

الف) $a_n = \frac{1}{r} \times r^{n-1} \rightarrow a_{10} = \frac{1}{r} \times r^9 = r^8 = 252$	۱
ب) $\frac{a_{11}}{a_{10}} = r \xrightarrow{r=2} r^4 = 12$	۲
ج) $\sqrt{a_5 \times a_{10}} = \sqrt{4 \times 252} = \sqrt{1008} = 32$	۳
د) $128 = \frac{1}{r} \times r^{n-1} \rightarrow r^8 = r^{n-1} \rightarrow n = 9$	۴
$r^3 = \frac{a_1}{a_5} = \frac{94}{12} = 8 \rightarrow r = 2$ $a_{10} = a_1 \times r^9 = 94 \times 512 = 48128$	۵
الف) $\frac{a_{10}}{r^9} \times \frac{a_{10}}{r^9} \times a_{10} \times a_{10} \times a_{10} \times r^9 = a_{10}^5 = 243 \rightarrow a_{10} = 3$	۶
ب) $\frac{a_{10}}{r^9} \times a_{10} r^9 = a_{10}^2 = r^2 = 9$	۷
$r^a, r^{\frac{a}{r}}, r^b \rightarrow \frac{r^{\frac{a}{r}}}{r^a} = \frac{r^b}{r^{\frac{a}{r}}} \rightarrow r^{\frac{a}{r}-a} = r^{\frac{b-a}{r}}$ $\Rightarrow \frac{a}{r} - a = b - \frac{a}{r} \rightarrow a + b = 2a$ رابطه: $\frac{a+b}{r} = \frac{2a}{r} = 2, 5$	۸
$a_v^2 = a_p \times a_{11} \rightarrow u^2 = (u+1)(1-u)$ $\rightarrow u^2 = 1 - u^2 \rightarrow 2u^2 = 1 \rightarrow u^2 = \frac{1}{2} \rightarrow u = \pm \frac{\sqrt{2}}{2}$	۹

$$a_1 + a_4 = 11 \rightarrow a_1(1+q^3) = 11 \rightarrow \frac{a_1(1+q^3)}{a_1(1+q)} = \frac{11}{9(1+q)} = \frac{11}{12}$$

$$a_2 + a_5 = 12 \rightarrow a_2(1+q) = 12 \rightarrow \frac{a_2(1+q)}{a_1(1+q)} = \frac{12}{9(1+q)}$$

$$\rightarrow 11 - 11q + 12q^3 = 12q \rightarrow 12q^3 - 10q + 11 = 0 \rightarrow 12q^3 - 10q + 11 = 0 \rightarrow q^3 - 2q + \frac{11}{12} = 0$$

$$\rightarrow q = 1, 2 \rightarrow q = 1, 2, \frac{1}{2} \rightarrow q = 3, \frac{1}{3} \rightarrow \text{در هر دو صورت مقدار عددی برابر است}$$

$$a_1 \times a_2 \times a_3 = 18 \rightarrow \frac{a_2}{a_1} \times a_2 \times a_3 = 18 \rightarrow a_3 = 3$$

$$a_1 + a_2 + a_3 = 13 \rightarrow a_1 + a_2 = 10 \quad , \quad a_1 \times a_3 = 9 \rightarrow a_1 = 1, a_3 = 9$$

$$1, 3, 9$$

$$S_{10} = 1 \times \left(\frac{1^{10} - 1}{1 - 1} \right) = 1 \times \frac{1^{10} - 1}{1 - 1} = 1^{10} - 1 = 89.81$$

$$a_1 \times a_2 \times a_3 \times \dots \times a_{10} = \sqrt{(a_1 \times a_{10})^{10}} = \sqrt{(1 \times 1^{10})^{10}} = (1^2 \times 1^9)^5$$

$$= 1^{10} \times 1^5 = 1^{15}$$

$$a_1, a_1q, a_1q^2, a_1q^3, \dots \rightarrow a_1q - a_1, a_1q^2 - a_1q, a_1q^3 - a_1q^2, \dots$$

$$\rightarrow a_1(q-1), a_1q(q-1), a_1q^2(q-1), \dots$$

$$\rightarrow \text{نسبت} = q$$

$$\rightarrow \text{نسبت} = \frac{a_1(q-1)q}{a_1(q-1)} = q$$

$$S_n = a_1 + a_2 + a_3 + \dots + a_n \rightarrow \text{البته می دانیم } a_1 + a_n = a_2 + a_{n-1} \text{ و به همین ترتیب}$$

$$\Rightarrow \frac{n}{2}(a_1 + a_n) = \frac{n}{2}(2a_1 + (n-1)d)$$

$$S_n = a_1 + a_1q + a_1q^2 + \dots + a_1q^{n-1} \xrightarrow{\times q} S_nq = a_1q + a_1q^2 + a_1q^3 + \dots + a_1q^n$$

$$\rightarrow S_n(q-1) = a_1(q^n - 1) \rightarrow S_n = a_1 \left(\frac{q^n - 1}{q - 1} \right)$$