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$$\text{الف) } \frac{n-1}{n} - \frac{n}{n-1} \geq 0 \Rightarrow \frac{n^2-1n+1}{n(n-1)} \geq 0 \Rightarrow \frac{-1n+1}{n(n-1)} \geq 0$$

$$\text{ب) I) } \frac{n-1n-1}{n(n+1)} \Rightarrow n(n+1) \neq 0 \Rightarrow n \neq -1, 0$$

$$\text{II) } \frac{1n+4+n-1}{(n-1)(n+2)} \neq 0 \Rightarrow \frac{1(n+3)}{(n-1)(n+2)} \neq 0 \Rightarrow n \neq -3, -2, 1$$

$$D = (-\infty, 0) \cup \left[\frac{1}{2}, 1\right)$$

$$D = \mathbb{R} - \left\{-\frac{1}{2}, -2, 1\right\}$$

$$\text{الف) } \left(\left(\frac{1}{10}\right)^n - 9\right)(10^n - 1) \geq 0$$

$$\left(\frac{1}{10}\right)^n = 9 \Rightarrow n = -1$$

$$10^n = 10^m \Rightarrow n = m$$

$$D = (-\infty, -1) \cup \left[\frac{1}{10}, +\infty\right)$$

$$D = (-\infty, -1) \cup \left[\frac{1}{10}, +\infty\right)$$

$$n \in [1, +\infty)$$

$$\text{I) } n-1 \geq 0 \Rightarrow n \geq 1$$

$$\text{II) } (10^{n+1})^2 = (10^n - \sqrt{10^{n-1}})^2 \Rightarrow 10^{2n+2} = 10^{2n} - 2 \cdot 10^n \cdot \sqrt{10^{n-1}} + 10^{n-1} \Rightarrow 10^{n+1} = 1 - 2\sqrt{10^{n-1}} + 10^{-n}$$

$$\text{III) } 10 - \sqrt{10^{n-1}} \geq 0 \Rightarrow \sqrt{10^{n-1}} \leq 10 \Rightarrow n-1 \leq 1 \Rightarrow n \leq 2$$

$$\Rightarrow \text{I} \cap \text{II} \cap \text{III} \Rightarrow D = [1, 2]$$

$$\text{I) } \frac{1}{n} - \frac{1}{n+1} \geq 0 \Rightarrow \frac{1}{n(n+1)} \geq 0 \Rightarrow n \in (-\infty, -1) \cup (1, +\infty)$$

$$\text{II) } n^2 - 1 \geq 0 \Rightarrow n^2 \geq 1 \Rightarrow n \geq 1 \Rightarrow n \in (-\infty, -1] \cup [1, +\infty)$$

$$\text{III) } \sqrt{n^2-1} \neq -1 \Rightarrow \text{I} \cap \text{II} \cap \text{III} \Rightarrow (-\infty, -1) \cup (1, +\infty) = D$$

$$-n^2 + an + 10 \geq 0 \Rightarrow -1 - 1a + 10 = 0 \Rightarrow a = \frac{1}{1}$$

$$\Rightarrow -n^2 - \frac{1}{1}n + 10 \xrightarrow{n=b} -b^2 - \frac{1}{1}b + 10 = 0 \Rightarrow 1b^2 + b - 10 = 0$$

$$b^2 + b - 10 = 0 \Rightarrow (b+10)(b-1) = 0$$

$$a+b = \frac{1}{1} + \frac{1}{1} = 2 \leftarrow [-2, \frac{10}{1}] = [-2, b]$$

$$f(n) = \begin{cases} 10n-1 & n \geq 1 \\ 10n+10 & n < 1 \end{cases}$$

$$f(n) - n \geq 0$$

$$n \geq 1 \Rightarrow n=1 \Rightarrow 10-1-1 \geq 0 \Rightarrow 8 \geq 0$$

$$n < 1 \Rightarrow n=0 \Rightarrow 10+10-0 \geq 0 \Rightarrow 20 \geq 0$$

$$n=-1 \Rightarrow -10+10-(-1) = 1 \geq 0$$

$$n=-2 \Rightarrow -4+10-(-2) = 8 \geq 0$$

$$n=-3 \Rightarrow -9+10-(-3) = 4 \geq 0$$

$$n=-4 \Rightarrow -16+10-(-4) = -2 < 0$$

P-Ardis

$$\Rightarrow [-10, +\infty) = D$$

