

$$a_n = \frac{1}{r}, 1, 2$$

(۱)

$$q = \frac{2}{1} = 2 \rightarrow a_n = a_1 q^{n-1} \rightarrow a_n = \frac{1}{r} (2)^{n-1}$$

$$a_{10} = ? \rightarrow a_{10} = a_1 q^9 \rightarrow a_{10} = \frac{1}{2} \times 2^9 = 2^8 = 256 \text{ (الف)}$$

$$\frac{a_{14}}{a_{12}} = \frac{a_1 q^{13}}{a_1 q^{11}} = 14$$

(ب)

$$a_4, \dots, a_{10} \Rightarrow b^2 = ac$$

(ج)

$$b^2 = a_{10} a_4$$

$$a_4, \dots, a_{10} \Rightarrow a_7^2 = a_{10} a_4$$

$$\downarrow a_7 = \frac{1}{r} (2^6) = 2^5 = 32$$

$$128 = r^{n-7} \Rightarrow r^7 = r^{n-7} \Rightarrow n-7 = 7 \Rightarrow n = 14$$

$$\frac{a_n}{a_5} = \frac{94}{12} \rightarrow \frac{a_5 q^r}{a_5} \Rightarrow q^r = 12 \Rightarrow q = 12$$

(۲)

$$a_{10} = a_1 q^9 \rightarrow a_{10} = 94 \times 12 = 1128$$

$$a_1 \times a_2 \times a_3 \times a_4 \times a_5 = 243$$

(۳)

$$a_1 q^0 \times a_2 q^1 \times a_3 q^2 \times a_4 q^3 \times a_5 q^4 = 243$$

(الف)

$$a_3^5 = 243 \Rightarrow a_3 = 3$$

$$a_1 \times a_5 = a_3 q^{-1} \times a_3 q^4 = a_3^2 = 3^2 = 9$$

(ب)

Hashtag

HASHTAG

$$r^a, r^{\sqrt{r}}, r^b$$

(15)

$$b^r = ac \Rightarrow (r^{\sqrt{r}})^r = r^a \times r^b \rightarrow r^r = r^{a+b} \rightarrow r^a = r^{a+b}$$

$$a = a+b$$

$$360, 21, = \frac{a+b}{r} = \frac{a}{r} = r, a$$

$$a_r = 1-n$$

(16)

$$a_r = n$$

$$a_{n+1} = n+1$$

$$\left. \begin{array}{l} a_r = 1-n \\ a_r = n \\ a_{n+1} = n+1 \end{array} \right\} \rightarrow \begin{array}{l} n^r = (n+1)(1-n) \\ n^r = 1-n^r \\ r n^r = 1 \end{array}$$

$$\rightarrow n^r = \frac{1}{r} \rightarrow n = \pm \frac{\sqrt{r}}{r}$$

$$a_1 + a_r = r1 \rightarrow a_1 + a_1 q^r = r1 \rightarrow a_1(1+q^r) = r1 \quad (17)$$

$$a_r + a_r = 1r \rightarrow a_1 q + a_1 q^r = 1r \rightarrow a_1 q(1+q) = 1r$$

$$\Rightarrow a_1 = \frac{1r}{q(1+q)}$$

$$a_1(1+q^r) \xrightarrow{\text{if } a_1 = \frac{1r}{q(1+q)}} \frac{1r}{q(1+q)} \times (1+q^r) = r1$$

$$\Rightarrow 1r(1+q^r) = r1q(1+q)$$

$$1r + 1r q^r = r1q + r1q^r \rightarrow 1r q^r - r1q^r - r1q + 1r = 0$$

$$r(3q^3 - 4q^2 - 4q + 3) = 0 \quad \text{این معادله را می توانیم به سه صورت زیر بنویسیم}$$

$$r(3(r1) - 4(q) - 4(r) + 3) = r(11 - 4r - 4(1+r)) = 0$$

$$\text{Hashtag} \Rightarrow q = r \rightarrow a_1 = \frac{1r}{q(1+q)} \Rightarrow a_1 = \frac{1r}{1r} = 1$$

$$\sqrt{16} \rightarrow 1, 3, 9, 27 \Rightarrow 27$$

$$a + aq + aq^2 = 1^3 \rightarrow a(1 + q + q^2) = 1^3 \quad (*)$$

$$a \times aq \times aq^2 = a^3 q^3 = 2^3 \rightarrow (aq)^3 = 2^3 \Rightarrow \underline{aq = 2}$$

$$* \text{ قیاب } \rightarrow \frac{aq}{q} (1 + q + q^2) = 1^3$$

$$\frac{1^3}{q} (1 + q + q^2) = 1^3$$

$$1^3 (1 + q + q^2) = 1^3 q \rightarrow 1 + q + q^2 = 1q$$

$$q^2 - 1 + q = 0$$

$$q^2 - 1 + q = 0$$

$$(q - 1)(q - 1) = 0$$

$$\rightarrow q = \frac{1}{q} = 1$$

$$\rightarrow q = \frac{1}{1} = 1$$

$$① \text{ if } q = 1 \rightarrow aq = 2 \rightarrow \frac{aq}{q} = \frac{2}{1} \Rightarrow \underline{a = 2}$$

$$② \text{ if } q = \frac{1}{1} \rightarrow a = \frac{2}{\frac{1}{1}} = 2$$



$$① \rightarrow \text{نسبت: } 1, 1, 1$$

$$② \rightarrow \text{نسبت: } 1, 1, 1$$

$$a_n = 1, 1, 1, \dots \rightarrow a_n = 1(1)^{n-1} \rightarrow a_{10} = 1(1)^9 \quad (1)$$

$$q = 1 \quad a_1 = 1 \rightarrow S_n = a_1 \left(\frac{q^n - 1}{q - 1} \right) \quad (2)$$

$$\Rightarrow S_{10} = 1 \left(\frac{1^{10} - 1}{1 - 1} \right) = 0$$

$$P_n = \sqrt[n]{(a_1 a_n)^n} \Rightarrow P_{10} = \sqrt[10]{(a_1 a_{10})^{10}}$$

$$= \sqrt[10]{(1 \times 1)^{10}} = (1 \times 1)^{10} = 1 \times 1 = 1$$

Hashtag

H A S H T A G

$$a, aq, aq^2, aq^3, \dots$$

(9)

$$aq - a, aq^2 - aq, aq^3 - aq^2, \dots$$

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

هر جمله نسبت به جمله قبل ضریب q دارد
 $\Rightarrow$ دنباله هندسی است با قدر نسبت q

(10)

$$\left\{ \begin{array}{l} S_n = a_1 + (a_1 + d) + (a_1 + 2d) + \dots + (a_n - d) + a_n \\ S_n = a_n + (a_n - d) + (a_n - 2d) + \dots + (a_1 + d) + a_1 \end{array} \right. \quad (\text{الف})$$

$$2S_n = \underbrace{(a_n + a_1) + (a_n + a_1) + (a_n + a_1) + \dots + (a_1 + a_n)}_{(a_n + a_1) \times n}$$

$$2S_n = n(a_n + a_1) \Rightarrow S_n = \frac{n}{2}(a_n + a_1)$$

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

$$S_n = a + aq + aq^2 + \dots + aq^{n-1} \quad (\text{ب})$$

$$-qS_n = -aq - aq^2 + \dots - aq^{n-1} - aq^n$$

$$S_n - qS_n = a + 0 + 0 + \dots - aq^n$$

$$\text{Hashtag} \quad S_n(1-q) = a - aq^n \rightarrow S_n = \frac{a - aq^n}{1-q}$$

HASHTAG

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