

سوال ۱) $\{1^2, 2^2, \dots, 9^2\} \rightarrow 4\omega, 11$ $\frac{a+c}{r} = b \rightarrow b = \frac{4\omega+11}{2} = 73$
(a, b, c)

سوال ۲) $\{1, 2, 3\}, \{4, 5, 6, 7, 8, 9, 10, 11, 12\}, \{13, \dots, 19\}, \{20, \dots, 26\}, \{27, \dots, 33\}$

میانگین آنها: $\frac{11+33}{2} = 22$

سوال ۳) $n=3k \rightarrow a_0 = 1^3 = 1, a_3 = 2^3 = 8, a_6 = 3^3 = 27, a_9 = 4^3 = 64$

$n=3k+1 \rightarrow a_1 = -2(0)+4 = 4, a_4 = -2(1)+4 = 2, a_7 = -2(2)+4 = 0$

$n=3k+2 \rightarrow a_2 = \left[\frac{2}{0+2}\right] + a_0 = 1+a_0, a_5 = \left[\frac{5}{1+2}\right] + a_1 = 1+a_1, a_8 = \left[\frac{8}{2+2}\right] + a_2 = 2+a_2$

مجموع: $1+2+4+8+2+1+1+a_2+a_5+a_8 = 2\omega+3a \rightarrow 2\omega+3a=19 \rightarrow 3a=-9 \rightarrow a=-3$

$a_2+a_5+a_8+\dots+a_{3n} \Rightarrow \left[\frac{3k+2}{k+2} - 2\right] = \left[\frac{3k+2-2k-4}{k+2}\right] = \left[\frac{k-2}{k+2}\right]$

$(-1)+(-1)+0+0+\dots+0 = -2$ (صورت کوچکتر از مخرج باشد)

سوال ۴) $an^2+bn+c \rightarrow a = \frac{1}{v_0} \times (-14) = -\frac{1}{\omega}$

$\begin{cases} 49a+7b+c=17, 2 \\ 25a+\omega b+c=14 \end{cases}$

$\frac{2\omega \times (-\frac{1}{\omega}) + \omega \times 14 + c = 14}{-\omega} \downarrow c = -1$

$25a+7b = 3, 2 \Rightarrow -\frac{1}{\omega} + 7b = 3, 2 \rightarrow 7b = 1 \rightarrow b = \frac{1}{7}$

$\frac{a_{1,\omega}}{a_1} = \frac{1\omega \times (-\frac{1}{\omega}) + 1\omega \times 14 + (-1)}{1 \times (-\frac{1}{\omega}) + 1 \times 14 + (-1)} = \frac{14}{\frac{14}{\omega}} = \omega$

سوال ۵) $a_k = b_r$ $a_n = b_v$

$\begin{cases} a+rd_A = b+d_B \\ a-b = d_B-rd_A \end{cases} \Rightarrow \begin{cases} d_B-rd_A = 4d_B-vd_A \\ rd_A = \omega d_B \rightarrow \frac{r}{\omega} d_A = d_B \end{cases}$

$b_{10} = b+9d_B = 0 \rightarrow b = -9d_B \Rightarrow -9(\frac{r}{\omega} d_A) = -\frac{9r}{\omega} d_A$

$b_{10} = b+14d_B \rightarrow -\frac{9r}{\omega} d_A + 14(\frac{r}{\omega} d_A) = r d_A \rightarrow \frac{r d_A}{d_A} = \frac{r}{\omega}$

$$4a^r - 3a^r a = 2a^r a \rightarrow 3a^r (3a^r - a) = 2a^r a \rightarrow 3a^r \left(\frac{a+rd}{a^r} \right) = 2a^r a \rightarrow 3(a+rd) = 2a \rightarrow 3d = 2a \rightarrow a = \frac{3}{2}d \quad (\text{سوال ۶})$$

$$\frac{a^r}{d} = \frac{a+rd}{d} = \frac{\frac{r}{2}d + rd}{d} = \frac{r+2d}{d} = \frac{r+2d}{d}$$

$$a, b, c \rightarrow a, \frac{a+d}{b}, \frac{a+rd}{c} \quad b, \frac{a}{r}, \frac{c}{r} \rightarrow a+rd, \frac{a}{r}, \frac{a+rd}{r} \quad (\text{سوال ۷})$$

$$\text{بسط نسبی: } \left(\frac{a}{r} \right)^r = (a+rd) \left(\frac{a+rd}{r} \right) \rightarrow \frac{a^r}{r} = \frac{a^r + 2ad + rd^r}{r} \rightarrow 2ad + rd^r = 0 \rightarrow d(2a+rd) = 0 \rightarrow 2a+rd = 0 \rightarrow d = -\frac{2a}{r}$$

چون لنته سمانه منفرست

$$q = \frac{\frac{a}{r}}{\frac{a+rd}{r}} = \frac{a}{2a+rd} = \frac{a}{-2a} = -\frac{1}{2} \rightarrow 2q = 2 \times \left(-\frac{1}{2} \right) = -1$$

$$a, b, c \rightarrow a, \frac{aq}{b}, \frac{aq^r}{c} \quad 3b, 2a, c \rightarrow 3aq, 2a, aq^r \quad (\text{سوال ۸})$$

$$\text{بسط حسابی} \Rightarrow 2a = \frac{3aq + aq^r}{2} \rightarrow 4a = aq(3+q) \rightarrow q^r + 3q - 4 = 0 \rightarrow (q-1)(q+4) = 0 \quad \begin{cases} q = -4 \\ q = 1 \end{cases}$$

(بلا سمانه، غلط)

$$\frac{a_q}{a_q} = \frac{aq^r}{aq^w} = q^r \rightarrow (-4)^r = -4$$

$$\frac{aq^w}{a^r q^r} + \frac{aq}{a^r} = 2 \rightarrow \frac{q^r}{a^r} + \frac{q}{a} = 2 \rightarrow \left(\frac{q}{a} \right)^r + \frac{q}{a} - 2 = 0 \rightarrow \left(\frac{q}{a} - 1 \right) \left(\frac{q}{a} + 1 \right) = 0 \quad (\text{سوال ۹})$$

$$\frac{q}{a} \begin{cases} 2 \\ -1 \end{cases} \quad \frac{a^r}{aq} = \frac{q}{a} \rightarrow \frac{q}{a} \text{ معکوس} = \frac{1}{2}, -1$$

$$\sqrt{a^r} = a^r \rightarrow \sqrt{aq^r} = aq^r \xrightarrow{\text{بلا سمانه}} aq^r = a^r q^r \rightarrow aq = 1 \quad (\text{سوال ۱۰})$$

$$a_d = aq^r = rv \rightarrow \frac{aq^r}{aq} = rv \rightarrow q^r = rv \rightarrow q = r \quad \text{بلا سمانه} = a \rightarrow \frac{aq}{q} = \frac{1}{r}$$

$$\frac{1}{r} - \frac{1}{r} = \frac{r-r}{r} = 0$$