

الف) $t_1 = (3 \times 1) - 1 = 2 \Rightarrow 2, 11, 24, 47, 74, \dots$ $t_2 = (3 \times 4) - 1 = 11$ $t_3 = (3 \times 9) - 1 = 26$ $t_4 = (3 \times 16) - 1 = 47$ $t_5 = (3 \times 25) - 1 = 74$	$t_1 = \frac{4+1}{4} = \frac{5}{4} \Rightarrow \frac{5}{4}, \frac{9}{4}, \frac{13}{4}, \frac{17}{4}, \dots$ $t_2 = \frac{9+1}{4} = \frac{10}{4}$ $t_3 = \frac{16+1}{4} = \frac{17}{4}$ $t_4 = \frac{25+1}{4} = \frac{26}{4}$ $t_5 = \frac{36+1}{4} = \frac{37}{4}$	1
الف) $n=13 \Rightarrow t_{13} = \frac{(-1)^{13}}{\sqrt{13+3}} = \frac{-1}{\sqrt{16}} = \frac{-1}{4}$ ب) $n=13 \Rightarrow t_{13} = (2 \times 13) - \left[\frac{13}{2} \right] = 26 - 3 = 23$ $\left[\frac{13}{2} \right] = 3$		2
الف) $2n-10 < 0 \Rightarrow 2n < 10 \Rightarrow n < 5 \Rightarrow n = 1, 2, 3, 4 \Rightarrow t_1, t_2, t_3, t_4$ ب) $n^2 - 14n + 40 < 0 \Rightarrow \frac{n}{(n-10)} \frac{4}{(n-4)} \Rightarrow \begin{array}{c c} 4 & 10 \\ \hline + & - \\ \hline 10 & 4 \end{array} \Rightarrow 5, 6, 7, 8, 9 \Rightarrow t_5, t_6, t_7, t_8, t_9$		3
الف) $2n-14 \leq 0 \Rightarrow 2n \leq 14 \Rightarrow n \leq 7 \Rightarrow n = 1, 2, 3, 4, 5, 6, 7 \Rightarrow t_1, t_2, t_3, t_4, t_5, t_6, t_7$ ب) $n^2 - 12n + 27 \leq 0 \Rightarrow \frac{n}{(n-9)} \frac{3}{(n-3)} \Rightarrow \begin{array}{c c} 3 & 9 \\ \hline + & - \\ \hline 9 & 3 \end{array} \Rightarrow n = 3, 4, 5, 6, 7, 8, 9 \Rightarrow t_3, t_4, t_5, t_6, t_7, t_8, t_9$		4
$t_n = an + b$ $t_4 \Rightarrow (4a + b = 11) \times (-1) \Rightarrow \begin{cases} -4a - b = -11 \\ 9a + b = 22 \end{cases} \xrightarrow{a=3} 27 + b = 22 \Rightarrow b = -5$ $t_9 \Rightarrow 9a + b = 22 \Rightarrow 9a = 27 \Rightarrow a = 3$ $\Rightarrow n = 3 \Rightarrow t_3 = (3 \times 3) - 5 = 4$		5

الف) $n^2 - 4n + 2 \xrightarrow{a>0} \min \Rightarrow \left\{ \begin{array}{l} -\frac{b}{2a} = -\frac{-4}{2} = 2 \\ 4 - 16 + 2 = -10 \end{array} \right. \Rightarrow \left. \begin{array}{l} \text{کمترین مقدار } -10 \text{ است و} \\ \text{در } n = 2 \end{array} \right\}$

$\rightarrow) n^r + t_{n+1} \xrightarrow{\text{also}} \min \Rightarrow \left[-\frac{b}{ra} = -\frac{t}{r} = -r \rightarrow -r \notin N_1 \right] \text{ GG } \xrightarrow{\text{پس}} \begin{cases} t_1 = 1 + t + 1 = 2 \\ t_r = t + 1 + 1 = 12 \\ t_{12} = 4 + 12 + 1 = 17 \end{cases} \rightarrow \text{مقدار عقلی برای } n=1$

$t_n = -r, -v, -1, -v, -r, \dots$
 $\rightsquigarrow$

$$t_n = an^r + bn + c$$

$$\rightsquigarrow a = \frac{r}{r} = 1, c = 1 \rightarrow b = -4$$

$$\Rightarrow a_n = n^r - 4n + 1 \rightarrow a_{10} = 100 - 40 + 1 = \boxed{61}$$

$$t_n = -4, -1, 1, 4, \dots \rightsquigarrow an^r + bn + c \rightsquigarrow rn^r + bn + \boxed{c} \quad \begin{matrix} \boxed{-v} \\ +1 \end{matrix} \rightarrow -4$$

$$\begin{matrix} \underbrace{\quad} & \underbrace{\quad} & \underbrace{\quad} \\ +0 & +4 & +12 \\ \underbrace{\quad} & \underbrace{\quad} \\ +4 & +4 \end{matrix}$$

$$\rightsquigarrow rn^r + bn - v \xrightarrow{n=1} r + b - v = -4 \rightarrow b = -1 \rightsquigarrow t_n = rn^r - n - v$$

$$\begin{cases} a = r \\ b = -1 \\ c = -v \end{cases}$$

$$\text{دلتا} \rightarrow r_{a+1} \leq a + r \rightarrow a \leq r \quad \text{بـ} \quad (-\infty, r]$$

$$\begin{aligned} & \text{حالت دوم} \rightarrow (\text{استفادۀ قفّ عینی}) \rightarrow a + t = 2a + 1 \rightarrow a = 3 \\ & \text{حالت سوم} \rightarrow (\text{استفادۀ قفّ ذاتی}) \rightarrow 2a + 1 > a + t \rightarrow a > 3 \end{aligned} \quad \left. \vphantom{\begin{aligned} & \text{حالت دوم} \rightarrow (\text{استفادۀ قفّ عینی}) \rightarrow a + t = 2a + 1 \rightarrow a = 3 \\ & \text{حالت سوم} \rightarrow (\text{استفادۀ قفّ ذاتی}) \rightarrow 2a + 1 > a + t \rightarrow a > 3 \end{aligned}} \right\} \rightarrow a \geq 3 \quad \text{ب} \quad [3, +\infty)$$

$$\text{الف) } \frac{\overset{24}{99-3}}{3} + 1 = 33$$

$$\therefore \frac{100 - \omega}{\omega} + 1 = 20$$

$\frac{90-15}{15} + 1 = 4$

$$\Rightarrow n(A \cup B) = n(A) + n(B) - n(A \cap B) \rightarrow \frac{23}{23+20-9} = \frac{24}{34}$$