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$$a_1 + rd = 91 \quad r + rd = 91 \quad d = V \quad a_n = Vn + r = 90 \quad n = \frac{180}{V} = 20 \quad (1)$$

$$100 \leq Vn + r \leq 999 \quad 9V \leq Vn \leq 999 \quad 12 \leq n \leq 182 \quad 18 \leq n \leq 182 \quad \frac{182-18}{1} + 1 = 169 \quad (2)$$

$$a_n = -r(n+1) \quad x(n+1) + x(n+2) + x(n+3) + x(n+4) + x(n+5) = rxn + rxn + rxn + rxn + rxn = -5n + 12 \quad (3)$$

$$a_n = -r(n+1) + A = -5 \quad \left\{ \begin{array}{l} \oplus \\ \ominus \end{array} \right\} - 3r \quad 7(-r) + 3r = 12 \quad \boxed{r = -2} \quad \boxed{A = 1}$$

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

$$y = r \quad y = -1 \quad (4)$$

$$ry - y + 1 = r - r^n - r^{n+1} \Rightarrow y^r - ry - r = 0 \Rightarrow (y-r)(y+1) \quad \begin{array}{l} y=r \checkmark \\ y=-1 \times \end{array}$$

$$a_1 + a_n + a_{1+r} = y - 1 + ry + y^r - r \xrightarrow{y=r} r - r + 1 + 9 - r = 2r$$

$$rd = d \Rightarrow d = r/a \quad a_n = a_1 + rd \Rightarrow -1/r + d = rV/a \quad (5)$$

$$a_1 + rd + a_{1+rd} \rightarrow ra_1 + d = rd \Rightarrow a_1 = -1/r$$

$$\frac{d}{r} (a_1 + a_n) = \frac{1}{r} \times \frac{d}{r} \rightarrow \frac{d}{r} (a_1 + a_n) \rightarrow da_1 + d = \frac{d}{r} a_1 + \frac{rd}{r} d \Rightarrow \frac{1}{r} a_1 = \frac{d}{r} d \rightarrow a_1 = \frac{d}{r} \quad (6)$$

$$\frac{d}{r} (a_1 + a_n) = \frac{d}{r} (a_1 + a_n) \rightarrow da_1 + d = \frac{1}{r} a_1 + d \Rightarrow \frac{1}{r} a_1 = d \rightarrow a_1 = \frac{rd}{r} = \frac{1}{r} d$$

$$\frac{a_r}{a_1} = \frac{1/d}{1/d} = r$$

$$t_n - t_m = rd = 12 \Rightarrow d = 12 \quad \frac{(t_n - t_m)(t_n + t_m)}{t_n} = \frac{r(t_n + t_m)}{t_n + d} = \frac{r(t_n + 12)}{t_n + 12} \rightarrow \frac{r(t_n + 12)}{t_n + 12} = r \quad (7)$$

$$d = \frac{r + \sqrt{r} - r + 12\sqrt{r}}{12} = \frac{12\sqrt{r}}{12} = \sqrt{r} \quad (8)$$

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$a_{n-1} = r_1 \Rightarrow r_1 + (n-1)d = r_1$
 $d = \frac{r_1}{n-1}$

$a_{n+1} = 1 \Rightarrow \frac{a_{n+1} - a_{n-1}}{(n-1)d} = r_1 \Rightarrow (n-1) \frac{r_1}{n-1} = r_1 \Rightarrow \frac{r_1(n-1)}{n-1} = r_1 \Rightarrow \boxed{n=2}$

$a_n + a_{n+1} = a_{n-1} + a_{n+2} \Rightarrow r_1 + 1 = n + n + r_1 \Rightarrow n = 1$
 $a_n = r_1 \Rightarrow a_1 + (n-1)d = r_1 [a_1 + \frac{(n-1)}{2}d]$

$\rightarrow a_1 + (n-1)d = r_1 = \frac{r_1}{2}d + r_1d = 0 \Rightarrow -r_1 + \frac{n+r_1}{2}d = 0 \Rightarrow (-n+r_1)d = r_1a_1$

$k=0 \rightarrow a_k = a + (k-1)d \rightarrow -d + (k-1)d \rightarrow d(k-2) = 0$

$a_1 = d \leftarrow -rd = r_1a_1$

$-(-1+r_1)d = r_1a_1$

$k-2=0 \rightarrow \boxed{k=2}$

دنی توانه صفر باشد پس

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