

الف) $\frac{1}{\frac{1}{r}} = \frac{r}{1} = r \Rightarrow r = 2 \Rightarrow qn = \frac{1}{r} \times r^{n-1} \Rightarrow A_{10} = \frac{1}{r} \times r^9 = (2 \times 2^9)$
 ب) $a_{17} = \frac{1}{r} \times r^{17} = 32,768$, $a_{13} = \frac{1}{r} \times r^{13} = 2,048 \Rightarrow \frac{32,768}{2,048} = 16$
 ج) $4, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32} \Rightarrow m = 6 \Rightarrow r = \frac{2 \times 2^6}{1} = 2^7 = 128 \Rightarrow r = 2$
 د) 4 مین جمله $\Rightarrow$ از روی بالایی $\Rightarrow$ 4

$+a = 12$, $+l = 96 \Rightarrow \frac{1-a}{r} = \frac{4}{12} = r^3 = 8 \Rightarrow r = 2 \Rightarrow r \times ? = 96 \Rightarrow ? = \frac{96}{r} \Rightarrow +_{10} = \frac{96}{r} \times r^9 = 384$

الف) $a \times q \times q^2 \times q^3 \times q^4 \times q^5 \Rightarrow a \times r = 2^2 \Rightarrow a \times (r^2)^5 = 2^4 \Rightarrow (a \times r^2)^5 = 2^4 \Rightarrow$
 $a \times r^2 = 2 \Rightarrow a \times r^2 = 2 \Rightarrow 2, 2, 2, 2, 2$
 $2 \times 2 = 4$

$(-r\sqrt{r})^2 = r^b \times r^a \Rightarrow r\sqrt{r} = r^2 \times r^{\frac{1}{2}} \Rightarrow r^{\frac{3}{2}} = (r^{\frac{a}{2}})^2 = r^a = 32 \Rightarrow$
 $r^b \times r^a = r^{a+b} = r^a = 32 \Rightarrow a+b = a \Rightarrow \frac{a+b}{r} =$
 $\frac{a}{r} = 2/a$

$+u = ar^r = 1-x$, $+v = ar^r = x \Rightarrow \frac{+u}{+v} = \frac{ar^r}{ar^r} = r^r = \frac{x}{1-x} \Rightarrow \frac{x}{1-x} = \frac{x+1}{x} \Rightarrow x^2 =$
 $+u = ar^r = x+1$, $x^2 = (x+1)(1-x) = 1 \Rightarrow x^2 = 1-x^2 \Rightarrow 2x^2 = 1 \Rightarrow$
 $x^2 = \frac{1}{2} \Rightarrow x = \sqrt{\frac{1}{2}} \Rightarrow x = \pm \sqrt{\frac{1}{2}}$

$t_1 = a, t_2 = ar, t_3 = ar^2, t_4 = ar^3 \Rightarrow a + ar^3 = 2a \Rightarrow a(1+r^3) = 2a$

$ar + ar^2 = 12 \Rightarrow ar(1+r) = 12 \Rightarrow \frac{a(1+r^3)}{ar(1+r)} = \frac{2a}{12} \Rightarrow \frac{1+r^3}{r(1+r)} = \frac{1}{3} \Rightarrow \begin{cases} r=3 \\ r=\frac{1}{3} \end{cases}$

$\frac{(1+r)(1-r+r^2)}{r(1+r)} = \frac{1}{3} \Rightarrow \frac{1-r+r^2}{r} = \frac{1}{3} \Rightarrow 3(1-r+r^2) = r \Rightarrow 3 - 3r + 3r^2 = r \Rightarrow 3r^2 - 4r + 3 = 0$

$3r^2 - 4r + 3 = 0 \Rightarrow r^2 - \frac{4}{3}r + 1 = 0 \Rightarrow \Delta = \frac{16}{9} - 4 = -\frac{20}{9} \Rightarrow r = \frac{\frac{4}{3} \pm \sqrt{-\frac{20}{9}}}{2} \Rightarrow r = 3$

$\frac{y}{x} = r \Rightarrow an = 2 \times 10^{n-1} \Rightarrow P\left(\frac{r^{10}-1}{r-1}\right) = S_{10} = 10^9 - 1 \Rightarrow n = a_1 \left(\frac{q^n-1}{q-1}\right)$

$\therefore P_n = a^n \times r^{\frac{n(n-1)}{2}} \Rightarrow P_{10} = 10^9 \times 10^{45}$

$\frac{v}{q}, v, vq \rightarrow \frac{v}{q} + v + vq = 13 \rightarrow (q-1)(q-4) = 0$

$\hookrightarrow \frac{v}{q} \times v \times vq = 10 \rightarrow v^3 = 10 \rightarrow v = \sqrt[3]{10}$

$\begin{cases} q = \frac{1}{3} \\ q = 3 \end{cases} \rightarrow 1, 3, 9$

$aq - a, aq^2 - aq, aq^3 - aq^2 \Rightarrow a(q-1), aq(q-1), aq^2(q-1)$

$t_n = aq^{n-1}(q-1) \Rightarrow \frac{t_{n+1}}{t_n} = \frac{aq^n(q-1)}{aq^{n-1}(q-1)} = q$

تعداد جمله ت ضرورت می آید $= an = a + (n-1)d = S_n = \frac{n}{2}(a + an) = \frac{n}{2}(2a + (n-1)d)$
اولین و آخرین جمله $\checkmark$

$\therefore (a_1 q^{n-1} + a_1 q^{n-2} + \dots + a_1 q + a_1 = S_n)$

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

$a_1 q^n + S_n - a_1 = q \cdot S_n \Rightarrow S_n(q-1) = a_1(q^n-1) \Rightarrow$

$S_n = a_1 \left(\frac{q^n-1}{q-1} \right)$