نام و نام خانوادگی مهدی مومن زاده .... پاسخنامه تشریحی تکلیف شماره ...۱۳... کلاس ....

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۱	$a_1 = 40$ $a_1 + 3d = 61 \rightarrow 3d = 21 \rightarrow d = 7$ $n = 25$ $a_n = 7(n-1) + 40 = 7n + 33$ $7n + 33 = 208 \rightarrow 7n = 175 \rightarrow n = \frac{175}{7} = 25$
۲	$100 \le 7n+3 \le 999 \rightarrow 97 \le 7n \le 996 \rightarrow 13.8 \le n \le 142.2$ $a_{91} = 23 \times 7$ یعنی بازه $14 \le n \le 142$ تعداد $142 - 14 + 1 = \boxed{129}$
۳	$a_3, a_8, a_{13} \rightarrow a_{13} + a_3 = 2a_8 \rightarrow 2^n - 1 + 2^{2n} - 3 = 2 \times 2^{n+1}$ $\rightarrow 2^n - 4 + 2^{2n} = 4 \times 2^n \rightarrow 2^{2n} - 3 \times 2^n - 4 = 0 \xrightarrow{a=2^n} a^2 - 3a - 4 = 0 \rightarrow (a-4)(a+1)$ $2^n - 4 = 0$, $2^n = 4$, $n = 2$ $2^n + 1 = 0$, $2^n = -1$ جواب ندارد $(2^4 - 3) + (2^3) + (2^2 - 1)$ $13 + 8 + 3 = 24$ سوال ۴
۴	$a_n = an + b$ سوال ۳ $a_{n+1} + a_{n+2} + a_{n+3} = a(n+1) + b + a(n+2) + b + a(n+3) + b = 3an + 6a + 3b$ $3an + 6a + 3b = -6n + 12$ $3a = -6$ $a = -2$ $-12 + 3b = 12$, $b = 8$ $a_8 + a_{17} = (-2 \times 8 + 8) + (-2 \times 17 + 8) = -34$ $-2 \times 25 = -50$
۵	$a_{17} - a_{15} = 2d = 5 \rightarrow d = 2.5 = \frac{5}{2}$ $a_{10} + a_{12} = 2a_{11} = 25 \rightarrow a_{11} = \frac{25}{2}$ $a_{21} = a_{11} + 10d = \frac{25}{2} = 12.5 + \cancel{10} \times \frac{5}{\cancel{2}} = 37.5$

۵ جمله اول → $a_1 + \dots + a_5 = 5a_3 = 5a_1 + 5\times 2d = 5a_1 + 10d$ ۵ جمله دوم → $a_6 + \dots + a_{10} = 5a_8 = 5a_1 + 5\times 7d = 5a_1 + 35d$ $\frac{3}{2}(5a_1 + 10d) = \frac{5}{2}a_1 + \frac{35}{2}d$ $\to \frac{10}{2}a_1 = \frac{5}{2}d \to 2a_1 = d$ $\qquad \frac{a_2}{a_1} = \frac{a_1 + 2a_1}{a_1} = 3$	۶
$t_n - t_{n-3} = 3d = 15$ $\to d = 5$ $\qquad$ t_0 برابر $t_9^2 - t_5^2 = (t_9 - t_5)(t_9 + t_5) = 4d(2t_7) = 8d\, t_7$ $8\times 5 = 40\, t_7$	۷
$d = \frac{2\sqrt{3} - 2 + 12\sqrt{3}}{12} = \frac{\cancel{12}\sqrt{3}}{\cancel{12}} = \sqrt{3}$ $\qquad 2(1 - 6\sqrt{3}) = 2 - 12\sqrt{3}$	۸
$a_1 = 2$ ——— 32 ۴n-۳ واسطه $\qquad$ جمله ۴n-۱ ام $= a_1$ $\qquad 2 + (4n-2)d = 32 \Rightarrow d = \frac{30}{4n-2}$ $a_{n+1} = 11 = 2 + (n-1)d$ $\qquad$ واسطه n ام یعنی جمله n+1 ام $a_{4n-1} - a_{n+1} = 32 - 11 = 21 = (3n-2)\left(\frac{30}{4n-2}\right) = \frac{\cancel{90}n - \cancel{60}}{4n-2} = \cancel{21}\,7$ $30n - 20 = 28n - 14 \to 2n = 6 \to n = 3$	۹
$n + n + 4 = 3\times 17 \to 2n + 4 = 20 \to 2n = 16 \to n = 8$ $a_n = a_1 + (n-1)d$ $a_8 = a_1 + 7d$ $\qquad a_1 + 7d = 3a_1 + 9d$ $a_{?=4} = a_1 + 3d$ $\qquad -2a_1 = 2d$ $-a_1 = d$ (۱) (۲) (۳) (۴) $-d \quad 0 \quad d \quad 2d$ $a_2 = 0$	۱۰