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سارا عزیزی - تکلیف شماره ۱۵

① $\frac{a}{q}+a+aq=21 \to \frac{4}{q}+4+4q=21 \to 4q^2-17q+4=0 \to q=\frac{17\pm\sqrt{225}}{8}$

$\frac{a}{q}\times a\times aq=64 \to a^3=64$

$q=\frac{17-15}{8}=\frac{2}{8}=\frac{1}{4}$ ✓

$q=\frac{17+15}{8}=\frac{32}{8}=4$ ✗

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② $(4n)^2=(n^2-2)(n^2+4) \to 16n^2=n^4+2n^2-8 \to n^4-14n^2-8=0 \to (n^2-4)(n^2+2)=0$

$\to n^2=4 \to n=\pm2$ ، $n^2=-2$ ✗

$n=2 \to 8,4,2,\ldots \to a=8, q=\frac{1}{2} \to S_7=8\left(\frac{1-\frac{1}{2^7}}{1-\frac{1}{2}}\right)=8\times\left(\frac{\frac{127}{128}}{\frac{1}{2}}\right)=8\times\frac{127}{64}$

$n=-2 \to 8,-4,2,\ldots \to a=8, q=-\frac{1}{2}$ ✗ $\to S_7=\frac{127}{8}$

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③ $1+q+q^2+q^3+q^4=\frac{121}{81} \xrightarrow{\times a} a+aq+aq^2+aq^3+aq^4=S_5$

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

S_5

④ واسطه حسابی: $1,\bigcirc,\bigcirc,\bigcirc,\bigcirc,\bigcirc,64 \to d=\frac{64-1}{6}=\frac{63}{6} \to A=a_4=a+3d=1+\frac{3\times63}{6}=32/5$

↓ A

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واسطه هندسی: $1,\bigcirc,\bigcirc,\bigcirc,\bigcirc,\bigcirc,64 \to q^6=\frac{64}{1} \to q=\pm2 \to B=a_4=aq^3=1\times(-2)^3=-8$

↓ B

$B=a_4=aq^3=1\times2^3=8$

$\to A+B=32/5-8=24/5$ یا $A+B=32/5+8=40/5$

⑤ حسابی: $a_{101}=a_1+100d=-24+(100\times\frac{1}{4})=1$

$d=-\frac{95}{4}-(-24)=-\frac{95}{4}+\frac{96}{4}=\frac{1}{4}$

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هندسی: $a_8=aq^7=128\times q^7=1 \to q^7=\frac{1}{128} \to q=\frac{1}{2}$

Scibo

$a+2d \quad a+4d \quad a+8d$ (1) (6)

$(a+4d)^2=(a+2d)(a+8d) \to a^2+16d^2+8ad=a^2+10ad+16d^2 \to 2d^2+2ad=0$

$2d(10d+a)=0 \to 2d\neq 0 \to 10d=-a \to a=-\frac{10}{d} \to ad=-10 \to d=\frac{-10}{a}$

$d=\frac{-a}{10}$ یا $d=0$ ← قابل قبول چون نمیتوان جملات متمایزند

$a+d \quad a+3d \quad a+7d$ (3) (7)

$a^2+9d^2+6ad=a^2+7ad+ad+7d^2 \to 2d^2-2ad=0 \to 2d(d-a)=0 \to 2d\neq 0$

$\to a=d \to 2d, 4d, 8d \to q=2, t_1=\frac{1}{4} \to t_{10}=tq^9=\frac{1}{4}\times 2^9=\boxed{128}$

$3a_2 \quad 2a_3 \quad a_4 \to 3aq, 2aq^2, aq^3$ (3) (8)

$4aq^2=3aq+aq^3 \to 4aq^2=aq(3+q^2) \to q^2-4q+3=0 \to (q-3)(q-1)=0$

$\to \boxed{q=3}$ ✓ $\qquad \to q=1 \to$ دنباله ثابت $\to$ ✗

$d=\frac{7}{4}-\frac{8}{4}=-\frac{1}{4} \qquad a_4, a_8, a_{13} \to a+3d, a+7d, a+12d$ (2) (9)

$\frac{8}{4}-\frac{3}{4} \quad \frac{8}{4}-\frac{7}{4} \quad 2-\frac{12}{4}$

$\to \frac{5}{4}, \frac{1}{4}, -1 \to \frac{5}{4}+d \quad \frac{1}{4}+d \quad -1+d$

$\frac{1}{16}+d^2+\frac{1}{2}d=-\frac{5}{4}+\frac{5}{4}d-d+d^2 \to \frac{2}{4}d-\frac{1}{4}d=-\frac{5}{4}+\frac{-1}{16} \to \frac{1}{4}d=\frac{-21}{16}$

$\to d=\frac{-21}{4} \to a_n=\left(\frac{5}{4}-\frac{21}{4}\right),\left(\frac{1}{4}-\frac{21}{4}\right),\left(-\frac{4}{4}-\frac{21}{4}\right)=-\frac{16}{4}, -\frac{20}{4}, -\frac{25}{4}$

$q=\left(\frac{-\frac{20}{4}}{-\frac{16}{4}}\right)=\boxed{\frac{5}{4}}$

$a+ar^3+ar^6=73 \to a(1+r^3+r^6)=73 \to a(1+8+64)=a(73)=73 \to a=1$ ✓ (10)

(0/5)

$t_1=t=a \quad t_4=t+3d=ar^3 \quad t_{10}=t+9d=ar^6 \to t=a$

$\to ar^3=a+3d \to d=a(r^3-1)$ — قدر نسبت دنباله نوشته نشده !

$ar^6=a+9d \to ar^6=a+9(a(r^3-1))$

$ar^6=9ar^3-8a \to r^3=n \to an^2=9an-8a$

$\to n^2=9n-8 \to n^2-9n+8=0 \to (n-8)(n-1)=0 \to n=8 \to \boxed{r=2}$ ✓ ; $n=1 \to r^3 \to r=1 \to$ ✗