Sub:

(طاها جعفری)

۱-

$a_1 - a_2 - a_3$

$\frac{a_2}{q} \times a_2 \times a_2 q = 64 \qquad a_2^3 = 64 \quad a_2 = 4$

$a_1 + a_3 = \frac{a_2}{q} + a_2 q = 17 \xrightarrow{\times q} a_2 + a_2 q^2 = 17q$

$a_2 q^2 - 17q + a_2 = 0 \longrightarrow 4q^2 - 17q + 4 = 0$

$(4q-1)(q-4) \Rightarrow 4q^2 - 17q + 4 \qquad q \to +4, \ \frac{1}{4}$

$(q = \frac{1}{4})$

۲-

$\frac{a_2}{a_1} = \frac{a_3}{a_2} \longrightarrow \frac{2x}{x^2+4} = \frac{x^2-2}{2x}$

$4x^2 = x^4 + 2x^2 - 8 \longrightarrow x^4 - 2x^2 - 8 = (x^2+2)(x^2-4)$

$x^2 \to -2, \ +4 \qquad x \to -\sqrt{2}, \ \pm 2 \qquad x = +2 \longrightarrow q > 0$

$a_1 - a_2 - a_3 \ldots$

$8 - 4 - 2 \ldots \qquad S_7 = \cancel{8} \times \left(\frac{1 - (\frac{1}{2})^7}{\cancel{\frac{1}{2}}} \right) = \frac{127}{128} \times 16$

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۳-

$$\underset{\downarrow \; a_۱}{۲۴۳}\,(۱+q+q^۲+q^۳+q^۴) = \frac{۱۲۱}{۸۱}$$

$$a_۱+a_۱q+a_۱q^۲+a_۱q^۳+a_۱q^۴ = ۱۲۱\times۳ = ۳۶۳$$

۴-

$$\frac{۶۴}{۱} = q^{n+۱} \longrightarrow q=۲ \longrightarrow a_۱q^۳=۸$$

$$\frac{۶۴-۱}{۲} = \frac{۶۳}{۲} = ۳۱/۵ = d \qquad a_۱+۳d = ۱+۳۱/۵ = ۳۲/۵$$

$$q=\pm۸$$

$$۳۲/۵+۸ = ۴۰/۵ \qquad ۳۲/۵-۸ = ۲۴/۵$$

۵-

$$-۲۴ , -\frac{۹۵}{۴} , \ldots$$

$$d = -\frac{۹۵}{۴}+\frac{۹۶}{۴} = +\frac{۱}{۴} \qquad a_{۱۰۱} = -۲۴+(۱۰۰)\frac{۱}{۴} = ۱$$

$$۱۲۸ , a_۲ , \ldots \qquad \frac{a_۸}{a_۱} = \frac{۱۲۸}{۱} \to a\,q^{-۷} = ۱۲۸ \quad (q=\frac{۱}{۲})$$

۶-

$$t_۳ , t_۷ , t_۹ = a_۱ , a_۲ , a_۳$$

$$\underset{a_۱+۲d}{t_۳} \quad \underset{a_۱+۶d}{t_۷} \quad \underset{a_۱+۸d}{t_۹}$$

$$\frac{a_۱+۶d}{a_۱+۲d} = \frac{a_۱+۸d}{a_۱+۶d} \longrightarrow \cancel{a_۱^۲}+۳۶d^۲+۱۲a_۱d = \cancel{a_۱^۲}+۱۶d^۲+۱۰a_۱d \longrightarrow$$

$$۲۰d^{\cancel{۲}} = -۲a_۱\cancel{d}$$

$$۱۰d = -a_۱$$

$$\left(d = \frac{-a_۱}{۱۰}\right)$$

$$t_۳ = -۸d$$

$$t_۷ = -۴d$$

$$t_{۱۰} = -۲d$$

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۷-

$a_1 , a_2 , a_3 \Rightarrow t_2 , t_4 , t_8$

$$\frac{a_1+3d}{a_1+d} = \frac{a_1+7d}{a+3d} \longrightarrow$$

$$\cancel{a_1^2} + 9d^2 + 6da_1 = \cancel{a_1^2} + 7d^2 + 8a_1d$$

$$2d^2 = 2a_1 d \qquad 2d = 2a_1 \longrightarrow a_1 = d$$

$t_2 \longrightarrow 2d$

$t_4 \longrightarrow 4d \qquad q \longrightarrow \frac{8d}{4d} = 2 \qquad 512 \times \frac{1}{4} = 128$

$t_8 \longrightarrow 8d$

$a_1 = \frac{1}{4} \qquad \cancel{\frac{1}{4}(2)^{9}} = a_{12}$

۸-

$3a^1 , 2a^2 , a^3 \longrightarrow t_1 , t_2 , t_3$

$(a_1 q = a)$

$a^3 - 2a^2 = 2a^2 - 3a^1 \qquad a^{\cancel{2}}(a-2) = \cancel{a}(2a-3)$

$a^2 - 2a = 2a - 3 \qquad a^2 - 4a + 3 = 0$

$(a-1)(a-3) = 0$

$a^1 , a^2 , a^3 \qquad a = 1$, $= 3$

$\cancel{1 , 1 , 1}$ یا $3 , 9 , 27$

$\cancel{(q = 1)}$ غیر ثابت $(q = 3)$

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۹. $d = -\frac{1}{4}$

$t_4, t_8, t_{13} \longrightarrow \frac{5}{4}+x,\ \frac{1}{4}+x,\ -1+x$

$\frac{\frac{1}{4}+x}{\frac{5}{4}+x} = \frac{x-1}{\frac{1}{4}+x}$ $\quad$ $\cancel{x^2}+\frac{1}{2}x+\frac{1}{16} = \cancel{x^2}+\frac{1}{4}x-\frac{5}{4}$

$\frac{1}{4}x = -\frac{21}{16} \quad x = -\frac{21}{4}$

$a_1, a_2, a_3 \longrightarrow -\frac{16}{4},\ -\frac{20}{4},\ -\frac{25}{4}$

$q = \frac{\frac{-25}{\cancel{4}}}{\frac{-4\times 5}{\cancel{4}}} = \frac{\frac{-5^2}{\cancel{4}}}{\frac{-4\times 5}{\cancel{4}}} = \frac{5}{4}$

۱۰- $a_1, a_4, a_7 \Rightarrow t_1, t_2, t_{10}$

$3a_1 + 10d = 73$

$\frac{a_4}{a_1} = \frac{a_7}{a_4} \longrightarrow \frac{a_1+d}{a_1} = \frac{a_1+9d}{a_1+d}$

$\cancel{a_1^2} + d^2 + 2a_1 d = \cancel{a_1^2} + 9a_1 d$

$d = 7a_1$

$3a_1 + 10d = 73a_1 = 73 \longrightarrow \boxed{a_1 = 1}$ $\boxed{d = 7}$

یا $d = 0 \quad 3a_1 = 73 \quad \boxed{a_1 = \frac{73}{3}}\ \boxed{d = 0}$

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