

$$\frac{\frac{1}{r} \times q^{16}}{\frac{1}{r} \times q^{12}} = q^4 = r^4 = 16$$

$$q = \pm 2$$

$$\frac{1}{r} \times q^{12} = 121$$

$$q^{12} = 121$$

$$n = 1$$

$$\frac{1}{r} \times q^9 = q^1 = 256$$

(الف)

$$a_1 \times a_7 = (a_4)^2$$

$$a_7 = \frac{1}{r} \times q^6 = \frac{1}{r} \times 2^6 = 128$$

(2)

$$a_0 = 12$$

$$a_1 = 96$$

$$a_{10} = 9$$

$$q^3 = \frac{a_7}{a_4}$$

$$q^3 = \frac{96}{12} = 8 \Rightarrow q = 2$$

$$a_{10} = 94 \times 4 = 376$$

1

2

$$a_1 \times a_9 = (a_5)^2 = 3^2 = 9$$

(-)

$$a_1 \times a_9 = (a_5)^2$$

$$a_1 \times a_9 = (a_5)^2 \Rightarrow (a_5)^2 = 3^2 = 9$$

(الف)

$$a_5 = 3$$

3

$$(r \sqrt{r})^2 = r^2 \times (\sqrt{r})^2$$

$$r^b \times r^a = r^{b+a}$$

$$r^{b+a} = r^a$$

$$b + a = a$$

$$\frac{b+a}{r} = \frac{a}{r} = 2, a$$

4

$$\frac{ar^4}{ar^2} = \frac{a}{1-a} \Rightarrow r^2 =$$

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

$$a^2 = (1-a)(a+1)$$

$$a^2 = 1 - a^2$$

$$2a^2 = 1 \Rightarrow a^2 = \frac{1}{2} \Rightarrow a = \pm \sqrt{\frac{1}{2}}$$

5

|                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                     |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| $a_1 + a_2 = 21$<br>$a + aq^2 = 21$<br>$a(1+q^2) = 21$<br><div style="text-align: center;">I</div>                                                                                                                                                                                              | $a_2 + a_3 = 12$<br>$aq + aq^2 = 12$<br>$aq(1+q) = 12$<br><div style="text-align: center;">II</div><br>$a = 3$<br>$b = -10$                                                                                                                                                                                                                                 | $\frac{a(1+q^3)}{aq(1+q)} = \frac{12}{21} \Rightarrow \frac{(1+q)(1-q+q^2)}{q(1+q)} = \frac{4}{7}$<br>$1 - \frac{10q}{1+q} + \frac{10q^2}{1+q} = 0$<br>$1 - 10q + 10q^2 = 0$<br>بجای $x$ در معادله درجه دوم<br>$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ | 6 |
| $a + aq + aq^2 = 13$<br>$a \times aq + aq^2 = 22$<br>$a^2 q^2 = 22$<br><div style="border: 1px solid black; padding: 2px; display: inline-block;"><math>aq = 2</math></div>                                                                                                                     | $a + 3 + (3 \times q) = 13$<br>$a + 10q = 10$<br><div style="border: 1px solid black; padding: 2px; display: inline-block;"><math>1</math></div> <div style="border: 1px solid black; padding: 2px; display: inline-block;"><math>10</math></div><br><div style="border: 1px solid black; padding: 2px; display: inline-block;"><math>aq^2 = 9</math></div> |                                                                                                                                                                                                                                                     | 7 |
| $q_n = 296, 18 \quad q = 3$<br>$S_{10} = 10 \left( \frac{1 - (3)^{10}}{1 - 3} \right) = \frac{10}{2} (1 - (3)^{10}) = 5 - 5(3^{10})$<br>$\left( \sqrt{a_1 \times a_n} \right)^n = \left( \sqrt{2 \times 2 \times 3^9} \right)^{10} = (2^2 \times 3^9)^5 = 2^{10} \times 3^{45}$                 | $q_n = 29q^{n-1}$                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                     | 8 |
| $u_n = a_{n+1} - a_n$<br>$u_n = a_1(q-1)q^{n-1}$<br>مقدار $q$ معلوم می‌شود                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                     | 9 |
| $S_n = t_1 + t_2 + t_3 + \dots + t_{n-1} + t_n$<br>$S_n = t_1 + (t_1 + d) + (t_1 + 2d) + \dots + (t_1 + (n-1)d) + t_n$<br>$S_n = t_n + (t_n - d) + (t_n - 2d) + \dots + (t_n - (n-1)d) + t_1$<br>$2S_n = n(t_1 + t_n) \Rightarrow S_n = \frac{n}{2}(t_1 + t_n)$<br>$\frac{n}{2}(rt_1 + (n-1)d)$ | $\left\{ \begin{array}{l} S = a + ar + ar^2 + \dots + ar^{n-1} \\ -Sr = -ar - ar^2 - ar^3 - \dots - ar^{n-1} - ar^n \\ \hline S - Sr = a - ar^n \\ S(1-r) = a(1-r^n) \\ S = \frac{a(1-r^n)}{(1-r)} = a \left( \frac{r^n - 1}{r - 1} \right) \end{array} \right.$                                                                                            | 10                                                                                                                                                                                                                                                  |   |