

① جمله nاماندهای - تکلیف شماره ۱۰ - دهم دختر

الف) $t_n = 3n^2 - 1$

$t_1 = 3 \times 1^2 - 1 = 3 - 1 = 2$

$t_2 = 3 \times 2^2 - 1 = 12 - 1 = 11$

$t_3 = 3 \times 3^2 - 1 = 27 - 1 = 24$

$t_4 = 3 \times 4^2 - 1 = 48 - 1 = 47$

$t_5 = 3 \times 5^2 - 1 = 75 - 1 = 74$

$2, 11, 24, 47, 74$

ب) $t_n = \frac{2n+1}{n+4}$

$t_1 = \frac{2 \times 1 + 1}{1 + 4} = \frac{3}{5}$

$t_2 = \frac{2 \times 2 + 1}{2 + 4} = \frac{5}{6}$

$t_3 = \frac{2 \times 3 + 1}{3 + 4} = \frac{7}{7} = 1$

$t_4 = \frac{2 \times 4 + 1}{4 + 4} = \frac{9}{8}$

$t_5 = \frac{2 \times 5 + 1}{5 + 4} = \frac{11}{9}$

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

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

ب) $t_n = 2n - \left[\frac{n}{4}\right] \rightarrow t_{13} = 2 \times 13 - \left[\frac{13}{4}\right] = 26 - [3, 25] = 26 - 3 = 23 \rightarrow t_{13} = 23$

الف) $t_n = 2n - 10 \rightarrow 2n - 10 < 0 \rightarrow 2n < 10 \rightarrow n < 5$ ۴ صید

ب) $t_n = n^2 - 14n + 4 \rightarrow n^2 - 14n + 4 < 0 \rightarrow (n-10)(n-4) < 0$

$(n-10)(n-4) < 0$
 $\downarrow \quad \downarrow$
 $10 \quad 4$
 $+$ $-$ $+$ $\rightarrow 4 < n < 10 \rightarrow$ ۱, ۲, ۳, ۴, ۵, ۶, ۷, ۸, ۹

الف) $t_n = 2n - 14 \rightarrow 2n - 14 \leq 0 \rightarrow 2n \leq 14 \rightarrow n \leq 7$ ۷ صید

$n \leq 7 \rightarrow$ ۷ صید

ب) $t_n = n^2 - 12n + 27 \rightarrow n^2 - 12n + 27 \leq 0$

$n^2 - 12n + 27 \leq 0 \rightarrow (n-9)(n-3) \leq 0$

$(n-9)(n-3) \leq 0$
 $\downarrow \quad \downarrow$
 $9 \quad 3$
 $+$ $-$ $+$ $\rightarrow 3 \leq n \leq 9$
 $3, 4, 5, 6, 7, 8, 9$

۷ صید

$t_4 = 7, t_9 = 22, t_3 = ?$

$d = \frac{t_m - t_n}{m - n} = \frac{t_9 - t_4}{9 - 4} = \frac{22 - 7}{5} = \frac{15}{5} = 3 \rightarrow d = 3$

$t_4 = t_1 + 3d \rightarrow 7 = t_1 + 3 \times 3 \rightarrow 7 = t_1 + 9 \rightarrow t_1 = -2$

$t_3 = t_1 + 2d = -2 + 2 \times 3 = -2 + 6 = 4 \rightarrow t_3 = 4$

الف) $t_n = n^2 - 4n + 2$

$t_1 = 1^2 - 4 \times 1 + 2 = -1$
 $\frac{-b}{2a} = \frac{-(-4)}{2 \times 1} = \frac{4}{2} = 2$

$t_3 = 3^2 - 4 \times 3 + 2 = 9 - 12 + 2 = -1$

ب) $t_n = n^2 + 4n + 1$

$\min = \frac{-b}{2a} = \frac{-4}{2 \times 1} = \frac{-4}{2} = -2 \rightarrow x (n \geq 1)$

$t_1 = 1^2 + 4 \times 1 + 1 = 1 + 4 + 1 = 6$

$t_1 = 6$

$$t_n = -4, -1, 1, 4, \dots$$

$\begin{array}{ccccccc} & \nearrow & \nearrow & \nearrow & \nearrow & \nearrow & \\ & +5 & +9 & +13 & & & \\ & \nwarrow & \nwarrow & \nwarrow & \nwarrow & \nwarrow & \\ & +4 & +4 & +4 & +4 & +4 & \end{array}$

$$ra = 4 \rightarrow a = \frac{4}{r} = 1 \rightarrow a = 1$$

$$ra + b = -4 \rightarrow r \times 1 + b = -4 \rightarrow r + b = -4 \rightarrow b = -4$$

$$a + b + c = -4 \rightarrow 1 - 4 + c = -4 \rightarrow c = -4 + 4 - 1 = 1 \rightarrow c = 1$$

$$t_n = an^r + bn + c \rightarrow t_n = n^2 - 4n + 1$$

$$t_1 = 1^2 - 4 \times 1 + 1 = 1 - 4 + 1 = -2 \rightarrow t_1 = -2$$

$$t_n = -4, -1, 1, 4, \dots$$

$\begin{array}{ccccccc} & \nearrow & \nearrow & \nearrow & \nearrow & \nearrow & \\ & +5 & +9 & +13 & & & \\ & \nwarrow & \nwarrow & \nwarrow & \nwarrow & \nwarrow & \\ & +4 & +4 & +4 & +4 & +4 & \end{array}$

$$ra = 4 \rightarrow a = r$$

$$ra + b = -4 \rightarrow r \times r + b = -4 \rightarrow r^2 + b = -4 \rightarrow b = -4$$

$$a + b + c = -4 \rightarrow r - 4 + c = -4 \rightarrow 1 + c = -4 \rightarrow c = -5$$

$$a_n = an^r + bn + c = rn^2 - 4n - 5$$

$$a_n = rn^2 - 4n - 5$$

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

$$a+r \leq ra+1 \rightarrow r-1 \leq ra-a \rightarrow r \leq a$$

$$a = [r, +\infty)$$

$$⑦ \quad \{3, 6, 9, \dots, 99\} \rightarrow \frac{99-3}{3} + 1 = \frac{96}{3} + 1 = 32 + 1 = 33 \quad ①$$

$$32 + 1 = 33 \rightarrow \boxed{33} \text{ بره چش بنبره شند}$$

$$⑧ \quad \{5, 10, 15, \dots, 95\} \rightarrow \frac{95-5}{5} + 1 = \frac{90}{5} + 1 = 18 + 1 = 19$$

$$\boxed{19} \text{ بره چش بنبره شند}$$

$$⑨ \quad \{15, 30, 45, \dots, 90\} \rightarrow \frac{90-15}{15} + 1 = \frac{75}{15} + 1 = 5 + 1 = 6$$

$$\frac{75}{15} + 1 = 5 + 1 = 6 \rightarrow \boxed{6} \text{ هم بره، هم بره، چش بنبره}$$

⑩

$$> n(A) \cup n(B) = n(A) + n(B) - n(A \cap B) =$$

$$32 + 19 - 4 = 32 + 13 = \boxed{45}$$

⑪