ارشیا ایزدی کلاس دهم B

۱- $\frac{\text{عدد اول} + \text{اعداد آخر}}{2} = \frac{8^2+1+9^2}{2} = \frac{146}{2} = \boxed{73}$

۲- $[1,2,3]\ [4,5,6,7,8,9,10,11,12], \ldots, [121,122,\ldots,363]$

$\quad ①\qquad\qquad ②\qquad\qquad ⑤$

$S_n = (a+L)\frac{n}{2} = (121+363)\frac{363-120}{2} = 58806$

میانگین $\Rightarrow \frac{58806}{243} = \boxed{242}$

۳-

$a_0, a_3, a_6, a_9 \rightarrow$ ضابطه‌ی اول

$a_1, a_4, a_7 \rightarrow$ ضابطه‌ی دوم

$a_2, a_5, a_8 \rightarrow$ ضابطه‌ی سوم

$\left[\frac{n}{k+2}\right] - 2 \xrightarrow{n=3k+2} \left[\frac{3k+2}{k+2}\right] - 2$

$= \left[2 + \frac{k-2}{k+2}\right] - 2 = \left[\frac{k-2}{k+2}\right] \rightarrow$ به ازای ۰ و ۱ $=-1$

به ازای دیگر اعداد $=0$

$\Rightarrow S_{10} = 1+4+(1+a)+2+(1+a)+4+0+(2+a)+8 = 19$

$\Rightarrow a = -2$

۴-

$a_n = an^2 + bn + c$

$\left.\begin{array}{l} 25a + 5b + c = 14 \\ 49a + 7b + c = 17.2 \end{array}\right\} \xRightarrow{\text{منها}} 12a + b = 1.6 \xRightarrow{a=-0.2} b = 4,\ c = -1$

$\Rightarrow a = \frac{1}{70} \times (-14) = -0.2$

$a_1 = -0.2 + 4 - 1 = 2.8$

$a_{15} = -0.2 \times (225) + (4 \times 15) - 1 = 14$

$\Rightarrow \frac{14}{2.8} =$ برابر ۵

۵-

$\left.\begin{array}{l} a_4 = b_2 \\ a_8 = b_7 \end{array}\right\} \Rightarrow \begin{array}{l} a_1 + 3d = b_1 + d' \\ a_1 + 7d = b_1 + 6d' \end{array} \Rightarrow 4d = 5d' \Rightarrow d' = \frac{4}{5}d$

$b_{10} = 0 \Rightarrow b_1 + 9d' = 0 \xRightarrow{d'=\frac{4}{5}d} b_1 + \frac{36}{5}d = 0 \Rightarrow b_1 = -\frac{36}{5}d$

$\frac{b_{15}}{d} = \frac{-\frac{36}{5}d + \frac{56}{5}d}{d} = \frac{4d}{d} =$ برابر ۴

۶-

$6(a_1+d) = 5a_1(a_1+2d) + 3a_1(a_1+d) \Rightarrow 6a_1 + 12a_1d + 6d$

$= 5a_1^2 + 10a_1d + 3a_1^2 + 3a_1d \longrightarrow 2a_1^2 + a_1d - 6d^2 = 0 \Rightarrow$

$\Rightarrow a = \dfrac{-d \pm \sqrt{d^2+48d^2}}{4} = \dfrac{-d \pm 7d}{4}$ ⟶ $a = \dfrac{3d}{2} = \dfrac{a_4}{d} = \dfrac{\frac{9d}{2}}{d} = \dfrac{9}{2}$

⟶ $\dfrac{-8d}{4} = -2d \Rightarrow \dfrac{a_4}{d} = \dfrac{d}{d} = 1$

۷-

$a_n = a, b, c$ ($+d$, $+d$)

$b_n = b, \dfrac{a}{2}, \dfrac{c}{4}$ ($\times q$, $\times q$) $\xrightarrow{\times 4}$ $c, 2a, 4b$ یا $b, \dfrac{b-d}{4}, \dfrac{b+d}{4}$

$\Rightarrow \dfrac{1}{4}(b-d)^2 = \dfrac{b}{4}(b+d) \Rightarrow d^2 - 3bd = 0 \Rightarrow d$ ⟶ 0 ✗ ، $3b$

متمایز

$a_n = -2b, b, 4b \Rightarrow b_n = b, -b, b \Rightarrow q = -1, 2q = \boxed{-2}$

۸-

$a, b, c \Rightarrow \begin{array}{l} b = aq \\ c = aq^2 \end{array}$

$3b, 2a, c \Rightarrow 3aq, 2a, aq^2 \Rightarrow 2a - 3aq = aq^2 - 2a$

$\Rightarrow aq^2 + 3aq - 4a = 0 \Rightarrow a(q^2+3q-4) = 0 \xRightarrow{a \neq 0} (q+4)(q-1) = 0$

$\Rightarrow q =$ ⟶ 1 ✗ ، -4

۹-

$\dfrac{\cancel{a}q^{\cancel{5}\,2}}{\cancel{a^3}\cancel{q^3}\,a^2} + \dfrac{\cancel{a}q}{\cancel{a^2}\,a} = 2 \Rightarrow \dfrac{q^2}{a^2} + \dfrac{q}{a} - 2 = 0 \Rightarrow \dfrac{q}{a} = x$

$\Rightarrow x^2 + x - 2 = 0 \Rightarrow (x+2)(x-1) = 0 \Rightarrow$ اگر $\dfrac{q}{a} = 1 \Rightarrow \dfrac{a^2}{aq} = 1$ ،

اگر $\dfrac{q}{a} = -2 \Rightarrow \dfrac{a}{q} = -\dfrac{1}{2}$

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۱۰-

$$a_3 = a q^2$$

$$a_4 = a q^3 = (a q^2)^2 \Rightarrow a q^3 = a^2 q^4 \Rightarrow a q = 1$$

$$a_5 = a q^4 = 27$$

$$\frac{a q^4}{a q} = \frac{27}{1} = 27 = q^3$$

$$\Rightarrow q^3 = 27 \Rightarrow q = 3 \Rightarrow a q = 1 \xRightarrow{q=3} a = \frac{1}{3} \Rightarrow \frac{1}{2} - \frac{1}{3} = \frac{1}{6}$$