

الف) $\frac{n^2 + n - 1}{n^2 + n} \cdot \frac{n-1}{n^2 + n - 1} \rightarrow \frac{n-1}{n^2 + n - 1} \neq 0 \rightarrow n \neq -1, -\frac{1}{2}, \frac{1}{3}$

ب) $\frac{n^2 + 4n + 10}{n^2 + 4n + 10} \cdot \frac{n+1}{n^2 + 4n + 10} \rightarrow \frac{n+1}{n^2 + 4n + 10} \neq 0 \rightarrow n \neq -1, -\frac{1}{2}, -\frac{1}{3}$

الف) $\frac{n^2 - n + n - 1}{n^2 - n + 1} \cdot \frac{n-1}{n^2 - n + 1} \rightarrow \frac{(n-1)(n^2 - n + 1)}{n^2 - n + 1} \neq 0 \rightarrow n \neq 1$

ب) $\frac{n^2}{(n-1)(n^2 - n + 1)} \geq 0 \rightarrow \frac{n^2}{n^2 - n + 1} \geq 0 \rightarrow (-\infty, -1] \cup (1, +\infty)$

① if $n \geq 1 \rightarrow n-1 = n-1 \rightarrow n^2 - 2n + 1 = (n-1)^2 \geq 0 \rightarrow (n-1)/(n-1) \geq 0$

$\rightarrow n \neq 1, 0$ ② if $n < 1 \rightarrow n-1 = 1-n \rightarrow n^2 - 2n + 1 = (n-1)^2 \geq 0 \rightarrow (n-1)/(1-n) \geq 0$

$\rightarrow n(n-1) \geq 0 \rightarrow n \geq 1 \text{ or } n \leq 0 \Rightarrow n \in (-\infty, 0] \cup [1, +\infty)$

الف) $[-n] - 1 \geq 0 \rightarrow [-n] \geq 1 \rightarrow n \leq -1$

ب) $[n] = t \rightarrow t - 1 \neq 0 \rightarrow (t-1)(t+1) \neq 0 \rightarrow t \in (-1, 1) \setminus \{0\} \rightarrow \begin{cases} [n] = t \rightarrow [5t] \\ -1 \leq [n] \leq 1, 0 \end{cases} \rightarrow \mathbb{R} \setminus [-1, 0) \cup (0, 1]$

الف) $[n - \frac{1}{2}] + [n + \frac{1}{2}] \geq 0 \rightarrow [n - \frac{1}{2} - 1] + [n + \frac{1}{2}] \geq 0 \rightarrow 2[n + \frac{1}{2}] - 1 \geq 0$

$\rightarrow [n + \frac{1}{2}] \geq \frac{1}{2} \rightarrow n \geq \frac{1}{2}$

ب) $[n - \frac{1}{2}] \leq [n + \frac{1}{2}] \geq 0 \rightarrow [n - \frac{1}{2}] + [-(n + \frac{1}{2})] \geq 0 \rightarrow \begin{cases} [n] - [n] \rightarrow n \in \mathbb{Z} \rightarrow 0 \\ [n] + [-n] \rightarrow n \notin \mathbb{Z} \rightarrow -1 \end{cases}$

$\rightarrow \{n \mid n = k + \frac{1}{2}, k \in \mathbb{Z}\}$

الف) $\tan n + 1 \neq 0 \rightarrow \tan n \neq -1 \rightarrow IR - \left\{ K\pi + \frac{3\pi}{4} \right\}$ -9

ب) $1 - \sin n > 0 \rightarrow 1 > \sin n \rightarrow \frac{1}{2} > \sin n \rightarrow -\frac{1}{2} < \sin n < \frac{1}{2} \rightarrow \text{[scribbled out]}$
 $\left[K\pi + \frac{\pi}{6}, K\pi - \frac{\pi}{6} \right]$

الف) $\cos n - 1 > 0 \rightarrow \cos n > \frac{1}{2} \rightarrow \left[2K\pi + \frac{\pi}{3}, 2K\pi + \frac{5\pi}{3} \right]$ ✓

ب) $1 - \cos n > 0 \rightarrow \frac{1}{2} < \cos n \rightarrow \left[2K\pi + \frac{2\pi}{3}, 2K\pi + \frac{4\pi}{3} \right]$

الف) $\frac{n^2 + n + 1}{n^2 + n} > 1 \rightarrow n^2 + n + 1 > n^2 + n \rightarrow n(n+1) > 0 \rightarrow \frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm i\sqrt{3}}{2} \rightarrow [0, \infty)$ -1
 $n^2 + n + 1 > -1 \rightarrow n^2 + n + 2 > 0 \rightarrow (n+1)(n+2) > 0 \rightarrow \frac{-2 \pm \sqrt{4-8}}{2} = \frac{-2 \pm 2i}{2} = -1 \pm i \rightarrow (-\infty, -2] \cup [-1, \infty)$
 $\omega - n > 0 \rightarrow \omega > n \rightarrow \frac{\omega}{n} > 1$, $-1 < \sqrt{\omega - n} < 1 \rightarrow \omega - n < 1 \rightarrow \omega < n + 1 \rightarrow \frac{\omega}{n} < 1 + \frac{1}{n}$
 $\Rightarrow \frac{\omega}{n} \in \left(1, 1 + \frac{1}{n} \right)$

الف) $n > 0$, $1 - \log_2 n > 0 \rightarrow 1 > \log_2 n \rightarrow n < 2 \Rightarrow 0 < n < 2$ -7

ب) $n > 0$, $1 - \log_2 \frac{1}{n} > 0 \rightarrow 1 > \log_2 \frac{1}{n} \rightarrow n < \frac{1}{2} \Rightarrow 0 < n < \frac{1}{2}$

الف) $\frac{n^2 - n^2}{n^2 - n} > 0 \rightarrow \frac{0}{n^2 - n} > 0 \rightarrow n^2 - n^2 > 0 \rightarrow n^2 - n + n^2 > 0 \rightarrow (n-n)(n-1) > 0 \rightarrow \frac{1 \pm \sqrt{1-4}}{2} = \frac{1 \pm i\sqrt{3}}{2} \rightarrow [0, \infty)$ -10

ب) $\frac{n^2 + d}{n^2 + e} \in W \rightarrow \frac{n^2 + d}{n^2 + e} = n \rightarrow n^2 + d = n(n^2 + e) \rightarrow n^2 + d = n^3 + en^2 \rightarrow \frac{n^2 + d}{n^2 + e} = n$

$\rightarrow \left\{ n \mid n = \frac{n^2 + d}{n^2 + e}, n \in W \right\}$