نام و نام خانوادگی: رهاموسوی پاسخنامه تشریحی تألیف شماره ۱۲ دهم دختر A

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الف) $t_n = 5, 9, 13, 17, \ldots$ $d = 4 \rightsquigarrow t_n = 4n + 1$

ب) $t_{10} = 4(10) + 1 = 40 + 1 = 41$

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$t_n = 4, 10, 14, 18, \ldots$ $d = 4 \rightsquigarrow t_n = 4n + 2$

$(t_1 = 4(1) + 2 = 4 + 2 = 6,\ t_{10} = 4(10) + 2 = 40 + 2 = 42)$

الف) $S_n = \frac{n}{2}(t_1 + t_n) \rightsquigarrow S_{10} = \frac{10}{2}(6 + 42) = 5 \times 48 = 240$

ب) جملات ۴: $t_{29}, t_{30}, t_{31}, t_{32}$ $\rightsquigarrow \frac{4}{2}(t_{29} + t_{32}) = 2(118 + 130) = 2 \times 248 = 496$

$(t_{29} = 4(29) + 2 = 116 + 2 = 118,\ t_{32} = 4(32) + 2 = 128 + 2 = 130)$

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$a_1 = 1 + \sqrt{3}$, $a_2 = 2$, $a_3 = 3 - \sqrt{3}$

$d = a_2 - a_1 = a_3 + a_2 = 3 - \sqrt{3} - 2 = 1 - \sqrt{3}$

$a_{25} - a_{22} = a_1 + 24d - (a_1 + 21d) = 3d = 3(1 - \sqrt{3}) = 3 - 3\sqrt{3}$

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$a_n = 5^{2x}, \frac{3 \times 25^x}{3 \times 5^{2x}}, 5^y$

$d_a = 3 \times 5^{2x} - 5^{2x} = 5^{2x}(3 - 1) = 5^{2x} \times 2 \rightsquigarrow (d_a = a_2 - a_1 = a_3 - a_2) \Rightarrow 5^y - 3 \times 5^{2x} = 5^{2x}(5^{y-2x} - 3) =$

$5^{y-2x} - 3 = 2 \rightsquigarrow 5^{y-2x} = 5^1 \rightsquigarrow y - 2x = 1 \Rightarrow y = 2x + 1$

$b_n = x, 2, y \rightsquigarrow d_b = 2 - x = y - 2 \rightsquigarrow 2 - x = 2x + 1 - 2 \Rightarrow 2 - x = 2x - 1 \rightsquigarrow x = 1, y = 3$

$xy = 1 \times 3^3 = 3$

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$2x - 4, 2x - 1, 4x, \ldots$

$d = 2x - 1 - (2x - 4) = 3$ $\xrightarrow{d = a_2 - a_1 = a_3 - a_2}$ $4x - (2x - 1) = 2x + 1 = 3 \rightsquigarrow x = \frac{1}{2}$

$-3, 0, 3$, $a_n = 3n - 4 \Rightarrow a_4 = 3(4) - 4 = 12 - 4 = 8$

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$a_n = 3, 5, 7, \ldots \rightsquigarrow a_n = 2n + 1$ $(d = 2)$ $\rightsquigarrow a_{20} = 2(20) + 1 = 41$

$b_n = 2, 5, 8, \ldots \rightsquigarrow b_n = 3n - 1$ $(d = 3)$ $\rightsquigarrow b_{20} = 3(20) - 1 = 59$

۷ جمله مشترک در ۲۰ جمله اول a_n, b_n

جمله عمومی جملات مشترک a_n, b_n $\rightsquigarrow 4n - 1$

$4n - 1 \leqslant 41 \rightsquigarrow 4n \leqslant 42 \Rightarrow n \leqslant 7$

$(5, 11, 17, \ldots)$

$a_1+a_2+a_3=21 \rightsquigarrow a_2-d+a_2+a_2+d=3a_2=21 \rightsquigarrow a_2=7$

$\begin{cases} a_1=a_2-d \\ a_3=a_2+d \end{cases}$

$a_1+a_2+a_5=105 \rightsquigarrow a_2-2d+a_2+a_2+2d=3a_2=105 \rightsquigarrow a_2=35$

$\begin{cases} a_1=a_2-2d \\ a_5=a_2+2d \end{cases}$

$a_1+a_2+a_{11}=21 \rightsquigarrow a_1+7+35=21 \rightsquigarrow a_1+42=21 \rightsquigarrow a_1=(-21)$

$\frac{a_{11}-a_2+a_1}{a_1}=\frac{35-7-21}{-21}=\frac{7}{-21}=\boxed{(-\frac{1}{3})}$

$a_1+a_2+a_3=15 \rightsquigarrow a_2-d+a_2+a_2+d=3a_2=15 \rightsquigarrow a_2=5$

$\begin{cases} a_1=a_2-d \\ a_3=a_2+d \end{cases}$

$a_4+a_5=25 \rightsquigarrow a_2+2d+a_2+3d=2\underbrace{a_2}_{5}+5d=10+5d=25 \rightsquigarrow d=3$

$\begin{cases} a_4=a_2+2d \\ a_5=a_2+3d \end{cases}$

$2, 5, 8, \dots \quad a_n=3n-1 \rightsquigarrow a_{10}=3(10)-1=30-1=\boxed{29}$

$a_1+a_2+a_3=a_2-d+a_2+a_2+d=3a_2$

$\begin{cases} a_1=a_2-d \\ a_3=a_2+d \end{cases}$

$a_1+a_2+a_3+\dots+a_9=9a_5$

$S_9=9\times 3 \rightsquigarrow 9a_5=9\times 3a_2 \rightsquigarrow a_5=3a_2 \xrightarrow{a_5=a_2+3d} a_2+3d=3a_2 \rightsquigarrow 2a_2=3d$

$\frac{a_{20}}{a_7}=\frac{a_2+18d}{a_2+5d}=\frac{a_2+18(\frac{2}{3}a_2)}{a_2+5(\frac{2}{3}a_2)}=\frac{a_2+12a_2}{a_2+\frac{10}{3}a_2}=\frac{13a_2}{\frac{13}{3}a_2}=13\times\frac{3}{13}=\boxed{3}$

$\frac{2}{3}a_2=d$

$t_1=11, t_7=35 \rightsquigarrow t_7-t_1=t_1+6d-t_1=6d=35-11=24 \rightsquigarrow d=4$

$t_n=4n+7 \rightsquigarrow t_4=4(4)+7=16+7=23$

$a_1=31, a_4=23 \rightsquigarrow a_4-a_1=a_1+3d'-a_1=3d'=23-31=(-15) \rightsquigarrow d'=(-5)$

$-5=\frac{13-31}{n-1} \rightsquigarrow -5n+5=-25 \rightsquigarrow n=6$ ↓ $a_6=13$ $\Rightarrow$ a_2, a_3, a_4, a_5 ۴ واسطه حسابی

$28, 23, 18$