

$$1, 5, 12, 22, \dots \quad \begin{cases} a+b+c=1 \rightarrow \frac{r}{p} - \frac{1}{p} + c = 1 \rightarrow c=0 \\ 3a+b=4 \rightarrow 3 \times \frac{r}{p} + b = 4 \rightarrow b = \frac{4}{p} - \frac{3r}{p} \rightarrow b = -\frac{1}{p} \\ 2a=3 \rightarrow a = \frac{3}{p} \end{cases} \quad (1)$$

$$a_n = an^r + bn + c \rightarrow a_n = \frac{3}{p} n^2 - \frac{1}{p} n$$

$$a_{10} = \frac{3}{p} \times 10^2 - \frac{1}{p} \times 10 = \frac{3}{p} \times 100 - \frac{10}{p} = 300 - 10 = 290$$

$$a_{10} = 290$$

$$0, 1, 3, 6, \dots \quad \begin{cases} a+b+c=0 \rightarrow \frac{1}{p} - \frac{1}{p} + c = 0 \rightarrow c=0 \\ 3a+b=1 \rightarrow 3 \times \frac{1}{p} + b = 1 \rightarrow b = -\frac{1}{p} \\ 2a=1 \rightarrow a = \frac{1}{p} \end{cases} \quad (2)$$

$$a_n = an^r + bn + c$$

$$a_n = \frac{1}{p} n^2 - \frac{1}{p} n \rightarrow \frac{1}{p} n^2 - \frac{1}{p} n = 55 \rightarrow \frac{1}{p} (n^2 - n) = 55$$

$$n^2 - n = 55 \div \frac{1}{p} = 55 \times 2 = 110 \rightarrow n^2 - n = 110$$

$$n^2 - n = 110 \rightarrow n^2 - n - 110 = 0 \rightarrow (n-11)(n+10) = 0$$

$$\boxed{n=11} \quad \text{شماره 11}$$

$$5, 13, 21, \dots \quad \begin{cases} a_n = 2n + b \\ a_1 = 2 \times 1 + b \rightarrow 5 = 2 + b \rightarrow b = -3 \\ a_n = 2n - 3 \end{cases} \quad (3)$$

$$a_{11} = 2 \times 11 - 3 = 22 - 3 = 19$$

$$5, 9, 13, \dots \quad \begin{cases} a_n = 4n + b \\ a_1 = 4 + b \rightarrow 5 = 4 + b \rightarrow b = 1 \\ a_n = 4n + 1 \\ a_{11} = 4 \times 11 + 1 = 44 + 1 = 45 \end{cases} \quad \text{شماره 45}$$

$$a_n = \frac{(-1)^n}{n} \quad a_1 = \frac{(-1)^1}{1} = -1 \quad a_r = \frac{(-1)^r}{r} = \frac{1}{r} \quad (4)$$

$$a_r = \frac{(-1)^r}{r} = \frac{1}{r} \quad a_5 = \frac{(-1)^5}{5} = -\frac{1}{5}$$

$$a_3 = \frac{(-1)^3}{3} = -\frac{1}{3} \quad \vdots$$

$$-1, \frac{1}{2}, -\frac{1}{3}, \frac{1}{4}, -\frac{1}{5}, \dots$$

$$\frac{1}{2} - (-1) = \frac{1}{2} + 1 = \frac{1}{2} + \frac{2}{2} = \frac{3}{2}$$

$$\frac{1}{2} = \text{برعکس}$$

$$-1 = \text{برعکس}$$

$$b_n = (-1)^n - 2n \quad (5)$$

$$b_3 = (-1)^3 - 2 \times 3 = -1 - 6 = -7$$

$$a_n = -2n + 22$$

$$a_k = -2k + 22 = -4$$

$$-2k + 22 = -4 \rightarrow -2k = -4 - 22 \rightarrow -2k = -26 \rightarrow k = 13$$

$$k = \frac{-26}{-2} = \frac{26}{2} = 13 \rightarrow \boxed{k=13}$$

$$a_{10} - a_5 = 12$$

$$a_4 - a_1 = ?$$

$$a_{10} - a_5 = a_5 + 3d - a_5 = 12 \rightarrow 3d = 12 \rightarrow d = 4$$

$$a_2 - a_1 = a_1 + d - a_1 = d = 4 \times 4 = 16$$

$$a_4 - a_1 = \boxed{12}$$

اسم زیاده

$$ar = v$$

$$ar = 10$$

$$ar = ar + rd = 10 \rightarrow v + rd = 10 \rightarrow rd = 10 - v$$

$$\rightarrow rd = 1 \rightarrow d = r$$

$$ar = a_1 + d \rightarrow v = a_1 + r \rightarrow a_1 = r$$

$$ar = a_1 + rd = r + r \times r = r + 1 = 11 \rightarrow ar = 11$$

$$\left. \begin{array}{l} t_1 = r \\ t_r = 11 \end{array} \right\} d = \frac{t_r - t_1}{r - 1} = \frac{11 - r}{1} = 11 - r = 1$$

$$bn = t_1 + (n-1)d \rightarrow bn = r + (n-1) \times 1$$

$$\rightarrow bn = r + 1n - 1 = 1n - 1 \rightarrow \boxed{bn = 1n - 1}$$

$$t_n = \frac{r}{1}, \frac{4}{1}, \frac{1}{1}, \frac{11}{1}$$

$$\begin{array}{l} r, 4, 1, 11, \dots \\ \downarrow \quad \downarrow \quad \downarrow \\ +r \quad +r \quad +r \end{array} \quad \begin{array}{l} a_n = rn + b \\ a_1 = r + b \rightarrow r = r + b \rightarrow b = -r \\ a_n = rn - r \end{array}$$

$$\begin{array}{l} 10, 1, 9, 11, \dots \\ \downarrow \quad \downarrow \quad \downarrow \\ +r \quad +r \quad +r \end{array} \quad \begin{array}{l} a_n = rn + b \\ a_1 = r + b \rightarrow 10 = r + b \rightarrow b = r \\ a_n = rn + r \end{array}$$

$$\frac{rn - r}{rn + r} < \frac{r}{r} \xrightarrow{\times r} \frac{1n - r}{1n + r} < 1 \rightarrow 1n - r < 1n + r$$

$$1n - r < 1n + r \rightarrow 1n - 1n < r + r \rightarrow 0 < 2r \rightarrow n < \frac{11}{r}$$

$$n < 4, 10 \rightarrow n = \{1, 2, 3, 4, 10, 11\} \rightarrow \boxed{\text{مجموعه}}$$

⑤

$$t_n = 9, 9, 9, 4, \dots$$

⑥

$$\begin{cases} a + b + c = 9 \rightarrow -\frac{r}{r} + \frac{10}{r} + c = 9 \rightarrow c = 0 \\ ra + b = r \rightarrow r \times (-\frac{r}{r}) + b = r \rightarrow -\frac{9}{r} + b = \frac{4}{r} \rightarrow b = \frac{10}{r} \\ ra = -r \rightarrow a = -\frac{r}{r} \end{cases}$$

$$\begin{array}{l} t_n = An^r + Bn \\ t_n = -\frac{r}{r}n^r + \frac{10}{r}n \end{array} \quad \left. \begin{array}{l} A = -\frac{r}{r} \\ B = \frac{10}{r} \end{array} \right\}$$

$$rA + 10B = r \times (-\frac{r}{r}) + 10 \times \frac{10}{r} = -\frac{9}{r} + \frac{100}{r} = \frac{91}{r}$$

$$\boxed{rA + 10B = rr}$$

⑦

$$\begin{array}{l} t_n = -4, -4, \dots \\ \downarrow \quad \downarrow \\ +r \quad +r \end{array} \quad \begin{cases} a + b + c = -4 \rightarrow 1 - 1 + c = -4 \rightarrow c = -4 \\ ra + b = r \rightarrow r + b = r \rightarrow b = 0 \\ ra = r \rightarrow a = 1 \end{cases}$$

$$a_n = an^r + bn + c \rightarrow a_n = n^r - n - 4$$

$$\begin{array}{l} ar = r^1 \\ ar = r^1 \end{array} \quad d = \frac{ar - ar}{r - r} = \frac{r^1 - r^1}{r} = \frac{0}{r} = 0$$

$$a_n = 1n + b \rightarrow ar = 1 + b \rightarrow r^1 = 1 + b \rightarrow b = r^1$$

$$a_n = 1n + r^1 \quad n^r - n - 4 = 1n + r^1$$

$$n^r - 4n - r^1 = 0$$

$$(n-4) \times (n+r^1) = 0 \rightarrow \boxed{n=4} \quad \begin{array}{l} 10 \times 9 + r^1 = \\ 10 + r^1 = 99 \end{array}$$

$$\begin{array}{l} n=4 \\ n=-r^1 \end{array} \times$$

$$\boxed{n=4, 99}$$