SAT ☐ SUN ☐ MON ☐ TUE ☐ WED ☐ THU ☐ FRI ☐ NOTEBOOK

آنیا شکرچی

کلاس : دفتر ا دهم A

۱ _

$\{1\}, \{2,3,4\}, \dots$ دسته نهم $\{8^2+1, \dots, 9^2\}$ → ۶۵ , ۸۱

$$\frac{81+65}{2} = \frac{146}{2} = 73$$

۲ _

$\{1,2,3\}, \{4,5,6,\dots,12\}, \{13,14,\dots,39\}, \{40,\dots,120\}$

$\{121,\dots,363\}$ میانه دسته پنجم $= \frac{121+363}{2} = \frac{484}{2} = 242$

۳

$$a_n = \begin{cases} 2^k & ; n=3k \\ -2k+4 & ; n=3k+1 \\ \left[\frac{n}{k+2}\right]+a & ; n=3k+2 \end{cases}$$

$n=3k+2$ (۳): $n=2, k=0 \to \left[\frac{2}{0+2}\right]+a = 1+a$; $n=5, k=1 \to \left[\frac{5}{1+2}\right]+a = 1+a$; $n=8, k=2 \to \left[\frac{8}{2+2}\right]+a = 2+a$

$n=3k$ (۱): $a_0 = 2^0 = 1$; $a_3 = 2^1 = 2$; $a_6 = 2^2 = 4$; $a_9 = 2^3 = 8$

$n=3k+1$ (۲): $a_1 = 4$; $a_4 = 2$; $a_7 = 0$

(۱) + (۲) + (۳) $= 25 + 3a = 19$

$25 - 19 = -3a$

$a = -2$

$a_2 + a_5 + \dots a_{29} =$

$(-1)+(-1)+(0)+\dots(0) = -2$ (۸ تا صفر)

۴ _

$a_5 = 14$, $a_7 = 17{,}2$ ax^2+bx+c

$$\begin{cases} 25a+5b+c = 14 \\ 49a+7b+c = 17{,}2 \end{cases} \quad 24a+2b = 3{,}2 \Rightarrow 12a+b = 1{,}6$$

$a = \frac{1}{10} \times -2 \Rightarrow a = -0{,}2 \to b = 4$

$25 \times (0{,}2) + 5\times 4 + c = 14 \longrightarrow c = -1$

$$\left.\begin{array}{l} a_{15} = -0{,}2\times 15^2 + 15\times 4 - 1 = 14 \\ a_1 = -0{,}2 + 4 - 1 = 2{,}8 \end{array}\right\} \to \frac{a_{15}}{a_1} = \frac{14}{2{,}8} = 5$$

۵-

حسابی a_4 = قطعی t_2 , $a_8 = t_7$, a_{10} = صفر , $\frac{a_{15}}{d}$ (حسابی) $= ?$

$x' + 3d' + x' + 7d' = x + d + x + 5d$ (قطعی)

(حسابی) $2x' + 10d' = 2x + 7d = -11d$ ($x = -9d$)

$\to x + 9d = 0$, $x = -9d$

$x' + 3d' = x + d = -8d$

$2x' + 10d' = -11d$

$x' + 7d' = -3d$

$\Rightarrow 4d' = 5d \to d' = \frac{5}{4}d$

$\frac{a_{15}}{d'} = \frac{x + 14d}{d'} = \frac{-9d + 14d}{d'} = \frac{5d}{\frac{5}{4}d} = 4$

۶-

$6a_2^2 = 5a_3 a + 3a_2 a$, $\frac{a_4}{d} = ?$, $\frac{a + 3d}{d}$

$6(a+d)^2 = a(5\times(a+2d) + 3\times(a+d))$

$6\times(a^2 + d^2 + 2ad) = a(5a + 10d + 3a + 3d)$ ($8a + 13d$) $\to 6a^2 + 6d^2 + 12ad = 8a^2 + 13ad$

$2a^2 + ad - 6d^2 = 0$

$\div 2$: $a^2 + \frac{d}{2}a - 3d^2 = 0$

$(a + 2d)(a - \frac{3}{2}d) = 0$

$\to a = -2d$ یا $a = \frac{3}{2}d$

$\frac{a_4}{d} = \frac{a + 3d}{d} = \frac{a}{d} + 3 = -2 + 3 = 1$ یا $\frac{a}{d} + 3 = \frac{3}{2} + 3 = 4/5$

۷-

حسابی a, b, c , هندسی $b, \frac{a}{2}, \frac{c}{4}$ ($a \to aq$, $\to aq^2$) , $2q = ?$

$b - a = c - b$

$c = 2b - a$

$q = \frac{\frac{a}{2}}{b} = \frac{a}{2b} = \frac{\frac{c}{4}}{\frac{a}{2}} = \frac{c}{2a} \to a^2 = bc$

$a^2 = b(2b - a)$

$a^2 = 2b^2 - ab$

$a^2 + ab - 2b^2 = 0$

$\div b^2$: $(\frac{a}{b})^2 + \frac{a}{b} - 2 = 0$

ادامه: $(\frac{a}{b}) = \frac{-1 \pm \sqrt{1+8}}{2} = \frac{-1 \pm 3}{2}$, $\frac{a}{b} = -2$, $\frac{a}{b} = 1$ ✗

$q = \frac{a}{2b} = \frac{x}{2} \to \frac{-2}{2} = -1 \to 2q = -2$

۸-

هندسی a, b, c , حسابی $c, 2a, 3b$

$b = aq$, $c = aq^2$

$2a - c = 3b - 2a$

$2a - aq^2 = 3aq - 2a$

$2 - q^2 = 3q - 2$

$3q - 4 + q^2 = 0$

$(q + 4)(q - 1) = 0$, $q = 1$, $q = -4$

$\frac{t_9}{t_6} = \frac{aq^8}{aq^5} = q^3$: -64 , $+1$

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- (۹)

$$\frac{a_9}{(a_2)^2} + \frac{a_2}{(a_1)^2} = 2 \qquad \frac{a^2}{a_2} = ?$$

$$\frac{aq^5}{(aq)^2} + \frac{aq}{a^2} = 2 \rightarrow \frac{q^2}{a^2} + \frac{q}{a} = 2 \longrightarrow \underbrace{\frac{q^2}{a^2} + \frac{q}{a} - 2 = 0}_{x^2 + x - 2} \quad / \ \frac{q}{a} = 1 \quad \backslash \ \frac{q}{a} = -2$$

$$\frac{a^2}{a_2} = \frac{a^2}{aq} = \frac{a}{q} = \boxed{-\frac{1}{2} \text{ ی } 1}$$

$$\text{L} \quad q = -\frac{1}{2} \text{ ی } 1$$

- (۱۰)

$$a_3 = \sqrt{a_4} \ , \ a_5 = 27 \qquad \frac{1}{2} - a_1 = ?$$

$$aq^2 = \sqrt{aq^3} \rightarrow a^2q^4 = aq^3 \longrightarrow aq = 1$$

$$aq^4 = 27 \longrightarrow \underbrace{aq}_{1} \times q^3 = 27 \longrightarrow q^3 = 27 \rightarrow q = 3$$

$$\left.\begin{array}{l} a \times 3 = 1 \\ a = \frac{1}{3} \end{array}\right\}$$

$$\frac{1}{2} - \frac{1}{3} = \boxed{\frac{1}{6}}$$