پیش‌آگاهی

1)

$a_n = \frac{1}{2}, 1, 2, \dots \quad q=2$

$aq^9 = \frac{1}{2}(2)^9 = \boxed{256} \quad aq^3 = \boxed{4}$

$\frac{a_{17}}{a_{13}} = \frac{q^{16}}{q^{12}} = 2^{16} \times 2^{-12} = 2^4 = \boxed{16}$

$256 \times 4 = b^2 \to b^2 = 1024 \to b = 2^5 = 32$

$128 = \frac{1}{2}(2)^{n-1} \to 128 = 2^{-1} \times 2^n \times 2^{-1} \to 128 \times 4 = 2^n \quad \boxed{n=9}$

2)

$aq^4 = 12 \quad aq^7 = 96 \quad \frac{q^7}{q^4} = \frac{96}{12} \to q = 2$

$a_8 = 96 \quad a_{10} = 96 \times 4 = \boxed{384}$

3)

$\underbrace{a_1 \times \overbrace{a_2 \times a_3 \times a_4}^{a_3 \times a_3} \times a_5}_{a_3 \times a_3} = 243 \to a_3^5 = 243$

$\boxed{a_3 = 3}$

$\boxed{a_1 \times a_5 = 9}$

4)

$2^a, 4\sqrt{2}, 2^b \to 2^a \times 2^b = 32 \to 2^{a+b} = 32$

$a + b = 5 \quad$ واسطه $= \boxed{\frac{5}{2}}$

$a + b = 2c$

5)

$x+1, \quad x, \quad 1-x$

11 7 3

4 4

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

$x - x^2 + 1 - x = x^2 \to 1 - x^2 = x^2 \to 2x^2 = 1 \to x^2 = \frac{1}{2} \quad x = \pm\sqrt{\frac{1}{2}}$

6)

(۶

$aq+aq^2=12 \qquad aq(1+q)=12 \Rightarrow 1+q=\frac{12}{aq}$ *

$\frac{a(1-q^4)}{1-q}=40 \Rightarrow \frac{12(1+q^2)}{q}=40 \qquad \frac{a_1(1-q)(1+q)(1+q^2)}{1-q}=40$

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

$\boxed{a_1=27}$

(۷

$aq+a+aq^2=13 \to a+aq^2=10$

$a(1+q^2)=10$

$a^3q^3=27 \to aq=3$

$a=\frac{3}{q} \qquad \frac{3}{q}+3q=10 \to 3+3q^2-10q=0$

$\Delta=100-36=64$

$\frac{10\pm 8}{6}=\frac{2}{6},3$

$\left.\begin{array}{l} a=1 \\ q=3 \end{array}\right\} \to$

$a_n=3,9,18,\ldots$

(۸

$S_{10}=a\left(\frac{q^{10}-1}{q-1}\right) \to 2\left(\frac{3^{10}-1}{2}\right)=\boxed{3^{10}-1}$

$a^n \times r^{\frac{n(n-1)}{2}} \to 2,\ 2\times 3,\ 2\times 3^2,\ \ldots\ \boxed{2^{10}\times 3^{45}}$

ب*:

(۹

$a,\ aq,\ aq^2,\ aq^3,\ aq^4,\ aq^5$

$(aq-a),\ (aq^3-aq^2),\ (aq^5-aq^4)$

$(aq^5-aq^4)(aq-a)=(aq^3-aq^2)^2$

$a^2q^6-a^2q^5-a^2q^5+a^2q^4=a^2q^6+a^2q^4-2a^2q^5$ ✓

$q'=\frac{aq^3-aq^2}{aq-a} \to \frac{a(q^3-q^2)}{a(q-1)} \to \frac{q^2(q-1)}{q-1}=\boxed{q^2}$

$$S_n = \frac{n}{2}\left(2a+(n-1)d\right) \Rightarrow$$ (۱۰

$$a_1, \dots, a_n \rightarrow a_1+a_n = a_2+a_{n-1} = a_3+a_{n-2} = \dots$$

$$\frac{n}{2}\left[a_1+a_n\right] = \frac{n}{2}\left[a_1+(n-1)d\right]$$

$$a_1+a_2+a_3+\dots a_n = a+aq+aq^2 \dots aq^{n-1}$$

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

$$a_1(1+q+q^2+\dots+q^n)\frac{(1-q)}{1-q}$$

$$a_1\frac{(1-q^n)}{(1-q)}$$

$$a_1, \dots, a_n \rightarrow a_1+a_n = a_2+a_{n-1} = a_3+a_{n-2} = \dots$$