

$$aq^9 = \frac{1}{r} \times 12^9 = 1206 \quad \checkmark \quad \text{الف}$$

$$\frac{a_{12}}{a_{13}} = q^{12} = 16 \quad \checkmark \quad \text{ب}$$

(۱۱۵)

$a_n = 12$

$$a_9 = 12 \Leftrightarrow \frac{1}{r} \times 12^9 = 12^9 \Leftrightarrow 121 = 2^9 \quad \text{د}$$

$$\left. \begin{aligned} a_8 &= aq^8 = 12 \\ a_{11} &= aq^9 = 96 \end{aligned} \right\} \Rightarrow q^3 = 8 \Rightarrow q = 2 \Rightarrow a = \frac{12}{2^8}$$

$$a_{10} = \frac{12}{2^8} \times 2^9 = \frac{12 \times 2}{1} = 24 \quad \checkmark \quad \text{ج}$$

$$(a_1)^a \times q^{10} = 243 \quad a_1 \times a_2 \times a_3 \times a_4 \times a_5 = (a_3)^5 = 125 \quad \text{د}$$

$$aq^9 \times \frac{1}{a^2} = \frac{243}{a^2 q^2} \Rightarrow 243 = 2a^2 q^7$$

$$a_3 = 5$$

$$a_1 \times a_5 = a_3^2 \rightarrow (a_3)^2 = 9$$

$$r^{a+b} = r^2 \Rightarrow a+b=2 \quad \checkmark \quad \text{ا}$$

$$a = \frac{b-a}{n+1}$$

$$\text{نسبت حسابی} = \frac{a+b}{r} = \frac{5}{2} = 2.5 \quad \text{ب}$$

$$\left. \begin{aligned} aq^r &= 1-n \\ aq^r &= n \\ aq^{10} &= n+1 \end{aligned} \right\}$$

(۱۱۷۵)

$$\frac{n+1}{n+1} = \frac{n}{1-n} \Rightarrow n^2 = n+1-n^2 \Rightarrow 2n^2 - n - 1 = 0$$

$$\Rightarrow 2n^2 - n - 1 = 0$$

$$\Rightarrow n = +\frac{1}{2} \Rightarrow n = \pm \sqrt{\frac{1}{2}} \quad \checkmark$$

ملاحظات: قابل قبول است زیرا به ازای $x = -\frac{\sqrt{2}}{2}$ جلات فرد با هم غیر علامت می‌شوند.

$$\left. \begin{aligned} a + aq^r &= 11 \Rightarrow a(q^r + 1) = 11 \\ aq^r + aq^r &= 12 \Rightarrow aq^r(q + 1) = 12 \end{aligned} \right\} \frac{q^r + 1}{q + 1} = \frac{11}{12} \Rightarrow q = 3$$

$$a_8 = 1 \times 3^7 = 2187$$

(2)

$$(b_1, b_2) = 12 \Rightarrow a_2 = 3 = aq$$

$$q = \frac{1}{3} \leq q = 3$$

$$a_1 + 3 + 3q = 13 \Rightarrow a + 3q = 10 \Rightarrow a = 1, q = 3$$

$$1, 3, 9, \dots \Rightarrow 1, 3, 9, \dots$$

(1, 3, 9)

$$\text{رابطه} \quad \frac{1 - q^{n+1}}{1 - q} = S_n = \frac{a_1(q^{n+1} - 1)}{q - 1} \rightarrow S_{10} = \frac{1(3^{10} - 1)}{3 - 1} = 3^{10} - 1$$

$$\text{جواب} = (a_1 \times a_{10})^{\frac{1}{2}} \rightarrow (1 \times 3^9)^{\frac{1}{2}} = 1 \times 3^{4.5}$$

$$a_1 \times a_{10} = a_2 \times a_9 = a_3 \times a_8 = a_4 \times a_7 = a_5 \times a_6$$

$$a_n = a_1, a_2, a_3, \dots, a_{n-1}, a_n$$

$$a_n = a \cdot aq \cdot aq^2 \cdot \dots \cdot aq^{n-2} \cdot aq^{n-1}$$

$$b_n = a_1(q-1), aq(q-1), \dots, aq^{n-1}(q-1)$$

$$\text{جواب} \quad S_n = a_1 + a_2 + \dots + a_n \rightarrow S_n = a_1 + a_1d + a_1 + a_1d + \dots + a_1 + a_1(n-1)d$$

$$S_n = na_1 + (1 + 2 + \dots + n-1)d \rightarrow S_n = na_1 + \frac{n(n-1)}{2}d = \frac{n}{2}(2a_1 + (n-1)d)$$

$$\text{ب} \quad S_n = a_1 + a_2 + \dots + a_n \rightarrow S_n = a_1 + aq + aq^2 + \dots + aq^{n-1}$$

$$Sq = aq + aq^2 + aq^3 + \dots + aq^n$$

$$Sq - S_n = a_1q^n - a_1 = \frac{a_1(q^n - 1)}{q - 1}$$