



$$a_n = n^2 + \frac{n(n-1)}{2} \Rightarrow 1 + 0 + \frac{4 \times 9}{2} = 19 \checkmark$$

(۲)

$$a_n = \frac{n(n-1)}{2}$$

$$\frac{n(n-1)}{2} = 55$$

$$n(n-1) = 110$$

$$(n=11) \checkmark$$

(۲)

$$\left. \begin{array}{l} \text{گوی سفید} \rightarrow a_n = 4n - 4 \\ \text{گوی سیاه} \rightarrow b_n = 4n + 1 \end{array} \right\} n=11 \Rightarrow \left\{ \begin{array}{l} \text{کل گوی} = 4 \times 11 - 4 + 4 \times 11 + 1 = 85 \checkmark \\ \text{گوی سیاه} \rightarrow b_{11} = 4 \times 11 + 1 = 45 \checkmark \end{array} \right.$$

(۲)

$$a_n = \frac{(-1)^n}{n} \rightarrow \text{برای } n \text{ های فرد منفی است} \quad \text{پاسخ } \boxed{1, 5} \checkmark \quad \text{اختلاف } = \left| \frac{1}{5} - (-1) \right|$$

$$\left\{ \begin{array}{l} \text{بزرگترین} \rightarrow n = \text{کوچکترین عدد زوج} \Rightarrow a_2 = \frac{1}{2} \\ \text{کوچکترین} \rightarrow n = \text{کوچکترین عدد فرد} \Rightarrow a_1 = -1 \end{array} \right.$$

$$b_3 = (-3)^3 - 7 \times 3 = -27 - 21 = -48$$

$$a_k = -5k + 22 = -48$$

$$-5k = -70 \Rightarrow k = 14 \checkmark$$

(۲)

$$a_1 - a_5 = a_1 + 4d - a_1 - 4d = 4d = 12 \Rightarrow d = 3$$

$$a_4 - a_1 = a_1 + 3d - a_1 = 3d = 9 \Rightarrow d = 3$$

$$a_5 - a_1 = a_1 + 4d - a_1 = 4d = 12 \Rightarrow d = 3$$

$$a_5 = a_1 + 4d = 11 \Rightarrow a_1 = 3 \Rightarrow a_n = 3 + (n-1) \cdot 3 = 3n$$

$$b_1 = 3 \quad b_5 - b_1 = b_1 + 4d - b_1 = 4d = 11 - 3 = 8 \Rightarrow d = 2$$

$$b_5 = 11 \quad b_n = 3 + (n-1) \cdot 2 = 2n + 1$$

$$t_n = \frac{r_n - r}{r_n + r} \quad \frac{r_n - r}{r_n + r} < \frac{r}{r} \Rightarrow \frac{r_n - r}{r_n + r} < 1 \Rightarrow r_n - r < r_n + r \Rightarrow -r < r$$

$$n = \{1, 2, 3, 4, 5, 6\} \rightarrow n < 9$$

$$t_n = 9, 9, 9, 9, \dots \quad A = \frac{r}{r} \Rightarrow \frac{r}{r} n^2 + Bn = t_n$$

$$t_1 = \frac{r}{r} + B = 9 \Rightarrow B = \frac{10}{r}$$

$$3A + 5B = 3 \cdot \frac{r}{r} + 5 \cdot \frac{10}{r} = \frac{3}{r} + \frac{50}{r} = \frac{53}{r} = 9 \Rightarrow r = \frac{53}{9}$$

$$t_n = -9, -9, -9, \dots \Rightarrow t_n = n^2 + bn - 9$$

$$t_1 = 1 + b - 9 = -9 \Rightarrow b = -1$$

$$t_n = n^2 - n - 9$$

$$b_n \Rightarrow b_5 - b_1 = b_1 + 4d - b_1 = 4d = 11 - 3 = 8 \Rightarrow d = 2$$

$$b_5 = b_1 + 4d = 11 \Rightarrow b_1 = 3$$

$$b_n = 3 + (n-1) \cdot 2 = 2n + 1$$

$$t_n = b_n \Rightarrow n^2 - n - 9 = 2n + 1$$

$$n^2 - 3n - 10 = 0 \Rightarrow (n-5)(n+2) = 0 \Rightarrow n = 5 \text{ or } n = -2$$

نمبره جمله مشترک $\rightarrow n = 5$
غیرطبیعی $\rightarrow n = -2$