

1	الف) $t_n = 3n^2 - 1 \rightarrow$ $t_1 = 3(1)^2 - 1 = 2$ $t_2 = 3(2)^2 - 1 = 11$ $t_3 = 3(3)^2 - 1 = 24$ $t_4 = 3(4)^2 - 1 = 47$ $t_5 = 3(5)^2 - 1 = 74$ $\downarrow$ $2, 11, 24, 47, 74$ ب) $t_n = \frac{3n+1}{n+4} \rightarrow t_1 = \frac{3(1)+1}{1+4} = \frac{4}{5}$ $t_2 = \frac{3(2)+1}{2+4} = \frac{7}{6}$ $t_3 = \frac{3(3)+1}{3+4} = \frac{10}{7}$ $t_4 = \frac{3(4)+1}{4+4} = \frac{13}{8}$ $t_5 = \frac{3(5)+1}{5+4} = \frac{16}{9}$
2	الف) $t_n = \frac{(-1)^n}{\sqrt{n+3}}$ $t_{13} = \frac{(-1)^{13}}{\sqrt{13+3}} = \frac{-1}{\sqrt{16}} = -\frac{1}{4}$ ب) $t_n = 2n - \left\lfloor \frac{n}{4} \right\rfloor$ $t_{13} = 2(13) - \left\lfloor \frac{13}{4} \right\rfloor = 26 - 3 = 23$
3	الف) $t_n = 2n - 10 \rightarrow 2n - 10 < 0$ $2n < 10$ $n < 5$ $n < 5$ حید منفی است ب) $t_n = n^2 - 14n + 40$ $(n-10)(n-4) < 0$ $\frac{4}{4-4+} \rightarrow (4, 10)$ a حید منفی است
4	الف) $t_n = 2n - 14 \rightarrow 2n - 14 < 0$ $2n < 14$ $n < 7$ $n < 7$ حید نامثبت است ب) $t_n = n^2 - 12n + 27$ $n^2 - 12n + 27 < 0$ $(n-3)(n-9) < 0$ $\frac{3}{3-9+} \rightarrow [3, 9]$ 7 حید نامثبت است
5	$t_1 + 3d = 7 \rightarrow t_1 + 3d = 7 - 9 = -2$ $t_1 + 8d = 22$ $\frac{5d = 14}{d = 2.8}$ $t_3 = t_1 + 2d = -2 + 4 = 2$

$$\text{الف) } t_n = n^2 - 4n + 2 \rightarrow a \geq 0$$

$$\left| \begin{array}{l} \frac{-b}{2a} = \frac{+4}{2} = 2 \\ \text{حاصل ۳: کسر مقدار: } 2^2 - 4(2) + 2 = 9 - 8 + 2 = -1 \end{array} \right.$$

۶

$$\text{ب) } n^2 + fn + 1 \rightarrow a \geq 0$$

$$\left| \begin{array}{l} \frac{-b}{2a} = \frac{-f}{2} = -2 \\ \Rightarrow r \in \mathbb{N} \rightarrow q = 1 + f(1) + 1 = 4 \\ (-2)^2 + f(-2) + 1 = 4 - 4 + 1 = 1 \end{array} \right.$$

$$\textcircled{+1} \begin{array}{ccccccc} -f, & -4, & -8, & -4, & -f \\ \swarrow & \downarrow & \downarrow & \downarrow & \swarrow \\ -a & -r & -1 & +1 & +r \\ \swarrow & \downarrow & \downarrow & \downarrow & \swarrow \\ +r & +r & +r & +r & \end{array}$$

$$a = \frac{r}{r} = 1 \quad C = 1$$

$$-f = 1(1)^2 + b(1) + 1 \rightarrow b = -4$$

$$t_n = n^2 - 4n + 1 \rightarrow t_{10} = 10^2 - 4 \times 10 + 1 = 100 - 40 + 1 = 61$$

۷

$$\textcircled{-v} \begin{array}{ccccccc} -4, & -1, & 1, & 1, & v \\ \swarrow & \downarrow & \downarrow & \downarrow & \swarrow \\ 1 & +a & +a & +a & 1 \\ \swarrow & \downarrow & \downarrow & \downarrow & \swarrow \\ +r & +r & +r & +r & \end{array}$$

$$a = \frac{f}{r} = r \quad C = -v$$

$$-4 = r(1)^2 + b(1) - v \rightarrow b = -1$$

$$t_n = rn^2 - n - v$$

۸

$$n \in ((-\infty, a+r] \cap [ra+1, +\infty)) \in W$$

$$\begin{array}{l} ra+1 \geq a+r \\ a \geq r \end{array}$$

۹

$$\text{الف) } \frac{99-r}{r} + 1 = 33$$

$$\text{ب) } 1 < an < 100 \rightarrow \frac{1}{a} < n < \frac{100}{a} \rightarrow 1 < n_1 < 19 \rightarrow 19 \text{ تا}$$

$$\text{ج) } 15, 30, 45, \dots \rightarrow t_n = 15n \quad 15n < 100 \rightarrow n < \frac{100}{15} \rightarrow n < \frac{20}{3} \rightarrow n = \{3, 4, 9, 12, 18\}$$

۱۰

$$\left. \begin{array}{l} 3 \text{ مقدار} = 33 - 4 = 29 \\ 2 \text{ مقدار} = 13 \\ 4 \text{ مقدار} = 4 \end{array} \right\} 29 + 13 + 4 = 46$$