

الف) $t_n = 3n^2 - 1 \Rightarrow$ $n=1 \rightarrow 2$ $n=4 \rightarrow 47$ $\Rightarrow 2, 11, 24, 47, 74, \dots$
 $n=2 \rightarrow 11$ $n=5 \rightarrow 74$
 $n=3 \rightarrow 24$

ب) $t_n = \frac{n+1}{n+4} \rightarrow$ $n=1 \rightarrow \frac{2}{5}$ $n=4 \rightarrow \frac{5}{8}$ $\frac{2}{5}, \frac{3}{4}, 1, \frac{4}{5}, \frac{5}{6}, \dots$
 $n=2 \rightarrow \frac{3}{6}$ $n=5 \rightarrow \frac{6}{9}$
 $n=3 \rightarrow \frac{4}{7}$

الف) $\frac{(-1)^n}{\sqrt{n+3}} \Rightarrow \frac{-1}{4} \Rightarrow \frac{-1}{4}$

ب) $t_n = n - \left\lfloor \frac{n}{4} \right\rfloor \Rightarrow 2 \times 13 - \left\lfloor \frac{13}{4} \right\rfloor \Rightarrow 26 - 3 = 23$

الف) $t_n = 2n - 10 \Rightarrow 2n - 10 < 0 \Rightarrow 2n < 10 \Rightarrow n < 5 \Rightarrow 1, 2, 3, 4 \rightarrow \underline{\text{ج ۴}}$

ب) $t_n = n^2 - 14n + 45 \Rightarrow n^2 - 14n + 45 < 0 \Rightarrow (n-5)(n-9) < 0$
 $\begin{cases} n-5 > 0, n-9 < 0 \rightarrow n > 5, n < 9 \rightarrow (5, 9) \\ n-5 < 0, n-9 > 0 \rightarrow n < 5, n > 9 \rightarrow \emptyset \end{cases} \rightarrow [5, 9] \rightarrow 5, 6, 7, 8, 9 \rightarrow \underline{\text{ج ۵}}$

الف) $t_n = 2n - 14 \Rightarrow 2n - 14 < 0 \Rightarrow 2n < 14 \Rightarrow n < 7 \Rightarrow 1, 2, 3, 4, 5, 6 \rightarrow \underline{\text{ج ۶}}$

ب) $t_n = n^2 - 12n + 27 \Rightarrow (n-3)(n-9) < 0$
 $\begin{cases} n-3 > 0, n-9 < 0 \rightarrow n > 3, n < 9 \rightarrow (3, 9) \\ n-3 < 0, n-9 > 0 \rightarrow n < 3, n > 9 \rightarrow \emptyset \end{cases} \rightarrow [3, 9] \rightarrow 3, 4, 5, 6, 7, 8, 9$
 $n=3, n=9$ $\underline{\text{ج ۷}}$

$\begin{cases} a_f = a_1 + 3d = 7 \\ a_v = a_1 + 4d = 22 \end{cases} \rightarrow dd = 15 \rightarrow \underline{d=3}$

$a_1 + 9 = 7 \rightarrow a_1 = -2$

$a_p = a_1 + 4d \Rightarrow -2 + 4(3) = 10$

الف) $t_n = n^2 - 4n + 2 \rightarrow a \neq 0 \rightarrow \min \quad x_s = \frac{-b}{2a} \Rightarrow \frac{-(-4)}{2 \times 1} = 2$
 $y_s = 2^2 - 4(2) + 2 = \underline{-2}$ ✓

ب) $t_n = n^2 + 4n + 1$
 $\rightarrow$ حيث $n=1 \Rightarrow 1 + 4 + 1 = \underline{6}$

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$t_n = -4, -1, 1, 4, \dots \Rightarrow x_a = 4 \rightarrow a = 1$
 $an^2 + bn + C \Rightarrow \begin{cases} 1 + b + C = -4 \\ 4 + 4b + C = -1 \end{cases} \Rightarrow \begin{cases} -3 - b = 4 \\ b = -7 \end{cases}$
 $n=1 \Rightarrow 1 - 4 + C = 4 \Rightarrow \underline{C=7}$
 $(\text{عوضه}) an = \underline{n^2 - 4n + 1} \rightarrow \frac{(10)^2}{100} - \frac{4(10)}{40} + 1 = \underline{41}$

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$t_n = -4, -1, 1, 4, \dots$
 $x_a = 4 \rightarrow a = 1$
 $an^2 + bn + C \Rightarrow \begin{cases} 1 + b + C = -4 \\ 4 + 4b + C = -1 \end{cases} \Rightarrow \begin{cases} 4 + b = 0 \\ b = -4 \end{cases}$
 $n=1 \Rightarrow 1(1)^2 - 1 + C = -4 \Rightarrow \underline{C=-4}$
 $(\text{عوضه}) an = \underline{2n^2 - n - 4}$

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$(-\infty, a+4] \cap [x_a+1, +\infty) \rightarrow$ تنافي
 $a+4, x_a+1 \rightarrow \underline{3 < a} \quad \underline{1} \quad \underline{[3, +\infty)}$

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الف) $3, 4, 9, \dots, 99 \Rightarrow \frac{an - a_1}{d} + 1 \Rightarrow \frac{99 - 3}{4} + 1 = \underline{23} \rightarrow n(A) = 23$
 ب) $0, 10, 100, \dots, 900 \Rightarrow \frac{an - a_1}{d} + 1 \Rightarrow \frac{900 - 0}{100} + 1 = \underline{10} \rightarrow n(B) = 10$
 ج) $10, 30, 40, \dots, 90 \Rightarrow \frac{an - a_1}{d} + 1 \Rightarrow \frac{90 - 10}{10} + 1 = \underline{9} \rightarrow n(A \cap B) = 9$
 د) $n(A \cup B) = n(A) + n(B) - n(A \cap B) = 23 + 10 - 9 = \underline{24} \rightarrow n(A \cup B) = 24$

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