

مجموعه اعداد صحیح - دهم - فصل ۲ - تلفیق شماره ۱۷

$$\{1\}, \{1, 2, 3, 4\}, \dots$$

$$\{1\}, \{1, 2, 3, 4\}, \{5, 6, 7, 8, 9\}, \dots, \{(n-1)^2 + 1, \dots, n^2\}$$

$(n-1)^2 + 1$ n^2 $(n-1)^2 + 1$ n^2

$$n=9 \rightarrow \{(n-1)^2 + 1, \dots, n^2\} = \{(9-1)^2 + 1, \dots, 9^2\}$$

$$= \{49, \dots, 81\} \rightarrow \frac{49 + 81}{2} = \frac{130}{2} = \boxed{65}$$

$$\{1, 2, 3\}, \{4, 5, 6, 7, 8, 9, 10, 11, 12\}, \{13, \dots, 16\},$$

$$\{17, \dots, 20\}, \{21, \dots, 24\}, \dots$$

$$1 \times 1 + 1 \times 2 + \dots + 1 \times 16$$

$$\frac{1 \times 16 + 1 \times 1}{2} + 1 = \frac{17}{2} + 1 = \frac{19}{2} = 9.5$$

$$\frac{1 \times 16 + 1 \times 1}{2} \times \frac{1 \times 16 + 1 \times 1}{2} = \frac{17 \times 17}{2} = 151.25$$

$$\frac{151.25}{16} = \boxed{9.45}$$

$$a_n = \begin{cases} 1^k & ; n = 3^k \\ -1^k + 1 & ; n = 3^k + 1 \\ \left[\frac{n}{3^k}\right] + 1 & ; n = 3^k + r \end{cases}$$

$$\begin{aligned} n=1 &\rightarrow 1=3^0+1 \rightarrow k=0 \rightarrow a_1=1 \\ n=2 &\rightarrow 2=3^0+2 \rightarrow k=0 \rightarrow a_2=1+a \\ n=3 &\rightarrow 3=3^1 \rightarrow k=1 \rightarrow a_3=2 \\ n=4 &\rightarrow 4=3^1+1 \rightarrow k=1 \rightarrow a_4=2 \\ n=5 &\rightarrow 5=3^1+2 \rightarrow k=1 \rightarrow a_5=1+a \\ n=6 &\rightarrow 6=3^1+3 \rightarrow k=1 \rightarrow a_6=2 \\ n=7 &\rightarrow 7=3^1+4 \rightarrow k=1 \rightarrow a_7=3 \\ n=8 &\rightarrow 8=3^1+5 \rightarrow k=1 \rightarrow a_8=4 \\ n=9 &\rightarrow 9=3^2 \rightarrow k=2 \rightarrow a_9=3 \\ n=10 &\rightarrow 10=3^2+1 \rightarrow k=2 \rightarrow a_{10}=3+a \end{aligned}$$

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$$\begin{aligned} f+1+a+2+2+1+a+f+0+2+a+1+1 &= \\ 2a+19 &= 19 \rightarrow 2a=19-19 \rightarrow 2a=0 \rightarrow a=0 \\ a_2 &= 1+a = -1 \quad -1-1 = \boxed{-2} \\ a_3 &= 1+a = -1 \\ a_4 &= 2+a = 0 \\ a_5 &= 2+a = 0 \\ a_{14} &= 2+a = 0 \\ a_{15} &= 2+a = 0 \\ a_{16} &= 2+a = 0 \end{aligned}$$

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$$\begin{aligned} a_5 &= 1f \\ a_v &= 1v, 2 \\ ax^2 + bx + c & \\ a &= \frac{1}{v}(-1f) = -\frac{1f}{v} = -\frac{1}{10} = -\frac{1}{10} \\ -\frac{1}{10}x^2 + bx + c & \\ a_v &= 49a + vb + c = 1v, 2 \\ a_5 &= 25a + 5b + c = 1f \\ 49a + vb + c &= 1v, 2 \\ -25a - 5b - c &= -1f \\ 74a + vb &= 3, 2 \\ 12a + b &= 1, 9 \\ 12(-\frac{1}{10}) + b &= \frac{19}{10} \\ -\frac{12}{10} + b &= \frac{19}{10} \rightarrow b = \frac{31}{10} = 3.1 \\ -\frac{1}{10}x^2 + 3.1x + c & \end{aligned}$$

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$$\begin{aligned} a_5 &= 25(-\frac{1}{10}) + 3.1 \times 5 + c = 1f \\ -5 + 15.5 + c &= 1f \rightarrow 10.5 + c = 1f \rightarrow c = -1 \\ -\frac{1}{10}x^2 + 3.1x - 1 & \\ a_1 &= -\frac{1}{10} \times 1^2 + 3.1 \times 1 - 1 = -\frac{1}{10} + 3.1 - 1 = 2.0 = \frac{20}{10} = \frac{2}{1} \\ a_{10} &= -\frac{1}{10}(10^2) + 3.1 \times 10 - 1 = -10 + 31 - 1 = 20 \\ \frac{a_{10}}{a_1} &= \boxed{10} \end{aligned}$$

$$ax + b \rightarrow \text{شکل خطی}$$

$$cn + d \rightarrow \text{دنباله حسابی}$$

$$\begin{aligned} rn + d &= ra + b \\ \Delta n + d &= va + b \end{aligned} \rightarrow \frac{\Delta n + d = va + b}{rn = \Delta a}$$

$$\begin{aligned} 1 \cdot a + b &= 0 \rightarrow b = -1 \cdot a = -1(\Delta a) = -1 \times rn = -rn \\ \rightarrow b &= -rn \end{aligned}$$

$$1 \Delta a + b = 1(\Delta a) - rn = 1 \times rn - rn = 1rn - rn = rn$$

$$\Delta n + d - rn - d = rn \rightarrow \frac{rn}{r} = n \quad \text{مقدار نسبت دنباله حسابی}$$

$$\frac{rn}{n} = \boxed{r}$$

$$4a_r = \Delta a + a + 3a + a$$

$$4(a+d)^r = \Delta(a+rd)a + 3(a+d)a$$

$$4(a^r + d^r + rad) = \Delta a(a+rd) + 3a(a+d)$$

$$4a^r + 4d^r + 4rad = \Delta a^r + 1 \cdot ad + 3a^r + 3ad$$

$$4a^r + 4d^r + 4rad = 1a^r + 13ad \rightarrow 4d^r = 1a^r + ad$$

$$4d^r - ad - 1a^r = 0 \rightarrow d^r - ad - 1a^r = 0 \rightarrow (d - fa)(d + 3a) = 0$$

$$d - fa = 0 \rightarrow d = \frac{fa}{4} = \frac{ra}{r} \rightarrow a = \frac{r}{r}d = 1, \Delta d$$

$$d + 3a = 0 \rightarrow d = -\frac{3a}{4} = -\frac{1}{r}a \rightarrow a = -rd$$

$$\frac{a_r}{d} = \frac{a + 3d}{d} = \rightarrow \frac{-rd + 3d}{d} = \frac{d}{d} = \boxed{1}$$

$$\rightarrow \frac{1 \cdot ad + 3d}{d} = \frac{r \cdot \Delta d}{d} = \frac{r \Delta}{1} = \frac{q}{r} = \boxed{r, \Delta}$$

$$\textcircled{a} \quad \begin{array}{ccc} a, b, c & & b, \frac{a}{r}, \frac{c}{r} \\ \downarrow & & \downarrow \\ (b-d) & & (b+d) \end{array}$$

$$b, \frac{a}{r}, \frac{c}{r} \rightarrow b, \frac{b-d}{r}, \frac{b+d}{r}$$

$$\left(\frac{b+d}{r}\right) \times b = \left(\frac{b-d}{r}\right)^r \rightarrow \frac{b^r + bd}{r} = \frac{b^r + d^r - rbd}{r}$$

$$\rightarrow b^r + bd = b^r + d^r - rbd \rightarrow rbd = d^r \rightarrow r^3b = d$$

$$\frac{b+d}{r} = \frac{b + r^3b}{r} = \frac{rb}{r} = b$$

$$\frac{b-d}{r} = \frac{b - r^3b}{r} = \frac{-r^3b}{r} = -b$$

$$\begin{array}{ccc} b, -b, b \\ \downarrow \quad \downarrow \quad \downarrow \\ \times(-1) \quad \times(-1) \end{array}$$

$$r^3r = r^4 \times (-1) = \boxed{-r^4}$$

$$\textcircled{a} \quad \begin{array}{ccc} a, b, c & & c, ra, r^3b \\ \downarrow & \downarrow & \downarrow \\ \frac{b}{r} & b & br \\ & & \downarrow \\ & & \frac{rb}{r} \end{array}$$

$$br + r^3b = r \times \frac{rb}{r} \rightarrow b(r + r^3) = b\left(\frac{r}{r}\right) \rightarrow r + r^3 = \frac{r}{r}$$

$$r^r + r^3r = r \rightarrow r^r + r^3r - r = 0 \rightarrow (r + r^3)(r - 1) = 0$$

$$r = -r \quad \checkmark \quad r = 1 \quad \times \quad \text{غير قابل قبول، جهت مقایسه مستقیم}$$

$$\frac{a_9}{a_4} = \frac{a_9 r^r}{a_4} = r^r = (-r)^r = \boxed{-r^4}$$

$$\frac{ar}{(ar)^r} + \frac{ar}{(a)^r} = r \rightarrow \frac{ar^2}{(ar)^r} + \frac{ar}{a^r} = \frac{ar^2}{a^r r^r} + \frac{ar}{a^r} = r \quad (9)$$

$$\frac{r^r}{a^r} + \frac{r}{a} = r \rightarrow \frac{r^r + ra}{a^r} = r \rightarrow r^r + ra = r a^r \rightarrow r^r + ra - r a^r = 0$$

$$(r + ra)(r - a) = 0 \rightarrow r = a, r = -ra$$

$$\frac{a^r}{a^r} = \frac{a^r}{ar} = \frac{a}{r} \rightarrow \frac{a}{a} = \boxed{1}$$

$$\hookrightarrow \frac{a}{-ra} = \boxed{-\frac{1}{r}}$$

$$a_r = \sqrt{a_f} \quad a_r, a_f, a_\omega$$

$$a_\omega = r_v$$

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$$a_r \times a_\omega = a_f^r \rightarrow \sqrt{a_f} \times r_v = a_f^r \rightarrow r_v = \frac{a_f^r}{\sqrt{a_f}} \times \frac{\sqrt{a_f}}{\sqrt{a_f}} \rightarrow r_v = \frac{a_f^r \sqrt{a_f}}{a_f} = a_f \sqrt{a_f} = (\sqrt{a_f})^r$$

$$r_v = (\sqrt{a_f})^r \rightarrow \sqrt{a_f} = r \rightarrow a_f = 9$$

$$a_r, a_f, a_\omega \rightarrow \underbrace{r, 9, r_v}_{\times r} \rightarrow \frac{1}{r}, 1, r, 9, r_v$$

$$a_i = \frac{1}{r} \rightarrow \frac{1}{r} - \frac{1}{r} = \frac{r-r}{9} = \boxed{\frac{1}{9}}$$