

د هم

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سهمی مونی

$$q=2 \rightarrow a_n = a_1 q^{n-1} \Rightarrow a_{10} = \left(\frac{1}{2}\right)(2^9) = 2^8 = 256 \quad (\text{اند})$$

(1)

$$\text{ب) } \frac{a_{14}}{a_{13}} = \frac{a_1 q^{14}}{a_1 q^{13}} \Rightarrow \frac{a_{14}}{a_{13}} = q^1 \Rightarrow q^1 = 2^1 = 2$$

$$\text{ج) } a_1 = a_2 \times a_{10} \Rightarrow a_1 = a_1 q^1 a_1 q^9 = a_1^3 q^{10} = 2^{10} \Rightarrow a_1 = 2^{\frac{10}{3}} = 32$$

$$\text{د) } 128 = \left(\frac{1}{2}\right)(2)^{n-1} \Rightarrow \left(\frac{1}{2}\right)(2)^{n-1} = 2^7 \Rightarrow n-1 = 8 \Rightarrow n = 9$$

$$\left. \begin{aligned} a_5 &= a_1 q^4 = 12 \\ a_{11} &= a_1 q^{10} = 48 \end{aligned} \right\} \Rightarrow \frac{a_{11}}{a_5} = q^6 = 4 \Rightarrow q = 2 \rightarrow a_1 = 1 \Rightarrow a_{10} = a_1 q^9 = 1 \times 2^9 = 512$$

384

$$\text{الف) } P_n = (a_1 + a_n)^n \rightarrow 256 = a_n^2 \rightarrow a_n = 16$$

(2)

$$\text{ب) } P_n = (a_1 \cdot a_n)^n \rightarrow 256 = (a_1 a_n)^n \Rightarrow 256 = (a_1 a_n)^2 \rightarrow a_1 a_n = 16$$

$$(f(r))' = \frac{b}{r^2} \rightarrow r = 2 \rightarrow a+b=0 \rightarrow \text{نسبت } = \frac{a+b}{r} = \frac{0}{2} = 0$$

(3)

$$q^1 = \frac{n+1}{n} = \frac{11}{10} \Rightarrow a_1 = 1 - \frac{11}{10} \rightarrow 2a_1 = 1 \rightarrow a_1 = \frac{1}{2} \rightarrow n = \pm \frac{1}{\frac{1}{2}}$$

(4)

$$n = \frac{1}{\frac{1}{2}} \text{ حالت } \rightarrow a_1 = 1 - \frac{1}{2} = \frac{1}{2}, a_2 = \frac{1}{2}, a_3 = 1 + \frac{1}{2} \rightarrow q^2 = \frac{a_3}{a_1} = \frac{\frac{3}{2}}{\frac{1}{2}} = 3 > 0$$

$$n = -\frac{1}{\frac{1}{2}} \text{ حالت } \rightarrow a_1 = 1 + \frac{1}{2} = \frac{3}{2}, a_2 = -\frac{1}{2}, a_3 = 1 - \frac{1}{2} = \frac{1}{2} \rightarrow q^2 = \frac{a_3}{a_1} = \frac{\frac{1}{2}}{\frac{3}{2}} = \frac{1}{3} < 0 \rightarrow \text{نمی تواند منفی باشد}$$

سین تنها مقدار $\frac{1}{\frac{1}{2}}$ برای n ممکن است.

$$\left. \begin{aligned} a_1 + a_1 q^2 &= 11 \\ a_1 + a_1 q^3 &= 12 \end{aligned} \right\} \rightarrow \frac{a_1(1+q^2)}{a_1(1+q^3)} = \frac{11}{12} \rightarrow \frac{1+q^2}{1+q^3} = \frac{11}{12} \rightarrow 12(1+q^2) = 11(1+q^3)$$

(5)

$$\Rightarrow 12q + 12q^2 = 11 + 11q^3 \rightarrow 11q^3 - 12q^2 - 12q + 11 = 0 \Rightarrow 11q^3 - 12q^2 - 12q + 11 = 0$$

$$\Rightarrow q = 1 \rightarrow a_1 = 1 \rightarrow \text{نسبت } \rightarrow 1, 2, 4, 8, \dots$$

نیز $11 = 11$

$$\left. \begin{aligned} a + aq + aq^2 &= 11 \\ a + aq + aq^2 &= 11 \end{aligned} \right\} \rightarrow a^2 q^2 = 11 \rightarrow aq = 11$$

(6)

$$a + a_1 q^2 = 10 \rightarrow \frac{a(1+q^2)}{aq} = \frac{10}{q} \rightarrow 12q^2 - 10q + 11 = 0 \rightarrow \Delta = 100 - 4 \times 12 \times 11 < 0$$

$$\text{حالت اول } a_1 = 1, a_2 = 2, a_3 = 4$$

$$\text{حالت دوم } a_1 = 4, a_2 = 2, a_3 = 1$$

الف) $S_{10} = a_1 \left(\frac{1-q^{10}}{1-q} \right) \rightarrow S_{10} = 2 \left(\frac{1-2^{10}}{-2} \right) = (1-2^{10}) = 59.51$

ب) $P = a_1 \cdot n \left(q^{\frac{n(n-1)}{2}} \right) \Rightarrow 2^{10} \left(2^{\frac{10 \cdot 9}{2}} \right) = 2^{10} \times 2^{45} \xrightarrow{\text{ضرب می شود}} P_n = (a_1 \cdot a_n)^{\frac{n}{2}}$

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

$(a_1q - a_1), (a_1q^2 - a_1q), (a_1q^3 - a_1q^2), \dots$

هر جمله در q ضرب شده و به جمله بعد تبدیل شده $\Rightarrow$ پس یک تفریق هندسی است.

$\hookrightarrow q = \frac{a_1q(q-1)}{a_1(q-1)} = q$ قدر نسبت دنباله ی جدید همان قدر نسبت دنباله ی اولی است.

الف) $a, a+d, a+2d, a+3d, \dots, a+(n-1)d$

$\hookrightarrow na + (d+2d+3d+\dots+(n-1)d) \rightarrow na + d(1+2+3+\dots+(n-1))$

$\hookrightarrow na + d \left(\frac{n(n-1)}{2} \right) \xrightarrow{\frac{n}{2} \text{ ضرب می شود}} \frac{n}{2} (2a + (n-1)d)$

ب) $S = a_1 + a_1q + a_1q^2 + \dots + a_1q^{(n-1)}$

$\times q \left\{ \begin{array}{l} qS = a_1q + a_1q^2 + a_1q^3 + \dots + a_1q^{n-1} + a_1q^n \end{array} \right\} \xrightarrow{\text{تفاضل}} S - Sq = a - aq^n$

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