

الف) $t_n = n^2 - 4n + 2$

$n_{\min} = \frac{-(-4)}{2 \times 1} = 2 \quad t_{n_{\min}} = 2^2 - 4 \times 2 + 2 = -6$

ب) $t_n = n^2 + 4n + 2$
 $n \geq 1, n \in \mathbb{N}$

توین غنیه های n^2 و n مثبت اند پس کتبی مقدار t_n همان کتبی مقدار n است

$\Rightarrow t_1 = 1^2 + 4 \times 1 + 2 = 7$
 $t_1 = t_{\min}$

$t_n = -4, -7, -1, 1, 3, \dots$
 $-4 \quad -7 \quad -1 \quad 1 \quad 3$
 $+2 \quad +2 \quad +2$

$t_0 = -4 + 5 = 1$

$t_1 = 1^2 + b \times 1 + 1 = -4 \Rightarrow b = -6$

$t_n = n^2 - 4n + 1$

$\frac{1}{2} \times n^2$

$t_{10} = 10^2 - 4 \times 10 + 1 = 41$

$t_n = -4, -1, 1, 3, \dots$
 $-4 \quad -1 \quad 1 \quad 3$
 $+1 \quad +2 \quad +2$

$t_2 = -4 - 1 = -5$

$t_1 = 1^2 \times 2 + b \times 1 - 1 = -4 \Rightarrow b = -6$

$t_n = n^2 \times \frac{1}{2} - n - 1 = \frac{1}{2}n^2 - n - 1$

$(-\infty, a+4] \cap [2a+1, +\infty) \neq \emptyset \Rightarrow 2a+1 \leq a+4$
 $\Rightarrow a \leq 3$

الف) $3, 4, 9, \dots, 99 \quad n = 1 + \frac{99-3}{9} = 11$

ب) $1, 10, 100, \dots, 1000 \quad n = 1 + \frac{1000-1}{9} = 111$

ج) $1, 10, 100, \dots, 900 \quad n = 1 + \frac{900-1}{9} = 100$

د) $n(A \cup B) = n(A) + n(B) - n(A \cap B) = 11 + 111 - 100 = 22$

الف) $t_n = 3n^2 - 1$ $t_1 = 3 \times 1^2 - 1 = 2$ $t_2 = 3 \times 2^2 - 1 = 11$ $t_3 = 3 \times 3^2 - 1 = 26$

$t_4 = 3 \times 4^2 - 1 = 47$ $t_5 = 3 \times 5^2 - 1 = 74$ $t_n = 2, 11, 26, 47, 74, \dots$

ب) $t_n = \frac{3n+1}{n+4}$ $t_1 = \frac{3+1}{1+4} = \frac{4}{5}$ $t_2 = \frac{3 \times 2 + 1}{2+4} = \frac{7}{6}$ $t_3 = \frac{3 \times 3 + 1}{3+4} = 1$

$t_4 = \frac{3 \times 4 + 1}{4+4} = \frac{9}{8}$ $t_5 = \frac{3 \times 5 + 1}{5+4} = \frac{11}{9}$ $t_n = \frac{4}{5}, \frac{7}{6}, 1, \frac{9}{8}, \frac{11}{9}, \dots$

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

ب) $t_n = 3n - \left[\frac{n}{4} \right] \rightarrow t_{13} = 3 \times 13 - \left[\frac{13}{4} \right] = 24 - 3 = 21$

الف) $t_n = 3n - 10 \xrightarrow{t_n < 0} 3n - 10 < 0 \Rightarrow 3n < 10 \Rightarrow n < \frac{10}{3} \Rightarrow n < 3.33$
 $n=1, n=2, n=3$
 $n=4$
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 $n=6$
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 $n=100$

ب) $t_n = n^2 - 14n + 40 \xrightarrow{t_n < 0} n^2 - 14n + 40 < 0 \Rightarrow (n-4)(n-10) < 0$

$\frac{4}{+} \quad \frac{10}{-}$
 $\frac{+}{+} \quad \frac{-}{-}$
 $\Rightarrow 4 < n < 10$
 $n=5, n=6, n=7, n=8, n=9$

الف) $t_n = 3n - 14 \xrightarrow{t_n < 0} 3n - 14 < 0 \Rightarrow 3n < 14 \Rightarrow n < \frac{14}{3} \Rightarrow n < 4.66$
 $n=1, n=2, n=3, n=4$

ب) $t_n = n^2 - 12n + 27 \xrightarrow{t_n < 0} n^2 - 12n + 27 < 0 \Rightarrow (n-3)(n-9) < 0$

$\frac{3}{+} \quad \frac{9}{-}$
 $\frac{+}{+} \quad \frac{-}{-}$
 $\Rightarrow 3 < n < 9$
 $n=4, n=5, n=6, n=7, n=8$

$t_n = an + b$

$t_n = 3n - 5$

$t_4 = 4a + b = 7$
 $t_9 = 9a + b = 22$

$5a = 15 \Rightarrow a = 3$

$t_3 = 3 \times 3 - 5 = 4$