آیلا جعفری - تکلیف شماره ۱۳ - دهم دفتر A

-۱

$a = 40$, $a_4 = 61$ $\rightarrow d = \frac{a_4 - a}{3} = \frac{21}{3} = 7 \rightarrow a_n = a + (n-1)d \rightarrow a_n = 40 + (n-1)7 = 7n + 33$

$\Rightarrow a_n = 208 = 7n + 33 \rightarrow 7n = 208 - 33 \rightarrow n = \frac{175}{7} = 25$ $\rightarrow$ جمله‌ی ۲۵ اُم = ۲۰۸

-۲

$\rightarrow \overset{14\times7}{98} + 3 = \overset{\text{اولین عدد}}{101} \rightarrow 101, 108, \dots, 997 \rightarrow \frac{\overset{896}{997 - 101}}{7} + 1 = 129$

-۳

$\underbrace{a_{n+1} + a_{n+2} + a_{n+3}}_{=2a_{n+2}} = 3a_{n+2} = -6n + 12 \rightarrow a_{n+2} = -2n + 4$

$n = 6 \Rightarrow a_8 = -12 + 4 = -8$

$n = 15 \Rightarrow a_{17} = -30 + 4 = -26$ $\rightarrow a_8 + a_{17} = -8 - 26 = -34$

-۴

$\boxed{a_8 = \frac{a_3 + a_{13}}{2}}$

$\rightarrow 2^{x+1} = \frac{2^{2x} - 3 + 2^x - 1}{2} \rightarrow 2^{x+2} = 2^{2x} + 2^x - 4 \rightarrow (4 \times 2^x) + 4 = (2^x \times 2^x) + 2^x$

$4(2^x + 1) = 2^x(2^x + 1) \rightarrow 2^x = 4 \rightarrow \boxed{x = 2}$

$\Rightarrow a_3 = 2^2 - 1 = 3$

$a_8 = 2^3 = 8$

$a_{13} = 2^4 - 3 = 13$

$3 + 8 + 13 = 24$

-۵

$a_{12} - a_{10} = 5 = 2d \rightarrow d = 2.5$

$a_{12} + a_{10} = 25 = 2(a_{11}) \rightarrow a_{11} = 12.5$

$a_{21} = a_{11} + 10d = 12.5 + 25 = 37.5$

-۶

$\overbrace{a_1 + \underbrace{a_2 + a_3 + a_4}_{a_3 + a_3} + a_5}^{a_3 + a_3} = \frac{1}{3}(\overbrace{a_6 + \underbrace{a_7 + a_8 + a_9}_{2a_8} + a_{10}}^{2a_8})$

$5a_3 = \frac{5a_8}{3} \rightarrow 15a_3 = 5a_8 \rightarrow 3\underset{(a+2d)}{a_3} = a_8 \rightarrow 3a + 6d = a + 7d \rightarrow 2a = d$

$\Rightarrow \frac{a_2}{a_1} = ? = \frac{a+d}{a} = \frac{3a}{a} = 3$

$t_n = t_{n-2} + 10 \rightarrow t_n = t_n - 2d + 10 \rightarrow 2d = 10 \rightarrow d = 5$ -۷

$\frac{(t_9 - t_5)^2}{t_7} \cdot \frac{(t_9 - t_5)(t_9 + t_5)}{t_7} = \frac{(4d)(2t_7)}{t_7} = 20 \times 2 = 40$

$d = \frac{b-a}{n+1} \rightarrow d = \frac{2+\sqrt{3} - 2 + 12\sqrt{3}}{12+1} = \frac{13\sqrt{3}}{13} = \sqrt{3}$ -۸

$d = \frac{b-a}{n+1} \rightarrow d = \frac{32-2}{4n-2+1} = \frac{30}{4n-2} = \frac{15}{2n-1}$,

$11 - 2 = 9 \overset{2d=3\times3}{\Rightarrow} d = 3$

$21 - 11 = 21 \overset{10\times2=10d}{\Rightarrow} d = 3$

$\rightarrow \frac{15}{2n-1} = 3$ -۹

$\rightarrow 2n-1 = 5 \rightarrow n = 3$

$a_n + a_{n+4} = a_2 + a_{11} \rightarrow 2n+4 = 3+11 \rightarrow 2n = 10 \rightarrow n = 8$ -۱۰

$\frac{a_8}{a_4} = 3 \rightarrow a+7d = 3a+9d \rightarrow -2a = 2d \rightarrow -d = a$, $a \rightarrow a_n = a + (n-1)d$

$a_n = -d + (n-1)d = dn - 2d = d(n-2)$

$a_n = d(n-2) = 0 \Rightarrow n-2 = 0 \rightarrow n = 2$

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