

① $a_n = a_1 r^{n-1} = \frac{1}{r} r^{n-1} \rightarrow a_{10} = \frac{1}{r} r^9 = r^8 = 256$

ب) $\frac{1}{r} \times r^{14} = r^8 = 14$

ج) $a_8 = a_1 r^7 \rightarrow a_8 = \frac{1}{r} \times r^7 = r^6 = 64$

د) $\frac{1}{r} \times r^{n-1} = 128 \rightarrow r^{n-1} = 256 \rightarrow n-1 = 8 \rightarrow n = 9$

② $a_8 = a_1 r^7 = 128$

$a_1 = a_1 r^0 = 64$

$a_{10} = a_1 \times r^9$

$\rightarrow 94 \times r = 1024$

$\rightarrow \frac{a_1 r^9}{a_1 r^0} = \frac{94}{64} = 1.46875 = r^9 \rightarrow r = 1.05$

③ $(a_n)^2 = (a_m)^2 \rightarrow 256 = 100 \rightarrow a_m = 10$ $a_1 \times a_8 = a_4 \times a_5$
 $\rightarrow a = a_1 \times a_8$

④ $(\sqrt{2})^2 = 2 \times 2 \rightarrow 14 \times 2 = 28 = 2^{a+b} \rightarrow a+b = 5$
 $\frac{a+b}{2} = 2.5 = 2.5$

⑤ $a_n \times a_{11} = (a_6)^2 \rightarrow (x+1)(1-x) = x^2 \rightarrow x^2 + x - x^2 - 1 = 0$
 $1 - x^2 = x^2 \rightarrow 1 = 2x^2 \rightarrow x^2 = \frac{1}{2} \rightarrow x = \pm \frac{1}{\sqrt{2}}$ $x = \frac{1}{\sqrt{2}}$

$$\textcircled{4} \begin{cases} a + aq^r = 11 \\ aq + aq^r = 11 \end{cases} \rightarrow \frac{a + aq^r}{aq + aq^r} = \frac{11}{11} \cdot \frac{1}{1} = 1$$

$$\frac{a(1+q^r)}{aq(1+q)} = \frac{(1+q)(1+q^r-1)}{(1+q)q} = \frac{1+q^r-1}{q} = \frac{1}{q} \rightarrow 1+q^r-1 = \frac{1}{q} \rightarrow 1+q^r-1 = \frac{1}{q}$$

$$\rightarrow \frac{10 \pm \sqrt{44}}{4} \begin{cases} \frac{11}{4} = 1 \\ \frac{1}{4} = \frac{1}{11} \end{cases} \rightarrow a + aq^r = 11 \rightarrow a(1+q^r) = 11$$

$$\rightarrow a_1 = 1 \rightarrow a + \frac{1}{a} = 11 \rightarrow a_1 = 11$$

$$\boxed{11} \cdot 1, 1, 1 \rightarrow 1, 11, 1, \boxed{11}$$

$$\textcircled{5} a \cdot \frac{a}{q} + a_r + a_r q = 11 \quad \frac{a^2}{q} \times a_r \times a_r q = 11 \rightarrow a_r = 11$$

$$\frac{1}{q} + 11 + 11q = 11 \rightarrow 11q^r - \log q + 11 = 0 \rightarrow \frac{10 \pm \sqrt{44}}{4} \rightarrow \frac{1}{11}$$

$$q = 11 \rightarrow 1, 11, 1 \quad q = \frac{1}{11} \rightarrow 1, 11, 1$$

$$\textcircled{6} 1_{10} = a_1 \cdot \frac{(q^{10}-1)}{q-1} = \frac{11 \times (11^{10}-1)}{11-1} = 11^{10} - 1 \text{ (نوع)}$$

$$\rightarrow (a_1 \times a_{10})^{\frac{1}{10}} = (11 \times a_{10})^{\frac{1}{10}} = (11 \times q^r)^{\frac{1}{10}} = (11 \times 11^{\frac{9}{10}})^{\frac{1}{10}} = 11^{\frac{1}{10} + \frac{9}{100}} = 11^{\frac{19}{100}}$$

$$\textcircled{7} \begin{cases} aq - a \\ aq^r - aq \\ aq^r - aq^r \end{cases} \rightarrow (aq - a)(aq^r - aq^r) = (aq^r - aq^r)^r$$

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$$a, aq, aq^2, \dots, aq^{n-1} \rightarrow (aq-a), (aq^2-aq), \dots, (aq^n - aq^{n-1})$$

$$a(q-1), aq(q-1), aq^2(q-1), \dots, aq^{n-1}(q-1)$$

$$\rightarrow (q-1) [a, aq, aq^2, \dots, aq^{n-1}] \rightarrow \text{سلسلة } q$$

١٥) $a_1 + a_2 + a_3 + \dots + a_n$
 $a_n + a_{n-1} + a_{n-2} + \dots + a_1$

$$\rightarrow n(a_1 + a_n) \rightarrow \frac{n}{2} (a_1 + a_n) \quad \square$$

$$b) a + aq + aq^2 + \dots + aq^{n-1} \rightarrow \frac{a(1 + q + q^2 + \dots + q^{n-1})(q-1)}{q-1}$$

$$\rightarrow a \left(\frac{q^n - 1}{q - 1} \right) \quad \square$$