

الف) $t_n = 3n^2 - 1$

$t_1 = 3 - 1 = 2$

$t_2 = 3 \times 4 - 1 = 11$

$t_3 = 3 \times 9 - 1 = 26$

$t_4 = 3 \times 16 - 1 = 47$

$t_5 = 3 \times 25 - 1 = 74$

$\boxed{2, 11, 26, 47, 74}$

ب) $t_n = \frac{n+1}{n+4}$

$t_1 = \frac{2}{5} = \frac{2}{5}$ $t_2 = \frac{3}{6} = \frac{1}{2}$

$t_3 = \frac{4}{7} = \frac{4}{7}$ $t_4 = \frac{5}{8} = \frac{5}{8}$

$t_5 = \frac{6}{9} = \frac{2}{3}$

$\boxed{\frac{2}{5}, \frac{1}{2}, \frac{4}{7}, \frac{5}{8}, \frac{2}{3}}$

الف) $t_n = \frac{(-1)^n}{\sqrt{n+3}}$

$t_{13} = \frac{(-1)^{13}}{\sqrt{13+3}} = -\frac{1}{4}$

ب) $t_n = 2n - \left[\frac{n}{4}\right]$

$t_{13} = 26 - \left[\frac{13}{4}\right] = 26 - 3 = 23$

الف) $t_n = 2n - 10$

$2n - 10 < 0$ $2n < 10$

$n < 5 \rightarrow \underline{\text{جواب}}$

ب) $t_n = n^2 - 14n + 40$

$(n-4)(n-10) < 0$

$\leftarrow$ $\frac{1}{+} \frac{4}{-} \frac{10}{+} \frac{1}{+}$ $\leftarrow$ ω جمله منفی است

الف) $t_n = 2n - 19$

$2n - 19 \leq 0$

$2n \leq 19$

$n \leq 9$

$\underline{\text{جواب}}$

ب) $t_n = n^2 - 14n + 40$

$n^2 - 14n + 40 \leq 0$

$(n-4)(n-10) \leq 0$

$\underline{\text{جواب}}$

$\frac{1}{+} \frac{4}{-} \frac{10}{+} \frac{1}{+}$

$t_4 = 5$ $t_9 = 22$

$d = \frac{22 - 5}{9 - 4} = \frac{t_m - t_n}{m - n} = \frac{17}{5} = 3\frac{2}{5}$

$t_7 = t_4 + d = 5 + 3\frac{2}{5} = 8\frac{2}{5}$

$$\text{الف) } t_n = n^2 - 9n + 2$$

$$\left| \begin{array}{l} -\frac{b}{r_a} = \frac{9}{2} = 4.5 \\ 9 - 18 + 2 = -7 \end{array} \right.$$

$$\text{کترین جمله} = -7$$

$$\text{ب) } t_n = n^2 + 4n + 1$$

$$\left| \begin{array}{l} -\frac{b}{r_a} = \frac{-4}{2} = -2 \\ 4 - 18 + 1 = -13 \end{array} \right.$$

$$\text{کترین جمله} = -13$$

$$t_n = -4, -7, -1, -7, -4, \dots$$

$$\begin{array}{ccccccc} \textcircled{1} & \xrightarrow{+5} & \textcircled{2} & \xrightarrow{-1} & \textcircled{3} & \xrightarrow{+1} & \textcircled{4} \\ & & \textcircled{5} & \xrightarrow{+2} & \textcircled{6} & \xrightarrow{+2} & \textcircled{7} \end{array}$$

$$r_a = 2 \quad a = 1 \quad c = 1$$

$$an^2 + bn + c \Rightarrow n^2 + bn + 1 \Rightarrow 1 + b + 1 = -4 \rightarrow b = -6$$

$$n^2 - 9n + 1 \rightarrow 100 - 90 + 1 = 11$$

$$t_n = -9, -1, 1, 5, \dots$$

$$\begin{array}{ccccccc} \textcircled{1} & \xrightarrow{+10} & \textcircled{2} & \xrightarrow{+8} & \textcircled{3} & \xrightarrow{+6} & \textcircled{4} \\ & & \textcircled{5} & \xrightarrow{+4} & \textcircled{6} & \xrightarrow{+2} & \textcircled{7} \end{array}$$

$$r_a = 4 \quad a = 2 \quad c = -9$$

$$an^2 + bn + c \Rightarrow 2n^2 + bn - 9 \rightarrow 2 + b - 9 = -9 \rightarrow b = -2$$

$$2n^2 - n - 9$$

$$(-\infty, a + 4] \cap [r_a + 1, +\infty) \rightarrow \text{مجموعه} \Rightarrow \emptyset \quad \textcircled{1}$$

$$a + 4 \leq r_a + 1$$

$$r(a) \rightarrow [4, +\infty) = a$$

$$\text{الف) } \left[\frac{100}{3} \right] = 33$$

$$\text{ب) } \left[\frac{100}{5} \right] = 20$$

$$\text{ج) } \left[\frac{100}{15} \right] = 6$$

$$\begin{aligned} & \text{د) } \left[\frac{100}{3} \right] + \left[\frac{100}{5} \right] - \left[\frac{100}{15} \right] = \\ & 33 + 20 - 6 = 47 \end{aligned}$$