

الف) $a_n = \frac{1}{r} \times r^{n-1} \rightarrow a_{10} = \frac{1}{r} \times r^9 = r^8$
 ج) واسطه $= \sqrt{a_4 \times a_{10}} = \sqrt{r^4 \times r^8} = r^6$

ب) $\frac{a_{14}}{a_{13}} = \frac{\frac{1}{r} \times r^{14}}{\frac{1}{r} \times r^{13}} = r = 14$

د) $\frac{1}{r} \times r^{n-1} = 128 \Rightarrow r^{n-2} = 2^7 \Rightarrow n-2=7 \Rightarrow n=9$

$a_1 = 99, a_{10} = 12 \rightarrow \frac{a_1}{a_{10}} = \frac{a_1 r^9}{a_1} = \frac{99}{12} \Rightarrow r^9 = \frac{11}{4} \Rightarrow r = \sqrt[9]{\frac{11}{4}}$
 $a_{10} = 12 \rightarrow a_{10} = a_1 r^9 = 99 \times \left(\sqrt[9]{\frac{11}{4}}\right)^9 = 12$

الف) $a_1 \times a_2 \times a_3 \times a_4 \times a_5 = 243 \Rightarrow \frac{a_1}{r^4} \times \frac{a_1}{r^3} \times \frac{a_1}{r^2} \times \frac{a_1}{r} \times a_1 = 243 \Rightarrow a_1^5 = 243 \Rightarrow a_1 = 3$

ب) $a_1 \times a_{10} = a_5 \times a_5 = 3 \times 3 = 9$

$a_1 \times a_5 = a_3 \times a_3 = 2 \times 2 = 4 \Rightarrow \sqrt{2} \times \sqrt{2} = 2 \Rightarrow r^{a+b} = 2 \Rightarrow a+b=2 \Rightarrow \text{واسطه} = \frac{a+b}{2} = \frac{2}{2} = 1$

$a_3 \times a_{11} = a_7 \times a_7 \Rightarrow (x+r)(1-x) = x^2 \Rightarrow 1-x^2 = x^2 \Rightarrow 1 = 2x^2 \Rightarrow x^2 = \frac{1}{2} \Rightarrow x = \pm \sqrt{\frac{1}{2}}$

$a_1 + a_5 = 24 \Rightarrow a(1+r^4) = 24 \rightarrow \frac{a(1+r^5)}{ar(1+r)} = \frac{(1+r)(1-r+r^2)}{r(1+r)} = \frac{1}{r} \Rightarrow r^2 - 3r + 2 = 0$
 $a_2 + a_4 = 12 \rightarrow ar(1+r) = 12 \Rightarrow \frac{r^2 - 10r + 9}{r(1+r)} = 0 \Rightarrow r^2 - 10r + 9 = 0$
 $r = 3 \rightarrow a(1+3^4) = 24 \Rightarrow a = 1$
 $r = \frac{1}{3} \rightarrow a(1+\frac{1}{3^4}) = 12 \Rightarrow a = \frac{11}{4}$
 $a_1 + a_5 = \frac{11}{4} + \frac{11}{4} \times \frac{1}{3^4} = \frac{11}{4} \neq 24$
 $\Rightarrow r = \frac{1}{3}, r = 3$

$a_1 = 1, a_2 = 3, a_3 = 9, a_4 = 27$

$a_1 \times a_2 \times a_3 = 27 \Rightarrow \frac{a_1}{r^2} \times a_1 \times a_1 = 27 \Rightarrow a_1 = 3$
 $a_1 + a_2 + a_3 = 13 \rightarrow \frac{3}{r} + 3 + 3r = 13 \Rightarrow \frac{3}{r} + 3r = 10 \Rightarrow \frac{3+3r^2}{r} = 10 \Rightarrow 3+3r^2 = 10r$
 $\Rightarrow 3r^2 - 10r + 3 = 0 \Rightarrow (3r-1)(r-9) = 0 \Rightarrow r = \frac{1}{3}, r = 9$

$a_n = 1, 3, 9, 27, \dots$

$S_{10} = a \left(\frac{r^{10} - 1}{r - 1} \right) = 3 \left(\frac{3^{10} - 1}{3 - 1} \right) = 3^{10} - 1$
 $\rightarrow P_{10} = \sqrt{a_1 a_{10}} = \sqrt{a_1 a_{10}} = (2 \times 2 \times 2^9)^{10} = (2^{10} \times 2^9)^{10} = (2^{19})^{10} = 2^{190}$

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

$$\left(\frac{1-r}{u}\right)v = \cancel{(1-r)}us$$

$$(u+1)v = (1-r)us \rightarrow u+1-v = us \rightarrow \begin{cases} us-rs = u+1-v \\ us-rs = u+1-v \end{cases} \rightarrow \begin{cases} us-rs = u+1-v \\ us-rs = u+1-v \end{cases} \rightarrow \begin{cases} us-rs = u+1-v \\ us-rs = u+1-v \end{cases}$$

$$\left(\frac{p(1-u)+v}{u}\right) \frac{1}{u} =$$

$$\cancel{p(1-u)} \times \frac{1}{u} + v = p \times \frac{1}{u(1-u)} + v = p(1-u) + v + \dots + p+u+v+p+v+v \dots$$

log 10

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