

سوال (۱) $\omega, 9, 13, 17, \dots$ $\begin{cases} a_1 = \omega \\ d = 4 \end{cases}$ $a_n = a_1 + (n-1)d \rightarrow \omega + (n-1)4 = 4n+1 \rightarrow$ الف $a_{10} = 4(10)+1 = 41 \rightarrow$ ب

سوال (۲) الف $2, 10, 18, 26, \dots$ $S_{10} = \frac{10}{2} [2(\frac{2}{2}) + (10-1)4] = \frac{240}{2}$

ب $a_{22} + a_{21} + a_{20} + a_{19} = 4a_1 + (21+20+19+18)d \xrightarrow[d=4]{a_1=2} 24 + 4 \times 72 = 492$

سوال (۳) $d = (3\sqrt{3}) - 2 = 2 - (1+\sqrt{3}) = 1-\sqrt{3}$ $t_{20} = t_{13} + 7d$
 $t_{20} - t_{13} = (t_{13} + 7d) - t_{13} = 7d \rightarrow 7(1-\sqrt{3}) = 7-7\sqrt{3}$

سوال (۴) واسطه حسابی: $2(3 \times 2\omega^x) = \omega^{2x} + \omega^y \rightarrow 2 \times \omega^{2x} - \omega^{2x} = \omega^y \rightarrow \omega^{2x}(\underbrace{2-1}) = \omega^y \rightarrow \omega^{2x+1} = \omega^y$
 $\omega^{2x+1} = \omega^y \rightarrow 2x+1 = y$
 $2 \times 2 = x+y \rightarrow y = 4-x$
 $\Rightarrow 2x+1 = y \Rightarrow 2x+1 = 4-x \Rightarrow 3x = 3 \Rightarrow x=1 \Rightarrow y = 4-(1) = 3 \Rightarrow xy = 1 \times 3 = 3$

سوال (۵) $d \Rightarrow 4x - (2x-1) = (2x-1) - (2x-4)$ $2(\frac{1}{4}) - 4, 2(\frac{1}{4}) - 1, 2(\frac{1}{4}), \dots$
 $4x+1 = 3 \rightarrow 4x=2 \rightarrow x = \frac{1}{2}$
 $-3, 0, 3, \dots \rightarrow t_4 = 3+3 \times 3 = 12$

سوال (۶) د: اولین جمله مشترک ۲۰۰ → ک.م.م. قد نسبتاً: قد نسبت دنباله ی اشتراک ۱
 ح: جمله عمومی دنباله اشتراک ۲: $\omega + (n-1)2 = 2n-1$

$\begin{cases} a_n = 3 + (n-1)2 = 2n+1 \xrightarrow{n=20} 2(20)+1 = 41 \\ b_n = 2 + (n-1)3 = 3n-1 \xrightarrow{n=20} 3(20)-1 = 59 \end{cases}$ پس برای اینکه مشترک باشد $2n+1 \leq 41$
 $3n-1 \leq 59$
 $n \leq 20$ به ۲۰ جمله مشترک وجود دارد

سوال (۷) $\begin{cases} a_1 + d_1 + a_3 = 10d \\ a_1 + d_1 + a_3 = 21 \end{cases}$ $a_3 = a_1 + 2d$ $3(a_1 + d) + (a_1 + 2d) = 21$
 $3a_1 + 3d + a_1 + 2d = 21$
 $4a_1 + 5d = 21$
 $a_1 + (2n) = 21 \rightarrow a_1 = 21 - 2n$

$\frac{a_3 - a_1 + a_1}{a_1} = \frac{(a_1 + 2d) - (a_1 + d) + a_1}{a_1} = \frac{d + a_1}{a_1} \rightarrow \frac{21 - 21}{-21} = \frac{21}{-21} = -1$

$$a_1 + (a_1 + d) + (a_1 + 2d) = 3(a_1 + d) = 12 \rightarrow a_1 + d = 4$$

$$(a_1 + 3d) + (a_1 + 4d) = 2a_1 + 7d = 22$$

(سوال ۸)

$$\begin{cases} 2a_1 + 7d = 22 \\ a_1 + d = 4 \end{cases} \xrightarrow{\times(-2)} \begin{cases} 2a_1 + 7d = 22 \\ -2a_1 - 2d = -8 \end{cases}$$

$$5d = 10 \rightarrow d = 2 \rightarrow a_1 + (2) = 4 \rightarrow a_1 = 2$$

$$a_{10} = a_1 + 9d \rightarrow 2 + 9 \times 2 = 20$$

$$S_9 = 9 S_3$$

(سوال ۹)

$$\frac{9}{3} (2a_1 + 11d) = 9 \left[\frac{3}{3} (2a_1 + 11d) \right] \Rightarrow 9a_1 + 33d = 9(2a_1 + 11d) \rightarrow 9a_1 + 33d = 18a_1 + 99d \rightarrow 11a_1 = 66d \rightarrow a_1 = 6d$$

$$\frac{a_{10}}{a_5} = \frac{a_1 + 9d}{a_1 + 4d} \xrightarrow{a_1 = 6d} \frac{a_1 + 15a_1}{a_1 + 10a_1} = \frac{16a_1}{11a_1} = \frac{16}{11}$$

$$\begin{cases} a_1 = 11 \\ a_5 = 23 \end{cases} \rightarrow a_5 = a_1 + 4d \rightarrow 23 = 11 + 4d \rightarrow 12 = 4d \rightarrow d = 3$$

$$a_8 = a_1 + 7d \rightarrow 11 + 7(3) = 23$$

(سوال ۱۰)

$$\begin{cases} b_1 = 31 \\ b_5 = a_5 = 23 \end{cases} \rightarrow b_5 = b_1 + 4d' \rightarrow 23 = 31 + 4d' \rightarrow -8 = 4d' \rightarrow d' = -2$$

$$31 + (n-1)(-2) = 13 \rightarrow (-2)(n-1) = -18 \rightarrow n-1 = 9 \rightarrow n = 10$$

$$\begin{array}{ccc} 31 & \text{---} & 13 \\ b_1 & \text{---} & b_n \end{array}$$

۴، اسطرهای حسابی