

$$d=4 \Rightarrow a_n = 4n+1 \quad \& \quad z_n = 4n+1$$

(الف)

$$a_{10} = (4 \times 10) + 1 = 41 \quad \& \quad z_{10} = 41$$

ب

$$d=4 \Rightarrow z_n = 4n+4$$

(الف)

$$S_n = \frac{n}{2} (2a_1 + (n-1)d) \Rightarrow S_{10} = \frac{10}{2} (2 \times (4) + 9 \times 4) = 5 \times 41 = 205$$

$$a_1 + a_4 + a_{10} + a_{11} = 0 \Rightarrow S_{a_1 - a_{11}} = \frac{n}{2} (a_1 + a_{11}) = \frac{4}{2} (a_1 + a_{11}) = 2 \left(\frac{4+44}{10} \right) = 2 \times 10 = 20$$

$a_1 = (4 \times 1) + 1 = 5$
 $a_{11} = (4 \times 11) + 1 = 45$

$$d = 1 - \sqrt{3} = ((1 + \sqrt{3}) + n = 1) \Rightarrow d = 1 - \sqrt{3}$$

(در واقع d اینگونه بدست آمد)

$$a_{10} - a_{12} = 2d \Rightarrow a_{10} - a_{12} = 2 - 2\sqrt{3}$$

$$a_{10} - a_{12} = a_1 + 9d - a_1 - 11d = 2d$$

$$a_7 - a_1 = a_7 - a_7 \Rightarrow 3(a^{rn}) - a^{rn} = 2 - (a^{rn})^3 \Rightarrow 2(a^{rn}) - a^{rn} = 2 \Rightarrow$$

$$4(a^{rn}) - a^{rn} = 2 \Rightarrow 2 = \frac{a^{rn+1}}{(a^{rn}) \times 2} \Rightarrow y = 2x + 1$$

$$b_7 - b_1 = b_7 - b_7 \Rightarrow 7 - x = y - 2 \Rightarrow -1 \times y + x = 4$$

$y - 2x = 1$

$\Rightarrow -2x = 3 \Rightarrow x = 1 \Rightarrow y = 3$

$xy = 3 \times 1 = 3$

$$d = a_7 - a_1 = a_7 - a_7 \Rightarrow a_7 - a_1 = -(7x-2) + (2x-1) = -7x+2+2x-1 = 3$$

$$a_7 - a_1 = 4x - (2x-1) = 2x + 1 \Rightarrow 2x+1=3 \Rightarrow$$

$$2x=2 \Rightarrow x=1$$

$$d = 3 \quad 3 \quad 3$$

$$\text{بنابراین: } a_1 = -3, a_2 = 0, a_3 = 3, \dots \Rightarrow -3, 0, 3, \dots \Rightarrow a_4 = a_3 + 3 \Rightarrow$$

$$a_4 = 6$$

$$b_n = 2n-1, a_n = 2n+1 \Rightarrow 3, 5, 7, 9, \dots \Rightarrow \text{مستقیم} \Rightarrow \dots, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, \dots \Rightarrow \text{مستقیم}$$

$$c_n = 9n-1 \Rightarrow 9n-1 \leq 1 \Rightarrow 9n \leq 2 \Rightarrow n \leq \frac{2}{9} \Rightarrow \boxed{n=1}$$

$$a_{r_0} < b_{r_0} \Rightarrow a_{r_0} = (r \times r_0) + 1 = 1 \Rightarrow \boxed{a_{r_0} = 1}$$

$$\boxed{a_{r_0} = 1} \quad \boxed{a_{r_0} = b_{r_0}}$$

$$b_{r_0} = (r_0 \times r) - 1 = 1 \Rightarrow r_0 = \frac{2}{r}$$

$$\Rightarrow b_{r_0} = 1 \Rightarrow r_0 = \frac{2}{r} \Rightarrow \dots, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, \dots \Rightarrow \text{مستقیم}$$

$$a_1 + a_r + a_v = a_1 + (a_1 + d) + (a_1 + rd) = 3a_1 + rd = 2v \Rightarrow \frac{a_1 + d}{2} = v$$

$$a_1 + a_r + a_v = a_1 + (a_1 + rd) + (a_1 + rd) = 3a_1 + 2rd = 2(v - a_1) \Rightarrow$$

$$\Rightarrow 3a_1 + 2rd = 2v - 2a_1 \Rightarrow 5a_1 + 2rd = 2v \Rightarrow$$

$$5a_1 + 2r - 2a_1 = 2v \Rightarrow 3a_1 + 2r = 2v \Rightarrow 3(1 - a_1) = 2v \Rightarrow$$

$$\Rightarrow 3 - 3a_1 = 2v \Rightarrow a_1 = \frac{3 - 2v}{3} \Rightarrow a_r - a_r + a_1 = 2v - v - 1 = 1 \Rightarrow$$

$$\frac{v}{a_1} = \frac{v}{1 - a_1} \Rightarrow \boxed{\frac{v}{a_1} = \frac{v}{1 - a_1}}$$

$$a_1 + a_r + a_v = 1 \Rightarrow a_r = \frac{1 - a_1}{r} \Rightarrow a_1 + d = 1 \Rightarrow a_1 = 1 - d$$

$$(a_1 + d + a_1 + rd = 1) \Rightarrow \dots$$

$$a_r + a_v = 2 \Rightarrow a_1 + rd + a_1 + rd = 2 \Rightarrow 2a_1 + 2rd = 2 \Rightarrow 2(a_1 + rd) = 2 \Rightarrow$$

$$\Rightarrow 1 - rd + rd = 2 \Rightarrow 1 = 2 \Rightarrow \boxed{d = 1} \Rightarrow a_r = a_1 + d = 1 \Rightarrow$$

$$a_{r_0} = a_1 + rd \Rightarrow a_{r_0} = 1 + (1 \times r) = r \Rightarrow \boxed{a_{r_0} = r}$$

$$S_n = \frac{n}{2} (2a_1 + (n-1)d) \Rightarrow \frac{n}{2} (2a_1 + nd) = \frac{n}{2} (2a_1 + rd)$$

$$\Rightarrow 2a_1 + nd = 2a_1 + rd \Rightarrow nd = rd \Rightarrow \boxed{d = r} \Rightarrow \dots$$

$$a_{r_0} = ar = a_1 \Rightarrow \frac{a_{r_0}}{ar} = \frac{a_1}{a_1} = 1 \Rightarrow \dots$$

$$a_1 = 1, ar = 2v \Rightarrow d = \frac{ar - a_1}{r - 1} = \frac{2v - 1}{r - 1} = \frac{2r - 1}{r - 1} = 1$$

$$a_n = 2n + v$$

$$3, 5, 7, 9, \dots, 13 \Rightarrow d = \frac{b_n - b_1}{n - 1} = \frac{13 - 3}{(n+1) - 1} = \frac{10}{n} \Rightarrow d = \frac{10}{n+1}$$

$$\boxed{a_n = n + 1}$$

$$\left. \begin{array}{l} a_r = a_1 + rd \\ b_r = b_1 + rd \end{array} \right\} \Rightarrow a_r = b_r \Rightarrow 1 + (r \times \frac{10}{n+1}) = 2r \Rightarrow$$

$$\boxed{a_n = n + 1}$$

$$1 + \frac{10r}{n+1} = 2r \Rightarrow \frac{10r}{n+1} = 2r - 1 \Rightarrow \frac{10}{n+1} = 2 - \frac{1}{r} \Rightarrow \boxed{n = 9}$$