۱ الف) $t_n = 3n^2 - 1 \rightsquigarrow t_1 = 3(1)^2 - 1 = 2,\ t_2 = 3(2)^2 - 1 = 11,\ t_3 = 3(3)^2 - 1 = 26,\ t_4 = 3(4)^2 - 1 = 47,\ t_5 = 3(5)^2 - 1 = 74$

$2, 11, 26, 47, 74$

ب) $t_n = \frac{2n+1}{n+4} \rightsquigarrow t_1 = \frac{2(1)+1}{1+4} = \frac{3}{5},\ t_2 = \frac{2(2)+1}{2+4} = \frac{5}{6},\ t_3 = \frac{2(3)+1}{3+4} = 1,\ t_4 = \frac{2(4)+1}{4+4} = \frac{9}{8},\ t_5 = \frac{2(5)+1}{5+4} = \frac{11}{9}$

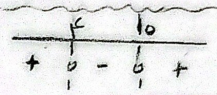
$\frac{3}{5}, \frac{5}{6}, 1, \frac{9}{8}, \frac{11}{9}$

۲ الف) $t_n = \frac{(-1)^n}{\sqrt{n+3}} \rightsquigarrow t_{13} = \frac{(-1)^{13}}{\sqrt{16}} = \frac{-1}{4}$

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

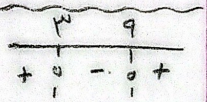
۳ الف) $t_n = 2n - 10 \rightsquigarrow 2n - 10 < 0 \rightsquigarrow n < 5$: ۴ جمله اول

ب) $t_n = n^2 - 14n + 45 \rightsquigarrow (n-4)(n-10) < 0 \rightsquigarrow$ ۵ جمله $\rightsquigarrow$ جملات ۵ تا ۹



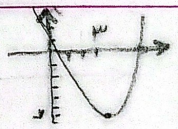
۴ الف) $t_n = 2n - 14 \rightsquigarrow 2n - 14 < 0 \rightsquigarrow n < 8$: ۸ جمله اول

ب) $t_n = n^2 - 12n + 27 \rightsquigarrow (n-3)(n-9) < 0$ ۷ جمله $\rightsquigarrow$ جملات ۳ تا ۹

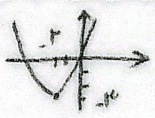


۵ $t_4 = t_1 + 3d \rightsquigarrow 22 = 7 + 3d \Rightarrow d = 3 \rightsquigarrow t_3 = t_4 - d = 7 - 3 = 4$

۶ الف) $t_n = n^2 - 4n + 2 \rightsquigarrow ext = \left|\frac{-b}{2a}\right| \rightsquigarrow \left|\begin{matrix}3\\-7\end{matrix}\right.$ $\overset{a>0}{\underset{min}{\rightsquigarrow}}$ $\Rightarrow$ کمترین جمله : (-7)



ب) $t_n = n^2 + 4n + 1 \rightsquigarrow ext = \left|\frac{-b}{2a}\right| \rightsquigarrow \left|\begin{matrix}-2\\-3\end{matrix}\right.$ $\overset{a>0}{\underset{min}{\rightsquigarrow}}$ $\Rightarrow$ کمترین جمله : (-3)



۷ $1, -4, -7, -8, -7, -4, \ldots$

$(n=0)$ $-5, -3, -1, +1, +3$ $\rightsquigarrow +2, +2, +2, +2$ $\rightsquigarrow 2a = 2 \rightsquigarrow \boxed{a=1}$, $t_0 = 1 \rightsquigarrow \boxed{c=1}$ $\xrightarrow{\text{جایگذاری}}$ $t_1 = n^2 + bn + 1 = 1 + b + 1 = -4 \rightsquigarrow \boxed{b=-4}$

$\boxed{n^2 - 4n + 1} \rightsquigarrow t_{10} = 100 - 40 + 1 = 41$

۸ $\boxed{-7}, -4, -1, 8, 21, \ldots$

$n=0$ $+1, +5, +9, +13$ $\rightsquigarrow +4, +4, +4$ $\rightsquigarrow 2a = 4 \rightsquigarrow \boxed{a=2}$, $t_0 = (-7) \rightsquigarrow \boxed{c=(-7)}$ $\xrightarrow{\text{جایگذاری}}$ $t_1 = 2n^2 + bn - 7 = 2 + b - 7 = -6 \rightsquigarrow \boxed{b=1}$

$\boxed{2n^2 - n - 7}$

۹ $(-\infty, a+4) \cap [2a+1, +\infty)$: تهی $\rightsquigarrow a+4 < 2a+1 \rightsquigarrow 3 < a \Rightarrow (3, +\infty)$

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

ب) $\left[\frac{100}{5}\right] = 20$

ج) $\left[\frac{100}{15}\right] = 6$

د) $33 + 20 - 6 = 47$