

الف) $t_n = 3n^2 - 1 \sim t_1 = 3(1)^2 - 1 = 2, t_2 = 3(2)^2 - 1 = 11, t_3 = 3(3)^2 - 1 = 24, t_4 = 3(4)^2 - 1 = 47, t_5 = 3(5)^2 - 1 = 74$
 $2, 11, 24, 47, 74$

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

الف) $t_n = \frac{(-1)^n}{\sqrt{n+3}} \sim t_{100} = \frac{(-1)^{100}}{\sqrt{103}} = \frac{1}{\sqrt{103}}$
 ب) $t_n = 2n - \left\lfloor \frac{n}{4} \right\rfloor \sim t_{100} = 2(100) - \left\lfloor \frac{100}{4} \right\rfloor = 200 - 25 = 175$

الف) $t_n = 2n - 10 \sim 2n - 10 < 0 \sim n < 5$: جمله اول
 ب) $t_n = n^2 - 17n + 40 \sim (n-4)(n-10) < 0 \sim$ ۴ جملات ۵ تا ۹

الف) $t_n = 2n - 14 \sim 2n - 14 < 0 \sim n < 7$: جمله اول
 ب) $t_n = n^2 - 14n + 27 \sim (n-3)(n-9) < 0 \sim$ ۷ جملات ۳ تا ۹

$t_4 = t_1 + 3d \sim 22 = 7 + 3d \Rightarrow d = 5 \sim t_3 = t_4 - d = 22 - 5 = 17$
 الف) $t_n = n^2 - 4n + 2 \sim \text{ext} = \left| \frac{-b}{2a} \right| \sim \left| \frac{2}{-2} \right| = 1 \xrightarrow{\text{min}} \Rightarrow$ کمترین جمله (-1)

ب) $t_n = n^2 + 6n + 1 \sim \text{ext} = \left| \frac{-b}{2a} \right| \sim \left| \frac{-3}{1} \right| = 3 \xrightarrow{\text{min}} \Rightarrow$ کمترین جمله (-3)
 ن به صورت اول یا آخری کوچکترین جمله اول است

۱) $-4, -7, -1, -4, -7, \dots$
 $n=0 \rightarrow 1, 2, 3, 4, 5, \dots$
 $t_1 = n^2 + bn + 1 = 1 + b + 1 = -4 \sim b = -6$
 $t_0 = 1 \sim c = 1$
 $t_2 = 4 + 2b + 1 = 4 + 2(-6) + 1 = -7$
 $t_3 = 9 + 3b + 1 = 9 + 3(-6) + 1 = -1$
 $t_4 = 16 + 4b + 1 = 16 + 4(-6) + 1 = -7$
 $t_5 = 25 + 5b + 1 = 25 + 5(-6) + 1 = -1$
 $t_6 = 36 + 6b + 1 = 36 + 6(-6) + 1 = -7$
 $t_7 = 49 + 7b + 1 = 49 + 7(-6) + 1 = -1$
 $t_8 = 64 + 8b + 1 = 64 + 8(-6) + 1 = -7$
 $t_9 = 81 + 9b + 1 = 81 + 9(-6) + 1 = -1$
 $t_{10} = 100 + 10b + 1 = 100 + 10(-6) + 1 = -7$
 $t_{11} = 121 + 11b + 1 = 121 + 11(-6) + 1 = -1$
 $t_{12} = 144 + 12b + 1 = 144 + 12(-6) + 1 = -7$
 $t_{13} = 169 + 13b + 1 = 169 + 13(-6) + 1 = -1$
 $t_{14} = 196 + 14b + 1 = 196 + 14(-6) + 1 = -7$
 $t_{15} = 225 + 15b + 1 = 225 + 15(-6) + 1 = -1$
 $t_{16} = 256 + 16b + 1 = 256 + 16(-6) + 1 = -7$
 $t_{17} = 289 + 17b + 1 = 289 + 17(-6) + 1 = -1$
 $t_{18} = 324 + 18b + 1 = 324 + 18(-6) + 1 = -7$
 $t_{19} = 361 + 19b + 1 = 361 + 19(-6) + 1 = -1$
 $t_{20} = 400 + 20b + 1 = 400 + 20(-6) + 1 = -7$
 $t_{21} = 441 + 21b + 1 = 441 + 21(-6) + 1 = -1$
 $t_{22} = 484 + 22b + 1 = 484 + 22(-6) + 1 = -7$
 $t_{23} = 529 + 23b + 1 = 529 + 23(-6) + 1 = -1$
 $t_{24} = 576 + 24b + 1 = 576 + 24(-6) + 1 = -7$
 $t_{25} = 625 + 25b + 1 = 625 + 25(-6) + 1 = -1$
 $t_{26} = 676 + 26b + 1 = 676 + 26(-6) + 1 = -7$
 $t_{27} = 729 + 27b + 1 = 729 + 27(-6) + 1 = -1$
 $t_{28} = 784 + 28b + 1 = 784 + 28(-6) + 1 = -7$
 $t_{29} = 841 + 29b + 1 = 841 + 29(-6) + 1 = -1$
 $t_{30} = 900 + 30b + 1 = 900 + 30(-6) + 1 = -7$
 $t_{31} = 961 + 31b + 1 = 961 + 31(-6) + 1 = -1$
 $t_{32} = 1024 + 32b + 1 = 1024 + 32(-6) + 1 = -7$
 $t_{33} = 1089 + 33b + 1 = 1089 + 33(-6) + 1 = -1$
 $t_{34} = 1156 + 34b + 1 = 1156 + 34(-6) + 1 = -7$
 $t_{35} = 1225 + 35b + 1 = 1225 + 35(-6) + 1 = -1$
 $t_{36} = 1296 + 36b + 1 = 1296 + 36(-6) + 1 = -7$
 $t_{37} = 1369 + 37b + 1 = 1369 + 37(-6) + 1 = -1$
 $t_{38} = 1444 + 38b + 1 = 1444 + 38(-6) + 1 = -7$
 $t_{39} = 1521 + 39b + 1 = 1521 + 39(-6) + 1 = -1$
 $t_{40} = 1600 + 40b + 1 = 1600 + 40(-6) + 1 = -7$
 $t_{41} = 1681 + 41b + 1 = 1681 + 41(-6) + 1 = -1$
 $t_{42} = 1764 + 42b + 1 = 1764 + 42(-6) + 1 = -7$
 $t_{43} = 1849 + 43b + 1 = 1849 + 43(-6) + 1 = -1$
 $t_{44} = 1936 + 44b + 1 = 1936 + 44(-6) + 1 = -7$
 $t_{45} = 2025 + 45b + 1 = 2025 + 45(-6) + 1 = -1$
 $t_{46} = 2116 + 46b + 1 = 2116 + 46(-6) + 1 = -7$
 $t_{47} = 2209 + 47b + 1 = 2209 + 47(-6) + 1 = -1$
 $t_{48} = 2304 + 48b + 1 = 2304 + 48(-6) + 1 = -7$
 $t_{49} = 2401 + 49b + 1 = 2401 + 49(-6) + 1 = -1$
 $t_{50} = 2500 + 50b + 1 = 2500 + 50(-6) + 1 = -7$
 $t_{51} = 2601 + 51b + 1 = 2601 + 51(-6) + 1 = -1$
 $t_{52} = 2704 + 52b + 1 = 2704 + 52(-6) + 1 = -7$
 $t_{53} = 2809 + 53b + 1 = 2809 + 53(-6) + 1 = -1$
 $t_{54} = 2916 + 54b + 1 = 2916 + 54(-6) + 1 = -7$
 $t_{55} = 3025 + 55b + 1 = 3025 + 55(-6) + 1 = -1$
 $t_{56} = 3136 + 56b + 1 = 3136 + 56(-6) + 1 = -7$
 $t_{57} = 3249 + 57b + 1 = 3249 + 57(-6) + 1 = -1$
 $t_{58} = 3364 + 58b + 1 = 3364 + 58(-6) + 1 = -7$
 $t_{59} = 3481 + 59b + 1 = 3481 + 59(-6) + 1 = -1$
 $t_{60} = 3600 + 60b + 1 = 3600 + 60(-6) + 1 = -7$
 $t_{61} = 3721 + 61b + 1 = 3721 + 61(-6) + 1 = -1$
 $t_{62} = 3844 + 62b + 1 = 3844 + 62(-6) + 1 = -7$
 $t_{63} = 3969 + 63b + 1 = 3969 + 63(-6) + 1 = -1$
 $t_{64} = 4096 + 64b + 1 = 4096 + 64(-6) + 1 = -7$
 $t_{65} = 4225 + 65b + 1 = 4225 + 65(-6) + 1 = -1$
 $t_{66} = 4356 + 66b + 1 = 4356 + 66(-6) + 1 = -7$
 $t_{67} = 4489 + 67b + 1 = 4489 + 67(-6) + 1 = -1$
 $t_{68} = 4624 + 68b + 1 = 4624 + 68(-6) + 1 = -7$
 $t_{69} = 4761 + 69b + 1 = 4761 + 69(-6) + 1 = -1$
 $t_{70} = 4900 + 70b + 1 = 4900 + 70(-6) + 1 = -7$
 $t_{71} = 5041 + 71b + 1 = 5041 + 71(-6) + 1 = -1$
 $t_{72} = 5184 + 72b + 1 = 5184 + 72(-6) + 1 = -7$
 $t_{73} = 5329 + 73b + 1 = 5329 + 73(-6) + 1 = -1$
 $t_{74} = 5476 + 74b + 1 = 5476 + 74(-6) + 1 = -7$
 $t_{75} = 5625 + 75b + 1 = 5625 + 75(-6) + 1 = -1$
 $t_{76} = 5776 + 76b + 1 = 5776 + 76(-6) + 1 = -7$
 $t_{77} = 5929 + 77b + 1 = 5929 + 77(-6) + 1 = -1$
 $t_{78} = 6084 + 78b + 1 = 6084 + 78(-6) + 1 = -7$
 $t_{79} = 6241 + 79b + 1 = 6241 + 79(-6) + 1 = -1$
 $t_{80} = 6400 + 80b + 1 = 6400 + 80(-6) + 1 = -7$
 $t_{81} = 6561 + 81b + 1 = 6561 + 81(-6) + 1 = -1$
 $t_{82} = 6724 + 82b + 1 = 6724 + 82(-6) + 1 = -7$
 $t_{83} = 6889 + 83b + 1 = 6889 + 83(-6) + 1 = -1$
 $t_{84} = 7056 + 84b + 1 = 7056 + 84(-6) + 1 = -7$
 $t_{85} = 7225 + 85b + 1 = 7225 + 85(-6) + 1 = -1$
 $t_{86} = 7396 + 86b + 1 = 7396 + 86(-6) + 1 = -7$
 $t_{87} = 7569 + 87b + 1 = 7569 + 87(-6) + 1 = -1$
 $t_{88} = 7744 + 88b + 1 = 7744 + 88(-6) + 1 = -7$
 $t_{89} = 7921 + 89b + 1 = 7921 + 89(-6) + 1 = -1$
 $t_{90} = 8100 + 90b + 1 = 8100 + 90(-6) + 1 = -7$
 $t_{91} = 8281 + 91b + 1 = 8281 + 91(-6) + 1 = -1$
 $t_{92} = 8464 + 92b + 1 = 8464 + 92(-6) + 1 = -7$
 $t_{93} = 8649 + 93b + 1 = 8649 + 93(-6) + 1 = -1$
 $t_{94} = 8836 + 94b + 1 = 8836 + 94(-6) + 1 = -7$
 $t_{95} = 9025 + 95b + 1 = 9025 + 95(-6) + 1 = -1$
 $t_{96} = 9216 + 96b + 1 = 9216 + 96(-6) + 1 = -7$
 $t_{97} = 9409 + 97b + 1 = 9409 + 97(-6) + 1 = -1$
 $t_{98} = 9604 + 98b + 1 = 9604 + 98(-6) + 1 = -7$
 $t_{99} = 9801 + 99b + 1 = 9801 + 99(-6) + 1 = -1$
 $t_{100} = 10000 + 100b + 1 = 10000 + 100(-6) + 1 = -7$

۷) $-7, -4, -1, 2, 5, \dots$
 $n=0 \rightarrow 1, 2, 3, 4, 5, \dots$
 $t_1 = 2n^2 + bn - 7 = 2 + b - 7 = -4 \sim b = -5$
 $t_0 = -7 \sim c = -7$
 $t_2 = 8 + 2b - 7 = 8 + 2(-5) - 7 = -4$
 $t_3 = 18 + 3b - 7 = 18 + 3(-5) - 7 = -4$
 $t_4 = 32 + 4b - 7 = 32 + 4(-5) - 7 = -4$
 $t_5 = 50 + 5b - 7 = 50 + 5(-5) - 7 = -4$
 $t_6 = 72 + 6b - 7 = 72 + 6(-5) - 7 = -4$
 $t_7 = 98 + 7b - 7 = 98 + 7(-5) - 7 = -4$
 $t_8 = 128 + 8b - 7 = 128 + 8(-5) - 7 = -4$
 $t_9 = 162 + 9b - 7 = 162 + 9(-5) - 7 = -4$
 $t_{10} = 200 + 10b - 7 = 200 + 10(-5) - 7 = -4$
 $t_{11} = 242 + 11b - 7 = 242 + 11(-5) - 7 = -4$
 $t_{12} = 288 + 12b - 7 = 288 + 12(-5) - 7 = -4$
 $t_{13} = 338 + 13b - 7 = 338 + 13(-5) - 7 = -4$
 $t_{14} = 392 + 14b - 7 = 392 + 14(-5) - 7 = -4$
 $t_{15} = 450 + 15b - 7 = 450 + 15(-5) - 7 = -4$
 $t_{16} = 512 + 16b - 7 = 512 + 16(-5) - 7 = -4$
 $t_{17} = 578 + 17b - 7 = 578 + 17(-5) - 7 = -4$
 $t_{18} = 648 + 18b - 7 = 648 + 18(-5) - 7 = -4$
 $t_{19} = 722 + 19b - 7 = 722 + 19(-5) - 7 = -4$
 $t_{20} = 800 + 20b - 7 = 800 + 20(-5) - 7 = -4$
 $t_{21} = 882 + 21b - 7 = 882 + 21(-5) - 7 = -4$
 $t_{22} = 968 + 22b - 7 = 968 + 22(-5) - 7 = -4$
 $t_{23} = 1058 + 23b - 7 = 1058 + 23(-5) - 7 = -4$
 $t_{24} = 1152 + 24b - 7 = 1152 + 24(-5) - 7 = -4$
 $t_{25} = 1250 + 25b - 7 = 1250 + 25(-5) - 7 = -4$
 $t_{26} = 1352 + 26b - 7 = 1352 + 26(-5) - 7 = -4$
 $t_{27} = 1458 + 27b - 7 = 1458 + 27(-5) - 7 = -4$
 $t_{28} = 1568 + 28b - 7 = 1568 + 28(-5) - 7 = -4$
 $t_{29} = 1682 + 29b - 7 = 1682 + 29(-5) - 7 = -4$
 $t_{30} = 1800 + 30b - 7 = 1800 + 30(-5) - 7 = -4$
 $t_{31} = 1922 + 31b - 7 = 1922 + 31(-5) - 7 = -4$
 $t_{32} = 2048 + 32b - 7 = 2048 + 32(-5) - 7 = -4$
 $t_{33} = 2178 + 33b - 7 = 2178 + 33(-5) - 7 = -4$
 $t_{34} = 2312 + 34b - 7 = 2312 + 34(-5) - 7 = -4$
 $t_{35} = 2450 + 35b - 7 = 2450 + 35(-5) - 7 = -4$
 $t_{36} = 2592 + 36b - 7 = 2592 + 36(-5) - 7 = -4$
 $t_{37} = 2738 + 37b - 7 = 2738 + 37(-5) - 7 = -4$
 $t_{38} = 2888 + 38b - 7 = 2888 + 38(-5) - 7 = -4$
 $t_{39} = 3042 + 39b - 7 = 3042 + 39(-5) - 7 = -4$
 $t_{40} = 3200 + 40b - 7 = 3200 + 40(-5) - 7 = -4$
 $t_{41} = 3362 + 41b - 7 = 3362 + 41(-5) - 7 = -4$
 $t_{42} = 3528 + 42b - 7 = 3528 + 42(-5) - 7 = -4$
 $t_{43} = 3698 + 43b - 7 = 3698 + 43(-5) - 7 = -4$
 $t_{44} = 3872 + 44b - 7 = 3872 + 44(-5) - 7 = -4$
 $t_{45} = 4050 + 45b - 7 = 4050 + 45(-5) - 7 = -4$
 $t_{46} = 4232 + 46b - 7 = 4232 + 46(-5) - 7 = -4$
 $t_{47} = 4418 + 47b - 7 = 4418 + 47(-5) - 7 = -4$
 $t_{48} = 4608 + 48b - 7 = 4608 + 48(-5) - 7 = -4$
 $t_{49} = 4802 + 49b - 7 = 4802 + 49(-5) - 7 = -4$
 $t_{50} = 5000 + 50b - 7 = 5000 + 50(-5) - 7 = -4$
 $t_{51} = 5202 + 51b - 7 = 5202 + 51(-5) - 7 = -4$
 $t_{52} = 5408 + 52b - 7 = 5408 + 52(-5) - 7 = -4$
 $t_{53} = 5618 + 53b - 7 = 5618 + 53(-5) - 7 = -4$
 $t_{54} = 5832 + 54b - 7 = 5832 + 54(-5) - 7 = -4$
 $t_{55} = 6050 + 55b - 7 = 6050 + 55(-5) - 7 = -4$
 $t_{56} = 6272 + 56b - 7 = 6272 + 56(-5) - 7 = -4$
 $t_{57} = 6498 + 57b - 7 = 6498 + 57(-5) - 7 = -4$
 $t_{58} = 6728 + 58b - 7 = 6728 + 58(-5) - 7 = -4$
 $t_{59} = 6962 + 59b - 7 = 6962 + 59(-5) - 7 = -4$
 $t_{60} = 7200 + 60b - 7 = 7200 + 60(-5) - 7 = -4$
 $t_{61} = 7442 + 61b - 7 = 7442 + 61(-5) - 7 = -4$
 $t_{62} = 7688 + 62b - 7 = 7688 + 62(-5) - 7 = -4$
 $t_{63} = 7938 + 63b - 7 = 7938 + 63(-5) - 7 = -4$
 $t_{64} = 8192 + 64b - 7 = 8192 + 64(-5) - 7 = -4$
 $t_{65} = 8450 + 65b - 7 = 8450 + 65(-5) - 7 = -4$
 $t_{66} = 8712 + 66b - 7 = 8712 + 66(-5) - 7 = -4$
 $t_{67} = 8978 + 67b - 7 = 8978 + 67(-5) - 7 = -4$
 $t_{68} = 9248 + 68b - 7 = 9248 + 68(-5) - 7 = -4$
 $t_{69} = 9522 + 69b - 7 = 9522 + 69(-5) - 7 = -4$
 $t_{70} = 9800 + 70b - 7 = 9800 + 70(-5) - 7 = -4$
 $t_{71} = 10082 + 71b - 7 = 10082 + 71(-5) - 7 = -4$
 $t_{72} = 10368 + 72b - 7 = 10368 + 72(-5) - 7 = -4$
 $t_{73} = 10658 + 73b - 7 = 10658 + 73(-5) - 7 = -4$
 $t_{74} = 10952 + 74b - 7 = 10952 + 74(-5) - 7 = -4$
 $t_{75} = 11250 + 75b - 7 = 11250 + 75(-5) - 7 = -4$
 $t_{76} = 11552 + 76b - 7 = 11552 + 76(-5) - 7 = -4$
 $t_{77} = 11858 + 77b - 7 = 11858 + 77(-5) - 7 = -4$
 $t_{78} = 12168 + 78b - 7 = 12168 + 78(-5) - 7 = -4$
 $t_{79} = 12482 + 79b - 7 = 12482 + 79(-5) - 7 = -4$
 $t_{80} = 12800 + 80b - 7 = 12800 + 80(-5) - 7 = -4$
 $t_{81} = 13122 + 81b - 7 = 13122 + 81(-5) - 7 = -4$
 $t_{82} = 13448 + 82b - 7 = 13448 + 82(-5) - 7 = -4$
 $t_{83} = 13778 + 83b - 7 = 13778 + 83(-5) - 7 = -4$
 $t_{84} = 14112 + 84b - 7 = 14112 + 84(-5) - 7 = -4$
 $t_{85} = 14450 + 85b - 7 = 14450 + 85(-5) - 7 = -4$
 $t_{86} = 14792 + 86b - 7 = 14792 + 86(-5) - 7 = -4$
 $t_{87} = 15138 + 87b - 7 = 15138 + 87(-5) - 7 = -4$
 $t_{88} = 15488 + 88b - 7 = 15488 + 88(-5) - 7 = -4$
 $t_{89} = 15842 + 89b - 7 = 15842 + 89(-5) - 7 = -4$
 $t_{90} = 16200 + 90b - 7 = 16200 + 90(-5) - 7 = -4$
 $t_{91} = 16562 + 91b - 7 = 16562 + 91(-5) - 7 = -4$
 $t_{92} = 16928 + 92b - 7 = 16928 + 92(-5) - 7 = -4$
 $t_{93} = 17298 + 93b - 7 = 17298 + 93(-5) - 7 = -4$
 $t_{94} = 17672 + 94b - 7 = 17672 + 94(-5) - 7 = -4$
 $t_{95} = 18050 + 95b - 7 = 18050 + 95(-5) - 7 = -4$
 $t_{96} = 18432 + 96b - 7 = 18432 + 96(-5) - 7 = -4$
 $t_{97} = 18818 + 97b - 7 = 18818 + 97(-5) - 7 = -4$
 $t_{98} = 19208 + 98b - 7 = 19208 + 98(-5) - 7 = -4$
 $t_{99} = 19602 + 99b - 7 = 19602 + 99(-5) - 7 = -4$
 $t_{100} = 20000 + 100b - 7 = 20000 + 100(-5) - 7 = -4$

۹) $(-\infty, a+4) \cap (2a+1, +\infty) \neq \emptyset \Rightarrow a+4 < 2a+1 \sim 3 < a \Rightarrow [3, +\infty)$

الف) $\left\lfloor \frac{100}{3} \right\rfloor = 33$
 ب) $\left\lfloor \frac{100}{5} \right\rfloor = 20$
 ۲) $33 + 20 - 4 = 49$
 ۳) $\left\lfloor \frac{100}{15} \right\rfloor = 6$