باران عسگری دهم دفتر 63

(۱)

$\{1\}, \{2,3,4\}, \{5, \ldots, 65, \ldots, 81\}$

دسته ۹ام ← آخری $= 9^2$, آخری دسته قبلی $(64) = 8^2$

$65 =$ پس اولی دسته ۹ام $\Longrightarrow \frac{81+65}{2} = 73$

(۲)

$\{1,2,3\}, \{4,5, \ldots, 12\}, \{13, \ldots, 39\}, \{40, \ldots, 120\}, \{121, \ldots, 363\} \Longrightarrow \frac{363+121}{2} = \boxed{242}$

(۳)

$a_1 \to 3k+1 \to k=0 \Rightarrow 4$

$a_2 \to 3k+2 \to k=0 \Rightarrow 1+a$

$a_3 \to 3k \to k=1 \to 2$

$a_4 \to 3k+1 \to k=1 \to 2$

$a_5 \to 3k+2 \to k=1 \Rightarrow 1+a$

$a_6 \to 3k \to k=2 \Rightarrow 4$

$a_7 \to 3k+1 \to k=2 \Rightarrow 0$

$a_8 \to 3k+2 \to k=2 \Rightarrow 2+a$

$a_9 \to 3k \to k=3 \to 8$

(چون صفر هم هست) $a_0 \to 3k \to k=0 \to 2^0 = 1$

$4+1+a+2+2+1+a+4+0+2+a+8+1 = 19 \to 25+3a = 19$

$\to a = \boxed{-2} \Longrightarrow a_2, a_5, \ldots, a_{29} \to 3k+2 \to -1+0+0+0$

$+0+0+0+0+0 = \boxed{-1}$

(۴)

$t_n = an^2+bn+c \xrightarrow[a_5=14]{a=\frac{1}{70}(-a_5)} a = -\frac{1}{5} \Rightarrow t_n = -\frac{1}{5}n^2+bn+c$

$t_5 = 14 \Rightarrow -\frac{1}{5}(5^2)+b(5)+c = 14 \to 5b+c = 19 \Rightarrow b=4, \ c=-1$

$t_7 = 17.2 \Rightarrow -\frac{1}{5}(7^2)+b(7)+c = 17.2 \to 7b+c = 27$

$t_n = -\frac{1}{5}n^2+4n-1 \Rightarrow t_{15} \div t_1 = 14 \div \frac{14}{5} = \boxed{5}$

(۵)

$$\begin{cases} a_4 = b_2 \\ a_1 + 3d = b_1 + d' \\ a_8 = b_7 \\ a_1 + 7d = b_1 + 6d' \end{cases} \quad , b_{10} = 0 \quad \frac{b_{15}}{d} = \frac{b_1 + 14d'}{d} \Rightarrow \frac{b_{10} + 5d'}{d} = \frac{5d'}{d} = ?$$

$$a_8 - a_4 = b_7 - b_2$$

$$4d = 5d' \Rightarrow \frac{d'}{d} = \frac{4}{5}$$

$$\boxed{5 \times \frac{4}{5} = 4}$$

(۶)

$$a_2 = x \longrightarrow 9x^2 = 5\underbrace{\overbrace{(x+d)(x-d)}^{5x^2 - 5d^2}}_{x^2 - d^2} + \underbrace{3x(x-d)}_{3x^2 - 3dx}$$

$$\Rightarrow 2x^2 - 3dx - 5d^2 = 0 \longrightarrow x = \frac{+3d \pm \sqrt{9d^2 + 40d^2}}{4} \quad = 49d^2 \quad \begin{cases} \frac{10}{4}d \\ -d \end{cases}$$

$$a_4 = a_2 + 2d \begin{cases} \frac{10}{4}d + 2d = 4.5d \rightarrow \frac{4.5d}{d} = \boxed{4.5} \\ -d + 2d = d \rightarrow \boxed{\frac{d}{d} = 1} \end{cases}$$

حسابی

c, b, a ($+d$)

(۷)

$b = c + d$

$a = c + 2d$

هندسی $\rightarrow \frac{c}{4}, \frac{a}{2}, b \xrightarrow{\text{جابجایی}} -\frac{1}{2}d, \frac{1}{4}d, -\frac{1}{4}d$

$2 - 1 = 9$

$$\frac{c}{4}, \frac{c+2d}{2}, c+d \xrightarrow{\text{هندسی}} (c+d)\left(\frac{c}{4}\right) = \left(\frac{c+2d}{2}\right)^2$$

$$\cancel{c^2} + dc = \cancel{c^2} + 4d^2 + 4dc \rightarrow -4d^2 = +3cd \rightarrow c = -\frac{4}{3}d \qquad \frac{c^2}{4} + \frac{dc}{4} = \frac{c^2 + 4d^2 + 4cd}{4}$$

$\boxed{9 - 1 - 3 - 2}$ جواب

هندسی a, b, c (۸)

$\frac{b}{q}, b, bq$

$$\frac{a_9}{a_6} = q^3 = -4 \qquad (-4)^3 = -64$$

حسابی $\rightarrow c, 2a, 3b$

$$\frac{b}{q}, 2bq, 3b \rightarrow 2bq - \frac{b}{q} = 3b - 2bq$$

$$4bq - \frac{b}{q} = 3b$$

$$\frac{4bq^2 - b}{q} = 3b$$

$$4bq^2 - b = 3bq$$

$$4bq^2 - 3bq - b = 0$$

$$q = \frac{+3b \pm \sqrt{9b^2 + 16b^2 = 25b^2}}{8b}$$

1, $-\frac{1}{4}$ ق

(۹)

$$\frac{a_1q^5}{(a_1q)^3} + \frac{a_1q}{(a_1)^2} = 2 \longrightarrow \frac{q^2}{a_1^2} + \frac{a_1q}{a_1^2} = 2$$

$$a_1q + q^2 = 2a_1^2 \qquad a_1q + q^2 - 2a_1^2 = 0$$

$$q = \frac{-a_1 \pm \sqrt{a_1^2 + 8a_1^2}}{2} \quad \begin{cases} a_1 \to a_2 = a_1^2 \\ -2a_1 \to a_2 = -2a_1^2 \end{cases}$$

$$\begin{cases} \dfrac{a_1^2}{a_1^2} = 1 \\[2mm] \dfrac{a_1^2}{-2a_1^2} = -\dfrac{1}{2} \end{cases}$$

(۱۰)

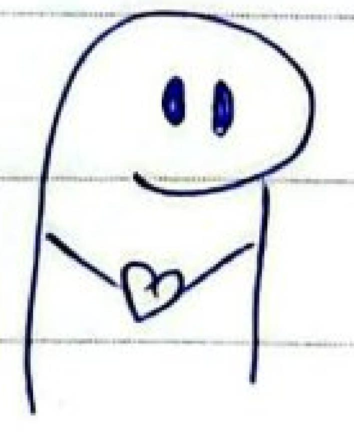
$$t_5 = 27 \longrightarrow aq^4 = 27$$

$$t_3 = \sqrt{t_4} \longrightarrow aq^2 = \sqrt{aq^3} \xrightarrow{\text{توان ۲}} a^2q^4 = aq^3 \longrightarrow aq = 1 \Rightarrow a = \frac{1}{q}$$

$$q^4 \times \frac{1}{q} = 27$$

$$q^3 = 27 \longrightarrow q = 3 \longrightarrow a = \frac{1}{q} = \frac{1}{3}$$

$$\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$$



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