

$$t_n = 5, 9, 13, 17, \dots$$

① الف) f_{n+1}

ب) $f_{10} + 1 = 41$

$$t_n = 6, 10, 14, 18, \dots \quad t_n = 4n + 2 \Rightarrow t_1 = 4 \times 1 + 2 = 6$$

②

$$s = \frac{1}{4} (42 + 6) = 12$$

الف) 240

$$t_{11}, t_{12}, t_{13}, t_{14} \Rightarrow t_n = 4n + 2 \Rightarrow 11 \times 1 + 12 \times 2 + 13 \times 3 + 14 \times 4 = 146$$

ب)

$$a_n = 1 + \sqrt{3}, 2, 3 - \sqrt{3}, \dots \quad a_n = (1 - \sqrt{3})n + 2\sqrt{3}$$

③

$$\Rightarrow a_{15} - a_{13} = ((1 - \sqrt{3}) \times 15 + 2\sqrt{3}) - ((1 - \sqrt{3}) \times 13 + 2\sqrt{3}) = 2 - 2\sqrt{3}$$

$$a_n = 5^{2x}, 3 \times 5^x, 5^y \Rightarrow a_n = 5^{2x}, 3 \times 5^{2x}, 5^y \Rightarrow 3 \times 5^{2x} + 2 \times 5^{2x} = 5^y \Rightarrow 5 \times 5^{2x} = 5^y \Rightarrow y = 2x + 1 \Rightarrow y - 2x = 1$$

④

$$b_n = x, 2, y \Rightarrow \frac{x+y}{2} = 2 \Rightarrow x+y = 4$$

$$\begin{cases} x+y=4 \\ y-2x=1 \end{cases} \Rightarrow 3x=3 \quad \begin{matrix} x=1 \\ y=2 \end{matrix} \quad xy=1 \times 2=2$$

$$\begin{matrix} 2x-4 & 2x-1 & 9x & ? \\ (1) & (2) & (3) & (4) \end{matrix}$$

$$\frac{2x-4+9x}{2} = 2x-1 \Rightarrow 11x-4 = 4x-2 \Rightarrow 7x=2 \Rightarrow x=\frac{2}{7}$$

⑤

$$\begin{matrix} -2 & 0 & 3 \\ (1) & (2) & (3) \end{matrix} \Rightarrow a_4 = 2 + 3 = 5$$

$$a_n = 3, 5, 7, \dots \Rightarrow a_n = 2n + 1 \Rightarrow a_n = 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, \dots, 41$$

⑥

$$b_n = 2, 5, 8, \dots \Rightarrow b_n = 3n - 1 \Rightarrow b_n = 2, 5, 8, 11, 14, 17, 20, 23, \dots, 59$$

جدول مشترک

$$b_{17} = 3 \times 17 - 1 = 50$$

$$5, 11, 17, \dots \Rightarrow t_n = 6n - 1 \Rightarrow 6n - 1 \leq 41 \Rightarrow 6n \leq 42 \Rightarrow n = 7$$

تا جمله هفتم

$$a_1 + a_r + a_p = 11 \Rightarrow \frac{a_1 + a_r}{r} = a_r \Rightarrow 3a_r = 11 \Rightarrow a_r = \frac{11}{3}$$

(7)

$$a_1 + a_p + a_d = 10 \Rightarrow (a_r - d) + (a_r + d) + (a_r + 2d) = 10 \Rightarrow 3a_r + 2d = 10$$

$$11 + 2d = 10 \Rightarrow d = -\frac{1}{2} \Rightarrow a_1 = -\frac{11}{2}$$

$$\frac{a_r - a_r + a_1}{a_1} = ? \quad \frac{(a_1 + 1d) - (a_1 + d) + a_1}{a_1} = \frac{3d - 1 + (-11)}{-11} = \frac{3d - 12}{-11} = -\frac{1}{r}$$

$$a_1 + a_r + a_p = 10 \Rightarrow \frac{a_1 + a_r}{r} = a_r \Rightarrow a_1 + a_r = 2a_r \Rightarrow 3a_r = 10 \Rightarrow a_r = \frac{10}{3}$$

(8)

$$a_r + a_d = 20 \Rightarrow a_r + 2d + a_r + 2d = 20 \Rightarrow 2a_r + 4d = 20 \Rightarrow 10 + 4d = 20 \Rightarrow d = \frac{5}{2}$$

$$a_1 = a_r - d = \frac{10}{3} - \frac{5}{2} = \frac{20 - 15}{6} = \frac{5}{6}$$

$$\Rightarrow a_n = 2d - 1 \Rightarrow a_{10} = 2 \times \frac{5}{2} - 1 = 4$$

$$S_9 = 9S_r \Rightarrow a_1 + (a_1 + d) + (a_1 + 2d) + (a_1 + 3d) + \dots + (a_1 + 8d) = 9(a_1 + (a_1 + d) + (a_1 + 2d)) \quad (9)$$

$$\Rightarrow 9a_1 + \frac{1+1}{2} \times 8d = 9(3a_1 + 3d) \Rightarrow 9a_1 + 4d = 27a_1 + 27d$$

$$\Rightarrow 9d = 18a_1 \Rightarrow d = 2a_1$$

$$\frac{a_r}{a_v} \Rightarrow \frac{a_1 + 19d}{a_1 + 4d} = \frac{a_1 + 19(2a_1)}{a_1 + 4(2a_1)} = \frac{39a_1}{13a_1} = 3$$

$$\left. \begin{array}{l} a_1 = 11 \\ a_v = 20 \end{array} \right\} \Rightarrow d = \frac{a_m - a_n}{m - n} = \frac{20 - 11}{5 - 1} = \frac{9}{4} = \frac{9}{4} \Rightarrow a_r = 22$$

(10)

$$b_m = 21 \quad \text{---} \quad \text{---} \quad 22 \quad \Rightarrow d = \frac{a_m - a_n}{m - n} = \frac{22 - 21}{5 - 1} = \frac{1}{4} = \frac{1}{4}$$

(1) (2) (3) (4)

$$d = \frac{13 - 21}{\frac{1}{2} + 1} \Rightarrow -8 = \frac{13 - 21}{\frac{1}{2} + 1} \Rightarrow \frac{1}{2} + 1 = 8 \quad \frac{1}{2} = 4$$