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$$t_f = t_1 + 3d$$

$$\Rightarrow 3d = 21$$

$$\Rightarrow d = 7$$

$$r_0 + (n-1)V = r_0 \Delta$$

$$r_0 + 7n - 7 = r_0 \Delta$$

$$7n + 33 = r_0 \Delta$$

$$7n = 143 \Rightarrow n = 20 \frac{1}{2}$$

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$$10.1, 10.1, \dots, 99V \Rightarrow 7n + 9K$$

$$7n + 9K = 99V$$

$$7n = 99V - 9K$$

$$n = \frac{903}{7}$$

$$n = 129 \frac{1}{2}$$

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$$3a_1 + (n+n+1+n+2)d = -4n + 12$$

$$3a_1 + (3n+3)d = -4n + 12$$

$$3a_1 + 3nd + 3d = -4n + 12$$

$$3a_1 - 4n - 4 = -4n + 12$$

$$3a_1 = 16$$

$$a_1 = \frac{16}{3}$$

$$\left. \begin{aligned} a_{12} + a_n &= 2a_1 + 23d = \\ 12 - 44 &= \boxed{-32} \end{aligned} \right\}$$

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$$r^{n+1} = \frac{r^n - 1}{r - 1} + r^n - 3 \Rightarrow r^{n+1} = \frac{r^n}{r - 1} + r^n - 3 \Rightarrow r = \frac{r^n}{r - 1} + r^n - 3$$

$$r = r^n \left(\frac{1}{r - 1} + 1 - \frac{3}{r^n} \right) \Rightarrow n = 2$$

$$r^{n+1}$$

$$r - 3 = 14 - 3 = 11 \quad r^{n+1} = r^3 = 1 \quad r^2 - 1 = 3 \quad 3 + 1 + 13 = 17 \frac{1}{2}$$

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$$\left. \begin{aligned} t_{10} - t_{12} &= \Delta \\ t_{10} + t_{12} &= r\Delta \end{aligned} \right\} \Rightarrow \begin{aligned} 2t_{10} &= r\Delta \\ t_{10} &= \frac{r\Delta}{2} \Rightarrow t_{12} = 10 \Rightarrow 2\Delta = -\Delta \Rightarrow \Delta = -\frac{r\Delta}{3} \\ a &= \frac{3V}{1\Delta} \end{aligned}$$

$$\Rightarrow 3V_{1\Delta} + (n-1)(-\frac{r\Delta}{3}) \Rightarrow t_{21} = a + r_0 d = 3V_{1\Delta} + r_0(-\frac{r\Delta}{3}) = -12 \frac{1}{2}$$

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$$\Delta a + \Delta d = \frac{1}{\mu} (\Delta a + \mu \Delta d)$$

$$\mu(a + \mu d) = \frac{1}{\mu} \mu(a + \mu d)$$

$$\mu(a + \mu d) = a + \mu d$$

$$\mu a + \mu^2 d = a + \mu d$$

$$\mu a = d \Rightarrow a = \frac{d}{\mu}$$

$$\frac{a+d}{a} = \frac{\frac{a}{\mu} + d}{\frac{a}{\mu}} = \frac{\mu d \times \mu}{d} = \mu$$

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$$t_n - t_{n-\mu} = \mu d = \Delta \Rightarrow d = \Delta$$

$$t_1^r - t_0^r = (t_q - t_0) \mu = \mu d \times \mu t_r = \mu \times \mu t_r$$

$$\frac{t_1^r - t_0^r}{t_r} = \frac{\mu t_r}{t_r} = \mu$$

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$$\frac{\mu + \sqrt{\mu} - \mu(1 - \sqrt{\mu})}{1\mu} = \frac{\mu + \sqrt{\mu} - \mu + \mu\sqrt{\mu}}{1\mu} = \frac{1\mu\sqrt{\mu}}{1\mu} = \sqrt{\mu}$$

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$$\frac{\mu\mu - \mu}{\mu_n - \mu + 1} = \frac{\mu}{\mu_n - \mu} = \frac{\mu(1\Delta)}{\mu(n-1)} = \frac{1\Delta}{\mu_{n-1}} = d$$

$$a_{n+1} \Rightarrow a_1 + n\left(\frac{1\Delta}{\mu_{n-1}}\right) = 11 \Rightarrow n\left(\frac{1\Delta}{\mu_{n-1}}\right) = 9$$

$$\frac{1\Delta n}{\mu_{n-1}} = 9 \Rightarrow 9(\mu_{n-1}) = 1\Delta n \quad 11n - 9 = 1\Delta n \quad \mu_n = 9 \quad n = \mu$$

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$$a + (n-1)d + a + (n+\mu-1)d = a + \mu d + a + \mu d \quad \left. \begin{array}{l} t_n = \mu t_r \\ a + \mu d = \mu(a + \mu d) \end{array} \right\}$$

$$\mu a + nd - d + nd + \mu d = \mu a + \mu d$$

$$\mu a + \mu d + nd = \mu a + \mu d$$

$$d(\mu + \mu) = d(\mu)$$

$$\mu + \mu = 1\mu$$

$$n = 1$$

$$a + \mu d = \mu a + \mu d$$

$$- \mu a = \mu d \Rightarrow a = -d$$

$$a + (n-1)d = 0$$

$$-d + nd - d = 0$$

$$- \mu d + nd = 0 \Rightarrow nd = \mu d$$

$$\frac{n = \mu}{n = \mu}$$

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