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باران عسکری، دهم دفتر B — بسم الله الرحمن الرحیم — تکلیف سری ۱۵

۱)

$a_1+a_2+a_3=21 \longrightarrow \frac{a}{q}+a+aq=21$

$a_1\times a_2\times a_3=64 \to (a)^3=64 \Rightarrow a=4$

$\frac{a}{q}\times a\times aq=a^3$

$\frac{4}{q}+4+4q=21 \longrightarrow \frac{4}{q}+4q=17$

$q=4$ ق ق ، $q=\frac{1}{4}$ ← q عددی غیر قابل قبول است

۲)

$b^2=ac \longrightarrow (2m)^2=(m^2+4)(m^2-2)$

$4m^2=m^4-8+2m^2 \Rightarrow 2m^2=m^4-8 \Rightarrow m^4-2m^2-8=0$

$(m^2-4)(m^2+2)=0 \Rightarrow \begin{cases} m^2=-2 \ \times \\ m^2=4 \ \text{ق ق} \ m=\pm 2 \xrightarrow{q>0} q=+2 \end{cases}$

$a_n=8,4,2,\dots$ ($\times\frac{1}{2}$) مجموع ۷ جمله اول $=a\left(\frac{1-q^n}{1-q}\right)$ یا $a\left(\frac{q^n-1}{q-1}\right)$

$\Rightarrow S_7=8\left(\frac{1-(\frac{1}{2})^7}{1-\frac{1}{2}}\right)\Rightarrow 8\times\frac{127}{64}=\frac{127}{8}$

۳)

$1+q+q^2+q^3+q^4=\frac{121}{81}$ ، $a=243$ ، $a_1+a_2+a_3+a_4+a_5=?$

$\underbrace{243+243q+243q^2+243q^3+243q^4}_{243(1+q+q^2+q^3+q^4)}=243\times\frac{121}{81}=363$

۴)

$d=\frac{64-1}{5+1}=10.5 \longrightarrow$ واسطه: $32.5=A$

$q=\frac{64}{1}=q^{5+1}\Rightarrow q=2 \longrightarrow$ واسطه: $8=B$ ، $-8=B$

$A+B=40.5$ یا 24.5

۵)

$-24, -\frac{95}{4}, \dots \Rightarrow d=\frac{1}{4} \longrightarrow a_{101}=a+100d \Rightarrow -24+25=1$

$a_{101}=a_8$ (هندسی) $=1 \Rightarrow 1=aq^7 \Rightarrow 128\times q^7=1 \longrightarrow q=\frac{1}{2}$

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(۶)

a_3, a_7, a_9 $\quad b^2 = ac$

$a+2d, a+6d, a+8d \Rightarrow (a+6d)^2 = (a+2d)(a+8d)$

$a^2 + 36d^2 + 12ad = a^2 + 16d^2 + 10ad \Rightarrow 20d^2 = -2ad$

$a = -10d$, $d = -\frac{a}{10}$

$a_9 = -2d, a_7 = -4d, a_3 = -8d \Rightarrow -10d, -9d, -8d, \ldots$ ($+d$, $+d$)

صفر (چون گفته متمایز)

(۷)

a_2, a_4, a_8, $d = \frac{1}{4}$

$a+d, a+3d, a+7d \Rightarrow (a+3d)^2 = (a+7d)(a+d)$

$a^2 + 9d^2 + 6ad = a^2 + 8ad + 7d^2 \Rightarrow 2d^2 = 2ad$

$d = a$

$a_1 = d = \frac{1}{4} \Rightarrow a_2 = a+d = 2d = \frac{1}{2}, a_3 = 1, a_4 = 2$

$\frac{1}{4}, \frac{1}{2}, 1, 2, \ldots \Rightarrow q = 2 \quad a_{10} = aq^9 = \frac{1}{4} \times 2^9 = 2^7 = 128$

(۸)

$3a_2, 2a_3, a_4$

$3aq, 2aq^2, aq^3 \Rightarrow 2b = a + c \Rightarrow 4aq^2 = aq^3 + 3aq$

$4aq^2 = aq(3 + q^2) \Rightarrow 4q = 3 + q^2 \Rightarrow q^2 - 4q + 3 = 0$

$(q-1)(q-3) = 0 \Rightarrow q$: 1 غ ق ق (دنباله ثابت)، 3 ✓

(۹)

a_4, a_7, a_{12}, $d = -\frac{1}{4}$

$a+3d, a+7d, a+12d$

$a - \frac{3}{4}, a - \frac{7}{4}, a - 3$

$\Rightarrow b^2 = ac \Rightarrow (a - \frac{7}{4})^2 = (a - \frac{3}{4})(a - 3)$

$a^2 + \frac{49}{16} - \frac{7}{2}a = a^2 + \frac{9}{4} - \frac{15}{4}a \Rightarrow \frac{13}{16} = -\frac{1}{4}a$

$a = -\frac{13}{4}$

منفی $a_1 = a_4$ ماقبل $\Rightarrow -\frac{13}{4} - \frac{3}{4} = -4$

منفی $a_2 = a_8$ ماقبل $\Rightarrow -\frac{13}{4} - \frac{7}{4} = -5$ $\quad$ منفی $a_3 = a_{12}$ ماقبل $= -\frac{13}{4} - 3 = -\frac{25}{4}$

MAHAN

$a_n = -4, -5, -\frac{25}{4} \Rightarrow q = \frac{5}{4}$

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$a_1 + a_2 + a_3 = 21 \rightarrow a + aq^2 + aq^3 = 21 \rightarrow 7a + 14d$ (1a)

$a \quad a+d \quad a+2d \qquad b^2 = ac$

$(a+d)^2 = (a+2d)(a) \Rightarrow a^2 + d^2 + 2ad = a^2 + 2ad$

$\Rightarrow d^2 = 2ad \Rightarrow d = 2a$

$7a + 14d = 21 \Rightarrow 7a + 14 \cdot a = 21 \rightarrow a = 1 \Rightarrow d = 2a = 2$

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