نام و نام خانوادگی ...[name]... پاسخنامه تشریحی تکلیف شماره ...۱۴... کلاس ...دهم...

الف) $a_n = \frac{1}{2}, 1, 2, \dots \rightarrow q=2 \quad aq^{n-1} \longrightarrow a_{10} = \frac{1}{2} \times 2^9 = \boxed{2^8} = 256$ $a=\frac{1}{2}$

ب) $\frac{\cancel{a}q^{16}}{\cancel{a}q^{12}} = q^4 = 2^4 = \boxed{16}$

ج) $a_1q^4, \dots, aq^9 \longrightarrow 4, 8, 16, 32, 64, 128, 256, \dots$

$a_1q^4 = 12 \qquad \frac{a_1q^7}{a_1q^4} = \frac{96}{12} = 8 = q^3 \Rightarrow q = 2 \quad \frac{3}{4}, \frac{3}{2}, 3, 6, 12, \dots, 96$

$a_1q^7 = 96$

$a_1q^9 = \frac{3}{4} \times 2^9 \Rightarrow 3 \times 128 = \boxed{384}$

الف) $a_1 \times q^{10} = 243 = 3^5 \xrightarrow{q} a_1q^2 = 3 = a_3$

ب) $a_1 \times a_1q^4 = a_1^2q^4 \xrightarrow{a_2 \times a_4 = a_1 \times a_5} \boxed{3^2} = \boxed{9}$

$(2\sqrt{2})^{10} = 32 = 2^9 \times 2^4 = 2^{a+b} \Rightarrow a+b = 5 \rightarrow a = 1, b = 4 \rightarrow q = 2\sqrt{2}, \quad 1, 2, 3, 4$

$t_3 = 1-n \quad t_7 = n \quad t_{11} = n+1 \quad t_7 = t_3 \times q^4 \quad t_{11} = t_7 \times q^4 \Rightarrow n = (1-n)q^4$
$n+1 = nq^4$

$q^4 = \frac{n+1}{n}, \; q^4 = \frac{n}{1-n} \rightarrow \frac{n+1}{n} = \frac{n}{1-n} \quad (n+1)(1-n) = n^2 \rightarrow n+1 = n^2 - n = n^2$

$1-n^2 = n^2 \Rightarrow 2n^2 = 1 \Rightarrow n^2 = \frac{1}{2} \rightarrow n = \pm\frac{1}{\sqrt{2}} \rightarrow q^4 = \frac{n+1}{n} = \frac{1+\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{2}}} = \sqrt{2}+1$

$q^4 = \frac{n+1}{n} = \frac{1-\frac{1}{\sqrt{2}}}{-\frac{1}{\sqrt{2}}} = -(\sqrt{2}-1) \quad n = \pm\frac{1}{\sqrt{2}} \quad q^4 = \frac{n+1}{n}$

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$a+ar^۳=۲۸$, $ar+ar^۲=۱۲$

$a=\frac{۱۲}{r(1+r)}$, $\frac{۱۲}{r(1+r)}(1+r^۳)=۲۸$, $۱۲(1+r^۳)=۲۸r(1+r) \Rightarrow ۳(1+r^۳)=۷r(1+r)$

$۳r^۳-۷r^۲-۷r+۳=0$ $(r-۳)(۳r^۲+۲r-1)=0$

if $r=۳ \to a=\frac{۱۲}{۳\times۴}=1 \to \boxed{1,۳,۹,۲۷}$

if $r=\frac{1}{۳} \to a=\frac{۱۲}{\frac{1}{۳}\times\frac{۴}{۳}}=۲۷ \to \boxed{1,۳,۹,۲۷}$; if $r=-1 \to \times$ $\Big\} \Rightarrow \boxed{۲۷}$

$a_1+a_1q+a_1q^۲=۱۳ \to a_1+a_1q^۲=۱۰$

$\hookrightarrow \frac{۳}{q}+۳+۳q=۱۳ \Rightarrow \frac{1}{q}+1+q=\frac{۱۳}{۳} \Rightarrow$

$a_1^۳q^۳=۲۷ \xrightarrow{\sqrt[۳]{}} a_1q=۳=a_۲$

$q+\frac{1}{q}=\frac{۱۰}{۳}$ $۳q^۲-۱۰q+۳=0$ $q=۳$ یا $q=\frac{1}{۳}$

if $q=۳ \to a=\frac{۳}{q}=1 \to 1,۳,۹$ $\boxed{1,۳,۹}$

if $q=\frac{1}{۳} \to a=\frac{۳}{\frac{1}{۳}}=۹ \to 1,۳,۹$

الف)

$\left.\begin{array}{l} a_1=۲ \\ a_1q=۶ \\ a_1q^۲=۱۸ \end{array}\right\} q=۳$ $S_{10}=\cancel{۲}\left(\frac{۳^{10}-1}{\cancel{۳-1}}\right) \Rightarrow \boxed{۳^{10}-1}$

ب)

$a_1^{10}q^{۴۵}=? \to \boxed{۲^{10}\times۳^{۴۵}}$

$a, aq, aq^۲, aq^۳ \dots \to b_1=aq-a=a(q-1)$

$b_۲=aq^۲-aq=aq(q-1)$

$b_۳=aq^۳-aq^۲=aq^۲(q-1)$

$b_n=aq^{n-1}(q-1)\ (n\geq1)$

$\frac{b_{n+1}}{b_n}=\frac{aq^n(q-1)}{aq^{n-1}(q-1)}=q$

الف)

$a, a+d, a+۲d, \dots, a+(n-1)d$

$S_n=a+(a+d)+(a+۲d)+\dots+[a+(n-1)d]$

$۲S_n=n[۲a+(n-1)d] \Rightarrow S_n=\frac{n}{۲}[۲a+(n-1)d]$

ب)

$a, aq, aq^۲, \dots aq^{n-1}$ $S_n=a+aq+aq^۲+\dots+aq^{n-1}$ $qS_n=aq+aq^۲+\dots+aq^n$

$S_n-qS_n=a-aq^n \to S_n(1-q)=a(1-q^n) \xrightarrow{q\neq1} S_n=\frac{a(1-q^n)}{1-q}$ یا $S_n=\frac{a(q^n-1)}{q-1}$