

$t_1 = a$, $t_2 = ar$, $t_3 = ar^2$, $t_4 = ar^3 \Rightarrow a + ar^3 = 12 \Rightarrow a(1+r^3) = 12$

$ar + ar^4 = 12 \Rightarrow ar(1+r) = 12 \Rightarrow \frac{a(1+r^3)}{ar(1+r)} = \frac{12}{12} \Rightarrow \frac{1+r^3}{r(1+r)} = \frac{1}{r} \Rightarrow$

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

$r^4 - r^2 + r - 1 = 0 \Rightarrow r^2 - 1 + r = 0 \Rightarrow \Delta = 1 - 4(-1) = 5 \Rightarrow r = \frac{1 \pm \sqrt{5}}{2} \Rightarrow r = 2$

$r = 2 \Rightarrow a_n = 2 \times 2^{n-1} \Rightarrow P_n = \frac{2^n - 1}{2 - 1} \Rightarrow P_{10} = 2^{10} - 1 \Rightarrow S_n = a_1 \left(\frac{r^n - 1}{r - 1} \right)$

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

جواب سوال ۶

جواب سوال ۷

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

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

تعداد جمله ت ضروری می باشد $= a_n = a + (n-1)d = S_n = \frac{n}{2} (a + a_n)$
 اولین و آخرین جمله $S_n = \frac{n}{2} (2a + (n-1)d)$

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

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

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

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

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