

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

$$d = 4 \Rightarrow t_n = t_1 + (n-1)d \Rightarrow t_n = 5 + t_1 - 5 = t_1 + (n-1) \times 4 = t_{n+1} \quad (\text{افت})$$

$$n=10 \Rightarrow t_n = 5n+1 \Rightarrow t_{10} = 51$$

(ب)

$$t_n = 4, 1, -2, -5, \dots \Rightarrow t_n = 5n-4 \Rightarrow t_{10} = 46$$

(افت)

$$S_{10} = a_1 + a_2 + \dots + a_{10} = 4 + 1 + \dots + 46 = 5 \left(\frac{4+46}{2} \right) = 250$$

۲

$$a_{19} + a_{18} + a_{17} + a_{16} =$$

$$4a_1 + d(19+18+17+16) = 4a_1 + 118d = 4 \times 4 + 118 \times 4 = 500 + 472 = 972$$

(ب)

$$1 + \sqrt{2}, 2, 3 - \sqrt{2}, \dots$$

$$\Rightarrow d = 1 - \sqrt{2}$$

$$a_{20} - a_{12} = a_{12} + 8d - a_{12} = 8d = 8(1 - \sqrt{2}) = 8 - 8\sqrt{2}$$

۳

$$a_n = 2^{r_n}, \quad 2 \times 2^{r_n} \Rightarrow 2^{y_n}$$

$$d = 2^{r_n} - 2^{r_{n-1}} = 2^{y_n} - 2^{r_{n-1}} \Rightarrow 2^{r_n} (2-1) = 2^{y_n} (2 - 2^{r_{n-1}})$$

۴

$$b_n = (n, r_n) \Rightarrow \frac{n+y}{2} = 2 \Rightarrow n+y = 4$$

$$\begin{aligned} n+y &= 4 \\ -y-r_n &= 1 \\ \hline r_n &= 3 \Rightarrow n=1, y=3 \end{aligned}$$

$$r_n = 3, r_{n-1}, r_n, \dots$$

$$d = r_n - 1 - r_{n-1} + 2 = 3 \Rightarrow \frac{r_n}{2} = 3 \Rightarrow n = \frac{r}{2} \Rightarrow a_1 = 1 - 2 = -1$$

$$a_n = a_1 + (n-1)d = -1 + (n-1)2 = 2n-3 \Rightarrow n=2 \Rightarrow a_2 = 1$$

۵

$a_n = 3, 5, 7, 9, 11, 13, 15, \dots$ $b_n = 2, 5, 8, 11, 14, 17, \dots$ $a_{20} = 3 + 19 \times 2 = 41$ $b_{20} = 2 \times 20 - 1 = 39$	$c_n = 5, 11, 17, \dots$ $c_n = 5 + 4(n-1) = 4n-1$ $4n-1 \neq 41$ $4n \neq 42 \rightarrow n \notin \mathbb{N}$ پس، c در این دنباله وجود ندارد.	۶
$a_1 + a_4 + a_7 = 21 \Rightarrow 3a_1 + 3d = 21 \Rightarrow \frac{a_1 + d}{a_1} = 7$ $a_1 + a_4 + a_7 = 10a_1 = 3a_1 + 9d = 10a_1 \Rightarrow \frac{a_1 + 3d}{a_1} = 10$ $\frac{a_7 - a_4 + a_1}{a_1} = \frac{3d - d + a_1}{a_1} = \frac{2d + a_1}{a_1} = -\frac{1}{3}$	$\left. \begin{array}{l} 3a_1 + 3d = 21 \\ a_1 + 3d = 10a_1 \\ \hline 2a_1 = -21 \\ d = 21 \end{array} \right\}$	۷
$a_1 + a_4 + a_7 = 10 \Rightarrow 3a_1 + 3d = 10 \Rightarrow \frac{a_1 + d}{a_1} = \frac{10}{3}$ $a_1 + a_7 = 10 \Rightarrow a_1 + 6d = 10$ $d = 3 \Rightarrow a_1 = 2 \Rightarrow a_n = 2 + 3(n-1) = 3n-1$ $a_{10} = 30 - 1 = 29$	$\left. \begin{array}{l} 3a_1 + 3d = 10 \\ a_1 + 6d = 10 \\ \hline 2d = 10 \Rightarrow d = 5 \end{array} \right\}$	۸
$a_1 \neq 0$ $S_9 = 9S_4 \Rightarrow \frac{9}{2}(a_1 + a_9) = \frac{9 \times 4}{2}(a_4 + a_1)$ $a_1 + a_9 = 4a_4 + 4a_1 \Rightarrow a_1 + 8d = 4a_1 + 4d \Rightarrow 4d = 3a_1 \Rightarrow d = \frac{3a_1}{4}$ $\frac{a_9}{a_4} = \frac{a_1 + 8d}{a_1 + 4d} = \frac{a_1 + 6a_1}{a_1 + 3a_1} = \frac{7a_1}{4a_1} = \frac{7}{4}$	$\frac{a_1 + 8d}{a_1 + 4d} = \frac{a_1 + 6a_1}{a_1 + 3a_1} = \frac{7a_1}{4a_1} = \frac{7}{4}$	۹
$a_1 = 11$ $a_4 = 30 = a_1 + 3d \Rightarrow 11 + 3d = 30 \Rightarrow d = 9$ $b_1 = 31$ $b_n = 13$ $31, \dots, 13$ $(1) \quad (n)$	$\Rightarrow a_1 + (n-1)d = 31 + (n-1)9 = 10n + 1$ $10n + 1 = 13 \Rightarrow 10n = 12 \Rightarrow n = \frac{6}{5}$ $\Rightarrow n \notin \mathbb{N}$ پس، b در این دنباله وجود ندارد.	۱۰

تعداد اعداد

در این دنباله وجود ندارد