

$a + aq = 21$ $aq + aq^2 = 12$ $\frac{1 - q + q^2}{q} = \frac{12}{21}$ $3(1 - q + q^2) = 4q$ $3 - 3q + 3q^2 = 4q$ $3q^2 - 7q + 3 = 0$ $q = \frac{7 \pm \sqrt{49 - 36}}{6} = \frac{7 \pm \sqrt{13}}{6}$ $q = \frac{1}{3} \text{ (مردود حالت)}$ $a = \frac{12}{2(1+q)} = \frac{12}{2(1+\frac{1}{3})} = \frac{12}{\frac{8}{3}} = \frac{9}{2}$	6
$a + aq + aq^2 = 13$ $a \times aq \times aq^2 = 216$ $a^3 q^3 = 216 \Rightarrow (aq)^3 = 216$ $aq = \sqrt[3]{216} = 6$ $a(1 + q + q^2) = 13$ $6(1 + q + q^2) = 13$ $1 + q + q^2 = \frac{13}{6}$ $q^2 + q + 1 = \frac{13}{6}$ $6q^2 + 6q + 6 = 13$ $6q^2 + 6q - 7 = 0$ $q = \frac{-6 \pm \sqrt{36 + 168}}{12} = \frac{-6 \pm \sqrt{204}}{12} = \frac{-6 \pm 2\sqrt{51}}{12} = \frac{-3 \pm \sqrt{51}}{6}$ $q = \frac{1}{3}$	7
$q = 3$ $a_1 = 2$ $S_n = a \times \frac{q^n - 1}{q - 1}$ $S_5 = 2 \times \frac{3^5 - 1}{3 - 1} = 2 \times \frac{243 - 1}{2} = 2 \times 121 = 242$ $P_n = a^n + q \frac{n(n-1)}{2}$ $P_5 = 2^5 + 3 \frac{5(5-1)}{2} = 32 + 3 \times 10 = 32 + 30 = 62$	8
$a_n = aq^{n-1}$ $L_n = a_{n+1} - a_n$ $L_n = aq^n - aq^{n-1} = aq^{n-1}(q - 1)$ $L_n = a(q - 1)q^{n-1}$ $\frac{L_{n+1}}{L_n} = \frac{a(q-1)q^n}{a(q-1)q^{n-1}} = q$	9
$a, a+d, a+2d, \dots, a+(n-1)d$ $S_n = a + (a+d) + (a+2d) + \dots + (a+(n-1)d)$ $S_n = a + (n-1)d + (a+(n-2)d) + \dots + a$ $2S_n = n(2a + (n-1)d)$ $S_n = \frac{n}{2}(2a + (n-1)d)$ $S_n(1-q) = a(1-q^n) \Rightarrow S_n = a \frac{1-q^n}{1-q}$	10