

الف) $tn \leq 3n^2 - 1 \rightarrow t_1 \leq 3(1)^2 - 1 = 3(1) - 1 = 2 = \boxed{2}$ جمله اول
 $t_2 \leq 3(2)^2 - 1 = 3(4) - 1 = 12 - 1 = 11$ جمله دوم
 $t_3 \leq 3(3)^2 - 1 = 3(9) - 1 = 27 - 1 = 26$ جمله سوم
 $t_4 \leq 3(4)^2 - 1 = 3(16) - 1 = 48 - 1 = 47$ جمله چهارم
 $t_5 \leq 3(5)^2 - 1 = 3(25) - 1 = 75 - 1 = 74$ جمله پنجم

(1)

ب) $\frac{2n+1}{n+4} \rightarrow t_1 = \frac{2(1)+1}{1+4} = \frac{2+1}{1+4} = \frac{3}{5} = \boxed{\frac{3}{5}}$ جمله اول
 $t_2 = \frac{2(2)+1}{2+4} = \frac{4+1}{2+4} = \frac{5}{6}$ جمله دوم
 $t_3 = \frac{2(3)+1}{3+4} = \frac{6+1}{3+4} = \frac{7}{7} = 1$ جمله سوم
 $t_4 = \frac{2(4)+1}{4+4} = \frac{8+1}{4+4} = \frac{9}{8}$ جمله چهارم
 $t_5 = \frac{2(5)+1}{5+4} = \frac{10+1}{5+4} = \frac{11}{9}$ جمله پنجم

الف) $tn = \frac{(-1)^n}{\sqrt{13n+3}} \rightarrow t_{13} = \frac{(-1)^{13}}{\sqrt{13(13)+3}} = \frac{-1}{\sqrt{174+3}} = \frac{-1}{\sqrt{177}}$

ب) $tn = 2n - \left[\frac{n}{4}\right] \rightarrow t_{13} = 2(13) - \left[\frac{13}{4}\right] = 26 - 3 = 23$

(2)

الف) $tn \leq 2n - 10 \rightarrow \begin{cases} n=1 \rightarrow 2(1)-10 = 2-10 = -8 \\ n=2 \rightarrow 2(2)-10 = 4-10 = -6 \\ n=3 \rightarrow 2(3)-10 = 6-10 = -4 \\ n=4 \rightarrow 2(4)-10 = 8-10 = -2 \end{cases} \rightarrow \boxed{\text{جمله ششم}}$

(3)

ب) $tn \leq n^2 - 12n + 30 \rightarrow n^2 - 12n + 30 < 0$
 $tn < 0 \rightarrow (n-4)(n-10) = 0 \rightarrow \begin{cases} n_1 = 4 \rightarrow 4 < n < 10 \\ n_2 = 10 \end{cases} \rightarrow \boxed{\text{جمله ششم}}$

الف) $tn \leq 2n - 14 \rightarrow \begin{cases} n=1 \rightarrow 2(1)-14 = 2-14 = -12 \\ n=2 \rightarrow 2(2)-14 = 4-14 = -10 \\ n=3 \rightarrow 2(3)-14 = 6-14 = -8 \\ n=4 \rightarrow 2(4)-14 = 8-14 = -6 \end{cases} \quad \begin{cases} n=5 \rightarrow 2(5)-14 = 10-14 = -4 \\ n=6 \rightarrow 2(6)-14 = 12-14 = -2 \\ n=7 \rightarrow 2(7)-14 = 14-14 = 0 \\ n=8 \rightarrow 2(8)-14 = 16-14 = 2 \end{cases}$

(4)

$$\rightarrow) th = n^r - 12n + 2V \rightarrow n^r - 12n + 2V \leq 0 \quad 3 \leq n \leq 9$$

$$th \leq 0 \quad (n-2)(n-9) \leq 0 \xrightarrow{6 \div} \begin{matrix} n_1, r \\ n_2, q \end{matrix} \quad n = \{r, 4, 5, 6, 7, 8, 9\}$$

$$\xrightarrow{\text{بداية}} \nearrow$$

$$tr = V$$

$$tq = 22$$

$$\begin{matrix} -r, & 1, & r \\ \leftarrow -r & \leftarrow -r & \leftarrow -r \end{matrix} \quad \begin{matrix} V, & 10, & 12, & 14, & 16, & 18, & 20 \\ \leftarrow +r & \leftarrow +r & \leftarrow +r & \leftarrow +r & \leftarrow +r & \leftarrow +r & \leftarrow +r \end{matrix}$$

$$\boxed{tr = r}$$

$$d = \frac{22-V}{r+1} = \frac{10}{0} = r$$

$$\rightarrow) th = n^r - 4n + r \rightarrow n = \frac{-b}{ra} \quad n \text{ و } r = -\frac{-4}{r(1)} = \frac{4}{r} = r$$

$$tr = (r)^r - 4(r) + r = 9 - 12 + r = \boxed{-V}$$

$$\rightarrow) th = n^r + 5n + 1 \rightarrow n = \frac{-b}{ra} \quad n \text{ و } r = -\frac{r}{r(1)} = -r$$

$$t1 = (1)^r + r(1) + 1 = 1 + r + 1 = \boxed{9}$$

$$\text{بداية } n=1$$

$$th = -r, -V, -11, -V, -r, \dots$$

$$ra = r \rightarrow a = 1$$

$$(rb+c) - (b+c) = -11 - (-a)$$

$$b = -11 + a = -9$$

$$\downarrow$$

$$c = 1$$

$$th = n^r - 4n + 1$$

$$t10 = 100 - 40 + 1 \rightarrow \boxed{t10 = r1}$$

$$t1 = (1)^r + b(1) + c = -r \quad \leftarrow n=1$$

$$1 + b + c = -r$$

$$b + c = -a$$

$$\Leftrightarrow tr = (r)^r + b(r) + c = -V \quad \leftarrow n=r$$

$$r + rb + c = -V \rightarrow rb + c = -11$$

$$th = -4, -1, 1, 2, \dots$$

$$\begin{matrix} +0 & +9 & +12 \\ \leftarrow +r & \leftarrow +r & \leftarrow +r \end{matrix}$$

$$an = an^r + b^n + c$$

$$a+b+c = -4 \rightarrow \boxed{c = -V}$$

$$ra+b = a \rightarrow \boxed{b = -1}$$

$$ra = r \rightarrow \boxed{a = r}$$

$$\Rightarrow \boxed{an = rn^r - n - V}$$

$$[ra+1, +\infty) \cap (-\infty, d+r] = [ra+1, a+r]$$

$$ra+1 \leq d+r \quad a \leq r-1$$

$$ra-a+1 \leq r \quad \boxed{a \leq r}$$

$$a+1 \leq r$$

$$\text{مجموع} = \{1, 2, 3, \dots, 100\}$$

$$(r+10) - 4 = \boxed{rV} \quad th = ra \rightarrow r, 4, 9, 12, \dots, 99 \rightarrow \frac{99-r}{r} + 1 = \boxed{33} \quad \text{الـ } (10)$$

$$r, 4, 9, 12, \dots, 99 \rightarrow \boxed{33}$$

$$2, 10, \dots, 100 \rightarrow \boxed{20}$$

$$12, r, r, \dots, 90 \rightarrow \boxed{9}$$

$$th = 2a \rightarrow 2, 10, 12, \dots, 100 \rightarrow \frac{100-2}{2} + 1 = \boxed{20}$$

$$th = 12a \rightarrow 12, r, r, \dots, 90 \rightarrow \frac{90-12}{12} + 1 = \boxed{9}$$