

$$\frac{1}{r}, 1, r, \dots \Rightarrow a_n = \frac{1}{r} (r)^{n-1}$$

$$a_1 = \frac{1}{r} (r)^{1-1} = \frac{1}{r} \times 1 = \boxed{1}$$

$$\frac{a_{14}}{a_{13}} = \frac{\frac{1}{r} (r)^{14-1}}{\frac{1}{r} (r)^{13-1}} = \frac{r^{13}}{r^{12}} = r = \boxed{1}$$

(ج) اما بتوجہ بہ متن سوال چون دنبال مصدقہ است r^2 قابل قبول است

$$1 \times 1 = \frac{1}{r} (r)^{n-1} \Rightarrow 1 = \frac{1}{r} (r)^{n-1} \Rightarrow r = r^{n-1} \Rightarrow 1 = n-1 \Rightarrow \boxed{n=2}$$

$$q^{1-\omega} = \frac{q}{1} \Rightarrow q^1 = 1 \Rightarrow q = 1 \Rightarrow a_1 = a_1 \times q^1 = 1 \times 1 = \boxed{1}$$

$$\frac{a_3}{q^2}, \frac{a_2}{q}, a_1, a_1 q, a_1 q^2 \Rightarrow \frac{a_3}{q^2} \times \frac{a_2}{q} \times a_1 \times a_1 q \times a_1 q^2 = 1 \Rightarrow \frac{a_3}{q^2} = 1 \Rightarrow \boxed{a_3 = 1}$$

$$\frac{a_3}{q^2} \times a_1 q^2 = \boxed{a_3 = 1}$$

$$r^a \times r^b = (r^{\sqrt{r}})^r \Rightarrow r^{a+b} = r^{\omega} \Rightarrow a+b = \omega \Rightarrow \boxed{\omega = 2}$$

$$\left. \begin{aligned} \frac{a_1}{a_3} &= q^2 = \frac{1}{1-r} \\ \frac{a_1}{a_2} &= q = \frac{1}{1-r} \end{aligned} \right\} \Rightarrow \frac{1}{1-r} = \frac{1}{1-r} \Rightarrow 1 = 1 \Rightarrow 1 = 1 \Rightarrow 1 = 1 \Rightarrow \boxed{r = \pm \sqrt{\frac{1}{2}}}$$

$$a_1 + a_1 q^2 = 1 \Rightarrow a_1 (1 + q^2) = 1 \Rightarrow a_1 q (1 + q) = \frac{1}{1} \Rightarrow \frac{q(1+q^2)}{q(1+q)} = \frac{1}{1} \Rightarrow \frac{(1+q)(1-q+q^2)}{q(1+q)} = \frac{1}{1} \Rightarrow \frac{1-q+q^2}{q} = 1 \Rightarrow 1 - q + q^2 = q \Rightarrow q^2 - 2q + 1 = 0 \Rightarrow q = \frac{2 \pm \sqrt{4-4}}{2} = \frac{2 \pm 0}{2} = 1 \Rightarrow \boxed{q = 1}$$

$$a_1 \times a_1 q \times a_1 q^2 = 1 \Rightarrow a_1^3 q^3 = 1 \Rightarrow a_1 q = 1 \Rightarrow a_1 + a_1 q + a_1 q^2 = 1 \Rightarrow \frac{1}{q} + 1 + q = 1 \Rightarrow \frac{1}{q} + q = 0 \Rightarrow 1 + q^2 = 0 \Rightarrow q^2 = -1 \Rightarrow q = \pm i$$

$$q = \frac{1 \pm \sqrt{4-4}}{2} = \frac{1 \pm 0}{2} = \frac{1}{2}$$

$$q = \frac{1}{2} \Rightarrow S_1 = \frac{1}{1-\frac{1}{2}} = \frac{1}{\frac{1}{2}} = 2 = \boxed{2}$$

$$P_1 = (1 \times (1 \times 1))^{1/2} = (1 \times 1)^{1/2} = 1$$

$$a_1, a_1q, a_1q^2, a_1q^3, \dots \Rightarrow a_1q - a_1, a_1q^2 - a_1q, a_1q^3 - a_1q^2, \dots \Rightarrow a_1(q-1), \underbrace{a_1q(q-1)}_{\times q}, \underbrace{a_1q^2(q-1)}_{\times q^2}, \dots$$

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$$d = \frac{n(n-1)}{2}$$

$$a_1 + a_1 + d + a_1 + 2d + a_1 + 3d + \dots + a_1 + (n-1)d \Rightarrow n a_1 + \frac{n(n-1)}{2} d \Rightarrow \frac{n}{2} (2a_1 + (n-1)d)$$

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(الف)

$$S_n = a_1 + a_1q + a_1q^2 + a_1q^3 + \dots + a_1q^{n-1} \Rightarrow q S_n = a_1q + a_1q^2 + a_1q^3 + a_1q^4 + \dots + a_1q^n \Rightarrow q S_n - S_n =$$

(ب)

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

☆ اگر $q \neq 1$ انگیز می باشد
و در غیر این صورت دنباله ثابت می باشد