۲۵

۱)

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

$$a = 4$$

$$\left(\frac{4}{q} + 4 + 4q = 21\right) \times q$$

$$\to 4 + 4q + 4q^2 = 21q \to 4q^2 - 17q + 4 = 0$$

$$q = \frac{17 \pm \sqrt{289-64}}{2\times 4} \left\langle \begin{array}{l} 4 \\ \frac{1}{4} \end{array}\right. \qquad \boxed{q = \frac{1}{4}}$$

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۲)

$$m^2+4,\ 2m,\ m^2-2 \to (2m)^2 = (m^2+4)(m^2-2)$$

$$m^4 - 2m^2 - 8 = 0$$

$$a^2 = \frac{2 \pm \sqrt{4+32}}{2} \left\langle \begin{array}{l} 2 \\ \cancel{-2} \end{array}\right.$$

$$8,\ 4,\ 2 \to q = \frac{1}{2}$$

$$S_7 = a\left(\frac{q^n-1}{q-1}\right) = 8\left(\frac{(\frac{1}{2})^7-1}{\frac{1}{2}-1}\right) = 15.875$$

۵

۳)

$$a_1 = 243$$

$$S_5 = \underbrace{243}_{a}\underbrace{(1+q+q^2+q^3+q^4)}_{\frac{121}{81}} = \boxed{363}$$

۵

۴

قدر نسبت : $\frac{43-1}{5-1} = 10,5$

$a_4 = a + (n-1)d = 1 + 3\times 10,5 = 32,5$ ۲

قدر نسبت : $q^{5-1} = 16 \to q = \pm 2$

$a_4 = aq^3 = 1\times(\pm 2)^3 = 8$ or -8

$A+B = 40,5$ or $A+B = 24,5$

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حسابی $= -24, \frac{-95}{4}, \ldots$ ۲

هندسی $= 128, 64, \ldots$

حسابی $a_{101} = a_8$ هندسی

$a + (n-1)d = -24 + 100\times\frac{1}{4} = 1$

$a_8 = 128 \times q^7 = 1 \to q^7 = \frac{1}{128}$

$\boxed{q = \frac{1}{2}}$

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$a_3 = a + 2d = a$ ۲

$a_7 = a + 4d = aq$

$a_9 = a + 8d = aq^2$

$(a+4d)^2 = (a+8d)(a+2d) \Rightarrow a = -10d$

$\boxed{d = \frac{-a}{10}}$ or $\boxed{d = 0}$ → چون جملات متمایزند

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$a_2 = a + d = a$

$a_4 = a + 3d = aq$

$a_8 = a + 7d = aq^2$

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

$q = \frac{4a}{2a} = 2$

$\frac{1}{4}, \frac{1}{2}, 1, 2, 4, 8, 16, 32, 64, \underbrace{128}_{\text{جمله دهم}}$

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$2aq, aq^2, aq^3$

$2aq^2 = \frac{2aq + aq^3}{2} \rightsquigarrow q(q^2 - 4q + 3) = 0$

$\boxed{q = 3}$ $\qquad q = \frac{4 \pm \sqrt{16-12}}{2} \begin{cases} 3 \\ 1 \end{cases}$

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$\begin{cases} a_4 = 2 + 3 \times \frac{-1}{4} = 1.25 + d \\ a_8 = 2 + 7 \times \frac{-1}{4} = 0.25 + d \\ a_{13} = 2 + 12 \times \frac{-1}{4} = -1 + d \end{cases}$

$-4, -5, -6.25, \ldots \qquad \boxed{q = 1.25}$

$(0.25 + d)^2 = (1.25 + d)(d - 1) \rightsquigarrow d = \boxed{5.25}$

$a_1 + a_4 + a_7 = a + aq^3 + aq^6 = 73$

$a + a + 3d + a + 6d$

$aq^3 = a + 3d$

$aq^6 = a + 6d$

$aq^6 = a(1 + 2(q^3 - 1)) = a(2q^3 - 1)$

$q^6 = 2q^3 - 1$ < $q = 1$, $q = 1$

$a(1 + 1 + 1) = 73$

$a = 1$ 　 $3a = 73$

$a = \frac{73}{3}$

$d = aq^3 - a$

$\frac{73}{3} - \frac{73}{3} = 0$