f = (-\infty, y)$

الف) $[n - \frac{1}{p} + 1 - 1] + [n + \frac{r}{p}] \geq 0 \quad [n + \frac{r}{p}] - 1 + [n + \frac{r}{p}] \geq 0 \quad [n + \frac{r}{p}] + [n + \frac{r}{p}] \geq 1$

$2[n + \frac{r}{p}] \geq 1 \quad [n + \frac{r}{p}] \geq \frac{1}{2} \rightarrow n \geq \frac{1}{2} \quad D_f = \{n | n \geq \frac{1}{2}\} \subseteq D_f = [\frac{1}{2}, +\infty)$

ب) $\underbrace{[n - \frac{1}{p}]}_a + \underbrace{[-(n - \frac{1}{p})]}_{-a} \geq 0 \rightarrow \begin{cases} a \in \mathbb{Z} & [a] + [-a] = 0 \\ a \notin \mathbb{Z} & [a] + [-a] = -1 \end{cases} \rightarrow n - \frac{1}{p} \in \mathbb{Z}$

$\rightarrow D_f = \{n | n = k + \frac{1}{p}, k \in \mathbb{Z}\}$

الف) $\sin n - 1 \neq 0 \quad \sin n \neq 1 \quad n \neq 2k\pi + \frac{\pi}{2} \quad D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}, k \in \mathbb{Z}\}$

ب) $\sqrt{\sin^2 n} - 1 \neq 0 \quad \sqrt{\sin^2 n} \neq 1 \quad \sin^2 n \neq \frac{1}{4} \rightarrow \sin n \neq \pm \frac{\sqrt{2}}{2}$

$n \neq \frac{k\pi}{2} + \frac{\pi}{4} \quad D_f = \mathbb{R} - \{\frac{k\pi}{2} + \frac{\pi}{4}, k \in \mathbb{Z}\}$

لحل:

الف) $r \sin u - 1 \geq 0 \quad r \sin u \geq 1 \quad \sin u \geq \frac{1}{r}$

$D_f = [rk\pi + \frac{\pi}{2}, rk\pi + \frac{3\pi}{2}] \quad k \in \mathbb{Z}$

ب) $\cos u - 1 \geq 0 \quad \cos u \geq 1 \quad D_f = \{rk\pi \mid k \in \mathbb{Z}\}$

الف) $-1 \leq |u| - r \leq 1 \quad r \leq |u| \leq r \quad -r \leq u \leq -r$

$D_f = [-r, -r] \cup [r, r]$

ب) $-1 \leq u^r + r^{u+1} \leq 1 \rightarrow u^r + r^{u+1} \geq 0 \quad (u+1)(u+r) \geq 0$
 $\frac{-r}{+ \phi - \phi +} \quad u \leq -r \quad u \geq -1 \quad u^r + r^{u+1} \leq 0 \quad u(u+r) \leq 0 \quad \frac{-r}{+ \phi - \phi +}$

الف) $r - \log_r(u-r) \geq 0 \quad -1 \leq \log_r(u-r) \leq r \quad (u-r) \leq r^r \quad r \leq u \leq r^r$
 $u \leq r^r \quad u-r > 0 \quad u > r \quad D_f = (r, r^r]$
 $D_f = [-r, -r] \cup [1, r^r]$

ب) $(u^r - u) \geq 0 \quad u(u^r - 1) \geq 0 \quad u(u-1)(u+1) \geq 0$
 $\frac{-1}{- \phi + \phi - \phi +} \quad D_f = (-1, 0) \cup (1, +\infty)$

الف) $r^u > 0 \Rightarrow r^u + 1 > 0 \rightarrow D_f = \mathbb{R}$

ب) $r^u - 1 \neq 0 \quad r^u \neq 1 \quad u \neq \log_r 1 = 0 \quad D_f = \mathbb{R} - \{\log_r 1\} \quad D_f = \mathbb{R} - \{0\}$

ج) $r^u - r \neq 0 \quad r^u \neq r \quad u \neq \log_r r = 1 \quad D_f = \mathbb{R} - \{\log_r r\} \quad D_f = \mathbb{R} - \{1\}$

د) $r^u - r^r \neq 0 \quad r^u \neq r^r \quad u \neq \log_r r^r = r \quad D_f = \mathbb{R} - \{\log_r r^r\}$

الف) $f_{n+1} \in W \quad f_n \in W-1 \quad n \in \frac{W-1}{r}$

$D_f = \{n \mid n = \frac{k-1}{r}, k \in W\}$

ب) $(\frac{r^n - r}{r^n - \omega}) \in W \quad r^n - r = r^n W - \omega W \rightarrow r^n - r \in W - \omega W + r$

$n(r^n - r) = -\omega W + r \quad n = \frac{-\omega W + r}{r^n - r} \quad D_f = \{n \mid n = \frac{\omega k - r}{r^n - r}, k \in W\}$

$= \frac{r(\omega W - r)}{r(r^n - r)}$