

نام و نام خانوادگی: ... شماره: ۱۰۵ ... ۲۰ امین گروه: ...

الف) $t_n = 3n^2 - 1$ $t_1 = 3 - 1 = 2$ $t_r = 3(r)^2 - 1 = 11$ $t_r = 3(r)^2 - 1 = 29$

$t_4 = 3(4)^2 - 1 = 47$ $t_5 = 3(5)^2 - 1 = 74$

ب) $t_n = \frac{r_{n+1}}{n+r}$ $t_1 = \frac{r+1}{1+r} = \frac{3}{5}$ $t_r = \frac{r+1}{r} = \frac{5}{4}$ $t_4 = \frac{4+1}{4} = 1$

$t_4 = \frac{9}{1}$ $t_5 = \frac{10+1}{9} = \frac{11}{9}$

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

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

الف) $t_n = 2n - 10$ $2n - 10 < 0 \Rightarrow 2n < 10 \Rightarrow n < 5$

ب) $t_n = n^2 - 14n + 40 \Rightarrow (n-4)(n-10)$

$\begin{array}{c} 4 \quad 10 \\ + \quad - \quad + \\ \hline \end{array}$

الف) $t_n = 2n - 19$ $2n - 19 < 0 \Rightarrow 2n < 19 \Rightarrow n < 10$

ب) $t_n = n^2 - 12n + 27 \Rightarrow (n-3)(n-9)$

$\begin{array}{c} 3 \quad 9 \\ + \quad - \quad + \\ \hline \end{array}$

$t_4 = 7$

$t_n = an + b$

$t_9 = 22$

$t_4 = a(4) + b = 7$

$t_{10} = ?$

$t_9 = a(9) + b = 22$

$t_{10} = 10a + b = 29$

$\Rightarrow \begin{cases} 4a + b = 7 \\ 9a + b = 22 \end{cases} \Rightarrow -5a = -15 \Rightarrow a = 3$
 $4 \times 3 + b = 7 \Rightarrow b = -5$

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

$$\text{طول (اس) } \Rightarrow -\frac{b}{2a} \Rightarrow -\frac{-4}{2} = 2 \quad a_2 = \frac{(2)^2}{4} - 4\left(\frac{2}{2}\right) + 2 = -2$$

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

$$\text{طول (اس) } \Rightarrow -\frac{b}{2a} \Rightarrow -\frac{4}{2} = -2 \times n \geq 1 \Rightarrow n = 1 \quad a_1 = 1 + 4 + 1 = 6$$

$$t_n = -4, -2, -1, -2, -4$$

$$\begin{array}{ccccccc} & & \nearrow & & \nearrow & & \nearrow \\ & -2 & & -1 & & +1 & & +2 \\ & \nwarrow & & \nwarrow & & \nwarrow & & \nwarrow \\ & +2 & & +2 & & +2 & & \end{array}$$

$$t_1 = ? \quad 41$$

$$t_1 = an^2 + bn + c \Rightarrow 1 \times (1)^2 + b \times 1 + c = 41$$

$$2a = 2 \Rightarrow a = 1$$

$$t_n = an^2 + bn + c$$

$$t_1 = 1 \times (1)^2 + b(1) + c = -4$$

$$t_1 = 1 + b + c = -4 \Rightarrow b + c = -5$$

$$t_2 = an^2 + bn + c \Rightarrow 1(2)^2 + 2b + c = -2 \Rightarrow$$

$$4 + 2b + c = -2 \Rightarrow 2b + c = -6$$

$$b + c = -5$$

$$\Rightarrow b = -1$$

$$-4 + c = -5 \Rightarrow c = -1$$

$$t_n = -4, -1, 2, 5$$

$$\begin{array}{ccccccc} & & \nearrow & & \nearrow & & \nearrow \\ & +2 & & +3 & & +4 & & +5 \\ & \nwarrow & & \nwarrow & & \nwarrow & & \nwarrow \\ & +2 & & +3 & & +4 & & \end{array}$$

$$t_n = an^2 + bn + c$$

$$2a = 4 \Rightarrow a = 2$$

$$t_1 = 2(1)^2 + b + c = -4$$

$$t_2 = 2(2)^2 + 2b + c = -1$$

$$\Rightarrow \begin{cases} b + c = -6 \\ 2b + c = -9 \end{cases} \Rightarrow -b = 3$$

$$b = -3$$

$$-2 + c = -9 \Rightarrow c = -7$$

$$t_n = 2n^2 - n - 7$$

$$[2a+1, +\infty) \cap (-\infty, a+4]$$

$$a > 2 \Rightarrow ?$$

$$\textcircled{1} a+4 < 2a+1 \Rightarrow 4-1 < 2a-a \Rightarrow 3 < a$$

$$\textcircled{2} a+4 = 2a+1 \Rightarrow 3 = a \Rightarrow (-\infty, 3] \cap [3, +\infty) = \{3\}$$

$$\textcircled{3} a+4 > 2a+1 \Rightarrow 3 > a \Rightarrow [2a+1, a+4]$$

$$a \in [3, +\infty)$$

$$\text{الف } 3, 6, 9, \dots \text{ بزرگترین عدد بخش پذیر } = 99 \div 3 = 33 \rightarrow \text{ عدد}$$

$$\text{ب } 5, 10, 15, \dots \text{ بزرگترین عدد بخش پذیر } = 100 \div 5 = 20 \rightarrow \text{ عدد}$$

$$\text{ج } (5, 3) \rightarrow \text{ م.م.ك } = 3 \times 5 = 15 \quad 100 \div 15 = 6 \rightarrow \text{ عدد}$$

$$\text{د } \text{اعداد بخش پذیر در 3} = 33 \quad \text{اعداد بخش پذیر در 5} = 20 \quad \text{اعداد بخش پذیر در 15} = 6 \quad \text{تعداد کل} = 33 + 20 - 6 = 47$$