هلیا توکلیان

$a_1 = ٤٠$

$a+٣d=٦١ \Big\} \Rightarrow ٣d=٢١ \quad d=٧ \,،\, a_1=٤٠$ ١

$٤٠ + (n-1)٧ = ٢٠٨ \rightarrow ٣٣+٧n = ٢٠٨ \qquad ١٧٥=٧n$

$\boxed{n=٢٥}$

$٩٨+٣=١٠١ \qquad ٩٩٤+٣=٩٩٧$

$١٠١ ، ١٠٨ ، ١١٥ ، \dots ، ٩٩٧ \qquad \frac{٩٩٧-١٠١}{٧}+١=١٢٩$ ٢

$a_n+١d+a_n+٢d+a_n+٣d=١٢-٦n$

$\frac{٣a_n+٦d=١٢-٦n}{٣} \Rightarrow a_n+٢d=٤-٢n$ ٣

$a_1+(n-1)d+٢d=٤-٢n$

$a_n=-٢n+٤-d$

$٣a_n+٦d=-٦n+١٢ \rightarrow ٣(-٢n+٤-d)+٦d = -٦n+١٢-٣d+٦d$

$٣d=-٦ \rightarrow d=-٢$

$a_{17}+a_8 = a_1+16\underset{-٢}{d}+a_1+٧\underset{-٢}{d} \Rightarrow \underset{١٢}{٢\times٦} -٤٦=-٣٤$

$a_3=٢^n-١ \qquad a_8=٢^{n+1} \qquad a_{13}=٢^{٢n}-٣$

$a_{13}-a_8=a_8-a_3$ ٤

$(٢^{٢n}-٣)-٢^{n+1}=٢^{n+1}-(٢^n-١)$

$٢^{٢n}-٣-٢^{n+1}=٢^{n+1}-٢^n+١ \Rightarrow ٢^{٢n}-٣(٢^n)-٤=0 \rightarrow a^٢-٣a-٤=0$

$(a+1)(a-٤)=0 \Longrightarrow a=\boxed{٤}\,،\,\underset{\text{غیرقابل قبول}}{-١} \qquad (٢^n)=a$

$٢^n=٤ \quad \boxed{n=٢}$

$a_3=٤-١=٣ \,،\, a_8=٨ \,،\, a_{13}=١٦-٣=١٣$

$١٣+٨+٣=\boxed{٢٤}$

$a_{12} - a_{10} = 5$

$a_{10} + a_{12} = 25$ ۵

$2a_{12} = 30 \qquad a_{10} = 10 \rightarrow \quad a_1 + 9d = 10$

$\qquad\qquad\qquad a_{12} = 15 \qquad\quad a_1 + 11d = 15$

$\qquad\qquad\qquad\qquad\qquad\qquad 2d = 5 \qquad d = \frac{5}{2}$

$a_1 + \frac{9 \times 5}{2} = 10$

$a_{21} = -12/5 + \cancel{20}^{10} \times \frac{5}{\cancel{2}} = 37/5 \qquad a_1 = 10 - \frac{45}{2} = \frac{-25}{2}$

$S_{10} - S_5 = \frac{10}{2}(a_1 + a_{10}) - \frac{5}{2}(a_1 + a_5) \qquad S_5 = \frac{5}{2}(a_1 + a_5)$

$\frac{5}{2}(a_1 + a_5) = \frac{1}{3}\left(5(a_1 + a_{10}) - \frac{5}{2}(a_1 + a_5)\right) \Rightarrow \frac{5}{2}(a_1 + a_5) + \frac{5}{6}(a_1 + a_5)$ ۶

$= \frac{5}{3}(a_1 + a_{10}) \Rightarrow (a_1 + a_5)\underbrace{\left(\frac{5}{2} + \frac{5}{6}\right)}_{\frac{20}{6} = \frac{10}{3}} = \frac{\cancel{5}}{\cancel{3}}(a_1 + a_{10}) \Rightarrow$

$2a_1 + 2a_5 = a_1 + a_{10}$

$a_1 + 2a_5 = a_{10} \Rightarrow \cancel{a_1} + \underbrace{2(a_1 + 4d)}_{2a_1 + 8d} = \cancel{a_1} + 9d \Rightarrow 2a_1 = d$

$a = \frac{d}{2}$

$\frac{a_1 + d}{a_1} = \frac{\frac{d}{2} + d}{\frac{d}{2}} = \frac{\frac{3}{2}\cancel{d}}{\frac{1}{2}\cancel{d}} = \frac{6}{2} = 3$

$t_n = t_{n-3} + 15 \rightarrow 3d = 15 \Rightarrow d = 5$

$t_9^2 - t_5^2 \Rightarrow \underbrace{(t_9 - t_5)}_{\cancel{a_1} + 40 - \cancel{a_1} - 20}\underbrace{(t_9 + t_5)}_{a_1 + 40 + a_1 + 20} = 20(2a_1 + 60) = \frac{40a_1 + 120}{t_7}$ ۷

$\frac{40a_1 + 1200}{a_1 + 30} =$

$\frac{40\cancel{(a_1 + 30)}}{\cancel{a_1 + 30}} = \boxed{40}$ برابر

$۲(۱-۶\sqrt{۳}) = ۲-۱۲\sqrt{۳} \quad , \quad ۲+\sqrt{۳}$

$d = \dfrac{\cancel{۲}+\sqrt{۳} \; \cancel{-۲}+۱۲\sqrt{۳}}{۱۳} \Rightarrow ۱۳\sqrt{۳} = ۱۳d$

$d = \sqrt{۳}$

راه اول

$۳۰ \quad a_{۴n-1} = a_۱ + (۴n-۲)d \Rightarrow (۴n-۲)d = ۳۰ \Rightarrow d = \dfrac{۱۵}{۲n-۱}$

$a_n = a_۱ + (n-1)d = ۱۱ \rightarrow nd = ۹ \qquad n\left(\dfrac{۱۵}{۲n-۱}\right) = ۹$

$\boxed{n = ۳}$

راه دوم

$\dfrac{۳۲-۲}{۴n-۳+۱} = \dfrac{۳۰}{\cancel{۲}(۲n-۱)} = \dfrac{۱۵}{۲n+۱} = d \qquad a_n = \cancel{a_۱} + nd = ۱۱$

$۹ = n\left(\dfrac{۱۵}{۲n+۱}\right)$

$\boxed{n = ۳}$

$a_n = a + (n-1)d \qquad n + n + ۴ = ۳ + ۱۷$

$a_{n+۴} = a + (n+۳)d \qquad ۲n + ۴ = ۲۰ \qquad \boxed{n = ۸}$

$a_۸ = ۳a_۴ = a_۱ + ۷d = ۳(a_۱ + ۳d) \rightarrow a_۱ = -d$

$a_z = 0 \qquad a_۱ + (z-1)d = 0 \qquad zd = ۲ \qquad \boxed{z = ۲}$