۱

$t_1 = 40 \quad | \quad t_4 = 61 \quad | \quad t_n = 208$

$t_4 - t_1 = 3d \Rightarrow 3d = 21 \Rightarrow d = 7$

$t_n = 7n + 33$

$7n + 33 = 208 \Rightarrow 7n = 175 \Rightarrow \boxed{n = 25}$

۲

$98 \div 7 = 14 \Rightarrow 98 + 3 = 101$

$101 \leq 7n + 3 < 997 \Rightarrow 98 \leq 7n < 994$

$14 \leq n < 142$

$\Rightarrow 142 - 14 = 128$

۳

$3an + 3d = -6n + 12 \Rightarrow \begin{matrix} a = -2 \\ d = 2 \end{matrix} \Rightarrow t_n = -2n + 2$

$t_n = an + d \Rightarrow a_{n+1} + a_{n+2} + a_{n+3} = 3a_n + 6d$

$\left.\begin{matrix} a_{17} = (-2 \times 17) + 2 = -32 \\ a_8 = (-2 \times 8) + 2 = -14 \end{matrix}\right\} \Rightarrow a_{17} + a_8 = -32 - 14 = -46$

۴

$\left.\begin{matrix} t_3 = a_1 + 2d = 2^{x-1} \\ t_8 = a_1 + 7d = 2 \\ t_{13} = a_1 + 12d = 2^{2x} - 3 \end{matrix}\right\} \Rightarrow t_3 + t_{13} = t_8 + t_8 \Rightarrow 2t_8 = 2(2^{x+1}) = 2^{x+2}$

$2^{x-1} + 2^{2x} - 3 = 2^{x+2} \Rightarrow 2^x + 2^{2x} - 4 = 2^{x+2} \Rightarrow 2^x + 2^{2x} - 2^{x+2} = 4$

$2^x(2^x - 3) = 4 \Rightarrow 2^x = 4 \Rightarrow x = 2$

۵

$a_{12} - a_{10} = 2d = 5 \Rightarrow d = 5/2$

$a_{12} + a_{10} = 2a + 50 = 25 \Rightarrow a = -25/2$

$a_{21} = a + 20d = 75/2$

$S_1 = 5\,\frac{a_1+a_5}{2} = 5(a_1+2d)$

$S_2 = 5\,\frac{a_6+a_{10}}{2} = 5(a_1+7d)$

$S_1 = \frac{1}{3} S_2 \Rightarrow 5(a_1+2d) = \frac{5}{3}(a_1+7d)$

$3a_1+6d = a_1+7d \Rightarrow 2a_1 = d$

$\frac{a_2}{a_1} = \frac{3a_1}{a_1} = 3 \qquad a_2 = a_1+d = 3a_1$ | ۶

$t_n = t_{n-3}+15 \Rightarrow t_n - t_n - 3d + 15$ (حذف)

$t_4 = t_1+5$, $t_4 = t_1+3d \Rightarrow d = 5$

$(t_9+t_5)(t_9-t_5) = 1400$

$\frac{2t_1+12d}{70}$

$t_7 = t_1+6d = 35 \Rightarrow \frac{1400}{35} = 40$ برابر

$t_1 = ? \Rightarrow t_3 = 15 \Rightarrow t_3 = t_1+2d \Rightarrow t_1 = 5$ | ۷

$t_1 = 2(1-6\sqrt{3}) = 2-12\sqrt{3}$

$t_{14} = 2+\sqrt{3}$

$t_{14} = t_1+13d \Rightarrow 2+\sqrt{3} = 2-12\sqrt{3} \Rightarrow 13d = 13\sqrt{3} \Rightarrow d = \sqrt{3}$ | ۸

$d = \frac{b-a}{(4n-3)+1} = \frac{32-2}{4n-2} = \frac{30}{4n-2}$ | $t_1 = 2$, $4n-3$ تعداد واسطه, $t_n = 32$

$t_{n+1} = t_1+nd \Rightarrow nd = 6$ $\qquad nd = \frac{30n}{4n-2} = 9$

$2 \quad 11 \quad 32$ $\qquad 30n = 36n-18 \qquad n = 3$ | ۹

$a_n+a_{n+4} = a_3+a_{17}$ $\qquad (a+(n-1)d)+(a+(n+3)d) = a+2d + a+16d$

$(a+nd-d)+(a+nd+3d) = (a+2d)+(a+16d)$

$2a+(2n+2)d = 2a+18d \Rightarrow (2n+2)d = 18d$

$2n+2 = 18 \Rightarrow 2n = 16 \Rightarrow n = 8$ | ۱۰