

$$\left. \begin{array}{l} a_1 = 4 \\ a_r = a_1 + rd = 41 \end{array} \right\} \Rightarrow rd = 37 \Rightarrow d = 7 \Rightarrow a_n = 7n + 37$$

$$\Rightarrow 2.1 = 7n + 37$$

$$\Rightarrow 178 = 7n \Rightarrow n = 25$$

$$100 \leq 7n + 37 \leq 999 \Rightarrow 63 \leq 7n \leq 962 \Rightarrow \frac{63}{7} \leq n \leq \frac{962}{7}$$

$$9, 91 \leq n \leq 137, 21 \Rightarrow 14 \leq n \leq 137 \Rightarrow \frac{137 - 14}{1} + 1 = 124$$

$$\begin{aligned} n=1 &\Rightarrow a_r + a_r + a_r = \overbrace{3a_1 + 9d}^4 = -4(1) + 12 \\ n=2 &\Rightarrow a_r + a_r + a_r = \overbrace{3a_1 + 9d}^0 = -4(2) + 12 \end{aligned}$$

$$\Rightarrow -3d = 4 \Rightarrow d = -\frac{4}{3} \Rightarrow 3a_1 + 9(-\frac{4}{3}) = 4 \Rightarrow 3a_1 = 16 \Rightarrow a_1 = \frac{16}{3}$$

$$a_{17} + a_1 = 2a_1 + 22d = 2(\frac{16}{3}) + 22(-\frac{4}{3}) = \boxed{-\frac{28}{3}}$$

$$\left. \begin{array}{l} a_{17} - a_1 = \Delta d \\ a_1 - a_r = \Delta d \end{array} \right\} \Rightarrow r^x - r - r^{x+1} = r^{x+1} - r^x + 1$$

$$\Rightarrow r^{2x} + r^x(-3) - 1 = 0 \Rightarrow (r^x - 1)(r^x + 1) = 0$$

$$\Rightarrow \begin{cases} r^x = -1 \\ r^x = 1 \Rightarrow x = 0 \end{cases}$$

$$r^2 - 1 + r^{2+1} + r^{2(2)} - 3 = 1 - 1 + 1 + 16 - 3 = 14$$

$$a_{1,r} - a_{1,o} = \delta \Rightarrow a_{1,o} + 1d - (a_{1,o} + r d) = \delta \Rightarrow r d = \delta \quad (4)$$

$$\Rightarrow d = +r, \delta \Rightarrow a_{1,o} + a_{1,r} = 2\delta \Rightarrow r a_{1,o} + r d = 2\delta \Rightarrow$$

$$r a_{1,o} + \overbrace{r \cdot (+r, \delta)}^{+\delta} = 2\delta \Rightarrow r a_{1,o} = -\delta \Rightarrow a_{1,o} = -1r, \delta$$

$$\Rightarrow a_{1,r} = -1r, \delta + \overbrace{r \cdot (+r, \delta)}^{+\delta} = \boxed{+2r, \delta}$$

$$\frac{S_o}{S_1 - S_o} = \frac{1}{r} \Rightarrow \frac{\frac{\delta}{r}(r a_{1,o} + (o-1)d)}{\frac{1}{r}(r a_{1,o} + (1-1)d) - \frac{\delta}{r}(r a_{1,o} + (o-1)d)} = \frac{1}{r} \quad (9)$$

$$\Rightarrow \frac{o a_{1,o} + 1 \cdot d}{1 \cdot a_{1,o} + r d - o a_{1,o} - 1 \cdot d} = \frac{1}{r} \Rightarrow 1\delta a_{1,o} + r d = o a_{1,o} + r d$$

$$\Rightarrow 1 \cdot a_{1,o} = \delta d \Rightarrow d = r a_{1,o} \Rightarrow \frac{a_{1,r}}{a_{1,o}} = \frac{a_{1,o} + d}{a_{1,o}} = \frac{a_{1,o} + r a_{1,o}}{a_{1,o}} = \frac{r a_{1,o}}{a_{1,o}} = r$$

$$t_n = t_n - r + 1\delta \Rightarrow t_n - t_{n-r} = 1\delta \Rightarrow r d = 1\delta \Rightarrow d = \delta \quad (v)$$

$$\frac{t_q^r - t_o^r}{t_v} = \frac{\overbrace{(t_q - t_o)}^{+d} \overbrace{(t_q + t_o)}^{+\frac{t_v}{r}}}{\cancel{t_v}} = \frac{r(\delta)}{r} = 1$$

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$$\frac{2 + \sqrt{r} - r(1 - 4\sqrt{r})}{1r + 1} = d \Rightarrow \frac{2\sqrt{r} - r + 4r\sqrt{r}}{1r} = d$$

①

$$\Rightarrow 4r\sqrt{r} = rd \Rightarrow d = \sqrt{r}$$

$$a_{n+1} = a_1 + (n-1)d = 11, \quad d = \frac{r_2 - r_1}{r_{n-1} - r_1} = \frac{10}{r_{n-1}}$$

②

$$\Rightarrow 2 + n\left(\frac{10}{r_{n-1}}\right) = 11 \Rightarrow \frac{10n}{r_{n-1}} = 9 \Rightarrow 10n = 11n - 9 \Rightarrow$$

$$r_n = 9 \Rightarrow n = 2$$

$$a_n + a_{n+r} = a_r + a_{1r} \Rightarrow 2a_1 + (n-1+n+r)d = 2a_1 + rd \quad ③$$

$$\Rightarrow 2n + r = 11 \Rightarrow n = 1$$

$$a_n = r a_{\frac{n}{r}} \Rightarrow a_1 = r a_r \Rightarrow a_1 + rd = r a_1 + r(rd) \Rightarrow d = -a_1$$

$$a_n = a_1 + (n-1)d \Rightarrow a_1 + (n-1)(-a_1) = 0 \Rightarrow a_1(r-n) = 0$$

$$\Rightarrow r-n=0 \Rightarrow n=r$$

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