

① ② ③ ④ $an^2 + bn + c \rightarrow a = \frac{d}{2}$
 $1^2 + 0 \rightarrow 2^2 + 1 \rightarrow 3^2 + 3 \rightarrow 4^2 + 4 \rightarrow \dots d = 1 \Rightarrow a = \frac{1}{2}$

0, 1, 3, 4 $t_1 = 0 \rightarrow \frac{1}{2} + b + c = 0 \Rightarrow b + c = -\frac{1}{2}$
 $t_2 = 1 \rightarrow 2 + 2b + c = 1 \Rightarrow 2b + c = -1$
 $\frac{1}{2}n^2 - \frac{1}{2}n = 0 \Rightarrow t_1 = 0 - 0 = 0 \rightarrow 1 + 0 = 1$ ✓

0, 1, 3, ... $a = \frac{d}{2}$ $an^2 + bn + c$
 $1 = d$

$t_1 = 0 \Rightarrow t_1 = 0 = \frac{1}{2}n^2 + bn + c \rightarrow \frac{1}{2} + b + c = 0 \Rightarrow b + c = -\frac{1}{2}$
 $t_2 = 1 = 2 + 2b + c = 1 \Rightarrow 2b + c = -1$
 $\frac{1}{2}n^2 - \frac{1}{2}n = 0 \Rightarrow n = 1 \rightarrow t_{11} = 0$

$8, 9, 13 \rightarrow d = 4 \rightarrow n + 1 \rightarrow t_{11} = 4$
 $0, 4, 8 \rightarrow d = 4 \rightarrow n - 4 \rightarrow t_{11} = 0$ ✓ $4 + 0 = 4$

$t_1 = -1 \rightarrow \checkmark$
 $t_2 = \frac{1}{2} \rightarrow \checkmark$
 $\frac{1}{2} - (-1) = 1\frac{1}{2}$ ✓

$b_4 = a_4 \Rightarrow \frac{1}{2} - 21 = -41 = b_4 \rightarrow -8n + 22 = -41 \Rightarrow -8n = -63 \Rightarrow n = 7\frac{7}{8}$ ✓

$$t_1 - t_v = 14 \quad t_1 - t_a - t_u - t_v \quad 12 \div 3 = 4 = d$$

$$t_4 - t_1 = ? \quad t_4 - t_8 - t_6 - t_3 - t_2 - t_1 \quad t \times 8 = \boxed{4} \checkmark$$

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$$a_1 = v \quad a_2 = 18 \quad a_1 \times a_2 \quad a_2 \times a_1 \quad a_1 \times a_2 \quad 18 - v = 1 \rightarrow 1 \div 3 = 3 = d$$

$$\frac{v}{a_1} = b_1$$

$$\frac{a_2}{v} = b_2$$

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$$b_1 \rightarrow 3, 11, 19, 27, \dots \rightarrow 1n - 8$$

$$\frac{1}{8}, \frac{9}{v}, \frac{1}{9}, \frac{1}{11}, \frac{11}{18}, \frac{18}{12}, \frac{12}{19}, \frac{19}{12}, \dots$$

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$$\boxed{4} \checkmark$$

$$\begin{cases} t_1 = 4 \rightarrow A + B = 4 \\ t_2 = 9 \rightarrow 2A + 3B = 9 \end{cases} \Rightarrow \begin{cases} 3A + 3B = 12 \\ 3A + 3B = 9 \end{cases} \Rightarrow 3B = 18 \Rightarrow B = \frac{18}{3} = 6, A = -\frac{4}{3}$$

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$$3A + 2B = -\frac{4}{3} + \frac{12}{3} = \frac{8}{3} = \boxed{2\frac{2}{3}}$$

$$-4, -1, 2, 5, \dots \quad t_1 = 31 \quad t_2 = 41 \Rightarrow d = 10 \rightarrow an + b \Rightarrow \boxed{10n + 21}$$

$$r = d \rightarrow a = \frac{d}{r} \rightarrow an^2 + bn + c \Rightarrow a = 1$$

$$\begin{cases} t_1 = -4 = 1 + b + c \Rightarrow -5 = b + c \\ t_2 = -1 = 4 + 2b + c \Rightarrow -5 = 2b + c \end{cases} \Rightarrow \boxed{b = -1}, \boxed{c = -4} \rightarrow n^2 - n - 4$$

$$n^2 - n - 4 = 10n + 21 \Rightarrow n^2 - 11n - 25 = 0 \Rightarrow n = \frac{11 \pm \sqrt{121 + 100}}{2} = \frac{11 \pm 11}{2} \Rightarrow n = 1 \Rightarrow 10(1) + 21 = \boxed{31}$$

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