ریاضی نهم — ۱۸ ص — دهم تجربی

۱) الف) $t_n = 2, 9, 16, 23, \dots$ (+7, +7, +7) ⇒ $t_n = 7n + 1$

ب) $t_n = 7n + 1 \rightarrow t_{10} = 7 \times 10 + 1 = 71$

۲) الف) $t_n = 4, 10, 16, 18, \dots$ ، $S_n = \frac{n}{2}(2a_1 + (n-1)d)$

$S_{10} = \frac{10}{2}(2 \times 4 + (10-1) \times 6) \rightarrow 5 \times (8 + 54) = 5 \times 62 = 310$

ب) $t_{10} = 4 + 9 \times 6 = 58$ ، $t_{11} = 58 + 6 = 64$

$t_{12} + t_{11} + t_{10} + t_9 + t_8 = 64 + 58 + 52 + 46 + 40 = 260$

۳) $a_1 = 1 + \sqrt{3}$ ، $a_2 = 2$ ، $a_3 = 2 - \sqrt{3}$

چون دنباله حسابی است ⇒ $a_2 - a_1 = a_3 - a_2 = d$

$d = a_2 - a_1 = 2 - (1 + \sqrt{3}) = 1 - \sqrt{3}$

$a_n = a_1 + (n-1)d \rightarrow a_{25} - a_{11} = (a_1 + 24d) - (a_1 + 10d) = 14d$

$a_{25} - a_{11} = 2(1 - \sqrt{3}) = 2 - 2\sqrt{3}$

۴) $a_n = 5^{2n}, 25 \times 5^n, 5^y \rightarrow 25 \times 5^n = 5^{2n+2}$

$b_n = x, 2, y$ ، $b_2 - b_1 = b_3 - b_2$

$2 - x = y - 2$ ، $x + y = 4$ ★

$2 + 2 = x + y$

★ → $y = 2n + 1$

$x + (2n + 1) = 4$ ، $2n + 1 = 4$ ، $2n = 2 \rightarrow n = 1$

$x + y = 4$ ، $x = 1$ ، $y = 3$

$a_2 - a_1 = a_3 - a_2$

$25 \times 5^{2n} - 5^{2n} = 5^y - 25 \times 5^{2n}$

$25 \times 5^{2n} = 5^y - 25 \times 5^{2n}$

$25 \times 5^{2n} + 25 \times 5^{2n} = 5^y$

$50 \times 5^{2n} = 5^y$

$5^2 \times 5^{2n} = 5^y$

$5^{2+2n} = 5^y$

$y = 2n + 2$ ★

۵) $a_n = 2n - 3, 2n - 1, 4n, \dots$

$d = a_2 - a_1 \rightarrow d = (2n - 1) - (2n - 3)$

$d = 2n - 1 - 2n + 3 \rightarrow d = 2$

$a_4, a_2 + d$

$a_4 = 4n + 2 \rightarrow a_4 = (4 \times \frac{1}{2}) + 2 = 4$

$d = a_2 - a_1$

$2 = 4n - (2n - 1)$ ، $2 = 4n - 2n + 1$ ، $2 = 2n + 1$

$2n = 1$ ، $n = \frac{1}{2}$

۶) $a_n = 2, 5, 8, \dots \rightarrow t_n = 3n + 1$ ، $t_{20} = 3 \times 20 + 1 = 61$

$b_n = 2, 5, 8 \dots \rightarrow t_n = 3n - 1$ ، $t_{20} = 3 \times 20 - 1 = 59$

$a_n = 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, \dots$

$b_n = 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, \dots$

مشترک ۱۰ تا

$d = 9 \rightarrow a_n = 9n - 1 \rightarrow n = 7$

$a_7 = 9 \times 7 - 1 = 61$

(۷)

$a_1 + a_2 + a_3 = 21$

$a_2 - d + a_2 + a_2 + d = 3a_2 = 21 \to a_2 = 7$

$-14, 7, 35 \to a_2 - a_2 + a_1 = 35 - 7 - 21 = 7$

$-21 \quad -28$

$a_1 + a_2 + a_3 = 10$

$a_2 - 2d + a_2 + a_2 + 2d = 3a_2 = 10$

$a_2 = 30$

$\frac{7}{a_1} = \frac{7}{-21} = -\frac{1}{3}$ ②

(۸)

$a_1 + a_2 + a_3 = 12$

$a_2 - d + a_2 + a_2 + d = 3a_2 = 12 \to a_2 = 4$

$\frac{2}{3}, 4, \frac{8}{3}, \frac{11}{3}$

$-\frac{2}{3} \quad +\frac{2}{3} \quad +\frac{2}{3}$

$a_4 + a_5 = 20$

$a_2 + 2d + a_2 + 3d = 20$

$2a_2 + 5d = 20 \to 10 + 5d = 20$

$5d = 10 \to d = 2$ ③

$a_n = a_1 + (n-1)d \to a_{10} = 2 + (10-1)2$

$a_{10} = 2 + 18 = 20$

(۹)

$a_n = a_1 + (n-1)d$

$S_n = \frac{n}{2}(2a_1 + (n-1)d) \longrightarrow \frac{9}{2}(2a_1 + 8d) = 9 \times \frac{3}{2}(2a_1 + 2d)$

$9(2a_1 + 8d) = 27(2a_1 + 2d)$

$18a_1 + 72d = 54a_1 + 54d$

$18d = 36a_1 \to a_1 = \frac{d}{2} \to d = 2a$

$a_{10} = \frac{d}{2} + 19d = \frac{39d}{2}$

$a_{70} = \frac{d}{2} + 69d = \frac{139d}{2}$

$\frac{a_{10}}{a_{70}} = \frac{\frac{39d}{2}}{\frac{139d}{2}} = \frac{39}{139}$

$a_{30} = a + 19d \to 39a$

$a_{70} = a + 69d = 139a \to \frac{39a}{139a} = \frac{3}{11}$

1,25

(۱۰)

دنباله اول:

$a_1 = 11 \quad a_7 = 35$

$a_n = a_1 + (n-1)d$

$a_7 = 11 + 6d = 35$

$6d = 24 \to d = 4$

$a_5 = 11 + 24 \to 11 + 12 = 23$

⑤

دنباله دوم:

$a_1 = 28 \quad a_{k+1} = 12$

$n = k+2$: تعداد جملات دنباله

$a_n = a_1 + (n-1)d \Rightarrow a_{k+2} = 12$

$12 = 28 + (k+1)d \to (k+1)d = -16$

$d = \frac{-16}{k+1}$

$a_4 = 28 + 2d$

$a_4 = 22 \to 28 + 2d = 22 \to 2d = -6$

$d = -3$

شرط:

$d = \frac{-16}{k+1} = -3 \to \frac{16}{k+1} = 3 \to k+1 = 5$

$k = 4$: تعداد جملات دنباله