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حالات $a_3 - a_4 - a_5 - a_6 - a_7 - a_8 - a_9$

هندسی متوالی $a_3 - a_7 - a_9$

جملات $a_1 + 2d \,,\, a_1 + 6d \,,\, a_1 + 8d$

$(a_1+2d)\times(a_1+8d) = a_1^2 + 10da_1 + 16d^2$

$(a_1+6d)^2 = a_1^2 + 36d^2 + 12a_1d$

$2a_1d + 20d^2 = 0 \to a_1 + 10d = 0 \to a_1 = -10d$

$d=0$ غ قابل قبوله چون از متغیر بودن جملات صحبت شده

$a_1+2d \to -10d + 2d = -8d$ $\times\frac{1}{2}$ $\quad q=\frac{1}{2}$

$a_1+6d \to -4d$ $\times\frac{1}{2}$

$a_1+8d \to -2d$

$-10d, -9d, -8d$ $\quad +1 \quad d=1$

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$a_2 = a_1 + d$

$a_4 = a_1 + 3d$ $\quad (a_1+3d)^2 = a_1^2 + 9d^2 + 6a_1d$

$a_8 = a_1 + 7d$ $\quad (a_1+d)(a_1+7d) = a_1^2 + 8a_1d + 7d^2$ $\quad a_1 = d$

$q = \frac{a_1+3d}{a_1+d} = \frac{4d}{2d} = 2 \to q=2$

$a_{10} = a_1 q^9 \to \frac{1}{4}\times 2^9 = 2^7 = 128$

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$a, ar, ar^2, ar^3, \dots$

$a, 3ar, 2ar^2, ar^3$

$2(2ar^2) = 4ar^2 = 3ar + ar^3$ $\quad \boxed{r=3}$

$\div a \to a \neq 0$ $\quad r \neq 1$ ← دنباله غیر ثابت

$r^3 - 4r^2 + 3r = 0 \leftarrow 4r^2 = 3r + r^3$

$\to r^2 - 4r + 3 \to (r-3)(r-1)$ $\quad r=3 \,,\, r=1$

۹-

ر

$3 , \frac{7}{4} , \ldots \rightarrow d = \frac{-1}{4}$

$a_4 = 3 - \frac{3}{4} = \frac{5}{4} \rightarrow a_4 + K$

$a_8 = 3 - \frac{7}{4} = \frac{1}{4} \rightarrow a_8 + K$

$a_{13} = 3 - 3 = \frac{-4}{4} = -1 \rightarrow a_{13} + K$

دنباله هندسی (?) $a_{13}+K , a_8+K , a_4+K$

$(a_8+K)^2 = a_8^2 + K^2 + 2Ka_8 \rightarrow K^2 + \frac{1}{2}K + \frac{1}{16}$

$(a_{13}+K)(a_4+K) \rightarrow (K-1)(K+\frac{5}{4}) = K^2 + \frac{1}{4}K - \frac{5}{4}$ } =

$\frac{1}{16} + \frac{1}{2}K = \frac{1}{4}K - \frac{5}{4} \rightarrow \frac{1}{4}K = \frac{-5}{4}$

$\frac{1}{4}K = \frac{-21}{16} \rightarrow K = \frac{-21}{4}$ $K = -5$ ←

$$\frac{a_8+K}{a_4+K} = \frac{\frac{1}{4} - \frac{21}{4}}{\frac{5}{4} - \frac{21}{4}} = \frac{\frac{-20}{4}}{\frac{-16}{4}} = \frac{-20}{-16} = \frac{5}{4}$$