

$$\frac{1}{r} + (n-1)d = 91$$

$$\frac{1}{r_0} + 3d \rightarrow d = 7$$

11/18

$$\frac{1}{r_0} + (n-1)d = 901 \rightarrow (n-1)d = 901 - \frac{1}{r_0} = 141 \rightarrow (n-1)7 = 141 \rightarrow n-1 = 20 \rightarrow n = 21$$

اولین عدد : 101 آخرین عدد : 997 تعداد = $\frac{997 - 101}{7} + 1 = 129$

$$a_{9+1} + a_{9+2} + a_{9+3} = a_9 + a_{10} + a_{11} \rightarrow a_{11} = \frac{a_9 + a_{13}}{2} \rightarrow a_9 + a_{13} = 2a_{11} \quad (1)$$

$$a_{10+1} + a_{10+2} + a_{10+3} = a_{10} + a_{11} + a_{12} \rightarrow a_{12} = \frac{a_{10} + a_{14}}{2} \rightarrow 2a_{12} = a_{10} + a_{14} \quad (2)$$

$$a_9 + a_{11} + a_{13} = 3a_{11} = -4 \times 4 + 12 = -16 \rightarrow a_{11} = \frac{-16}{3} = -\frac{16}{3} \rightarrow a_9 + a_{11} = -\frac{32}{3}$$

$$a_{10} + a_{12} + a_{14} = 3a_{12} = -4 \times 10 + 12 = -38 \rightarrow a_{12} = \frac{-38}{3} = -\frac{38}{3}$$

$$\left. \begin{aligned} r^x - 1 &= a_1 + r d \rightarrow r^x = a_1 + r d + 1 \\ r^x \times r &= a_1 + r d \end{aligned} \right\} \Rightarrow \omega d - 1 = r^x \times r - r^x = r^x (r - 1)$$

$$\omega d - 1 = r^x \rightarrow \omega d = r^x + 1 \quad (1)$$

$$a_{13} - a_1 = \omega d \rightarrow r^{13} - r - r^{x+1} = \omega d \quad (2)$$

$$1, 2 \rightarrow r^x + 1 = r^{13} - r^{x+1} - r \rightarrow r^{13} - r^{x+1} - r - r^x - 1 = 0 \rightarrow r^{13} - r^{x+1} - r^x - r - 1 = 0$$

$$\rightarrow (r^x - 1)(r^2 + r + 1) \rightarrow t^x - (t^2 + t) - t - 1 = t^x - t^2 - 2t - 1 = (t-1)(t+1) \rightarrow t = 1$$

$$r^x = 4 \rightarrow x = 2$$

$t = -1$ غیر قابل قبول چون r^x نمی تواند منفی شود

$$a_9 = 4 - 1 \quad a_{11} = r^2 \quad a_{13} = r^4 - 3 \rightarrow a_9 + a_{11} + a_{13} = 4 + 1 + 13 = 18$$

$$a_{10} - a_{12} = \omega \rightarrow a_1 + 9d - a_1 - 11d = \omega \rightarrow -2d = \omega \rightarrow -d = \frac{\omega}{2} \rightarrow d = +\frac{\omega}{2}$$

$$a_1 + a_1 - \frac{4\omega}{2} - \frac{\omega\omega}{2} = 2\omega \rightarrow 2a_1 = \frac{4\omega}{2} + \frac{\omega\omega}{2} \rightarrow a_1 = \frac{2\omega}{2} + \frac{\omega\omega}{4} = \omega + \frac{\omega^2}{4}$$

$$a_{11} = a_1 + 10d = \omega + \frac{\omega^2}{4} - 5\omega = -\frac{3\omega}{2}$$

$$-\frac{3\omega}{2} + 10 \left(\frac{\omega}{2} \right) = \frac{13\omega}{2}$$

$$\text{مجموع 5 جمله اول} = \frac{\omega}{2} (2a_1 + 4d) \quad \text{مجموع 5 جمله دوم} = \frac{\omega}{2} ((a_1 + \omega d) + (9d + a_1)) = \frac{\omega}{2} (2a_1 + 10d)$$

$$\frac{1}{2} \times \frac{\omega}{2} \times (2a_1 + 4d) = \frac{\omega}{2} (2a_1 + 4d)$$

$$\rightarrow \left(\frac{1}{2} \times (2a_1 + 4d) \right) = (2a_1 + 4d) \times 2 \rightarrow d = 2d$$

$$\frac{a_1}{a_1} = \frac{a+d}{a} = \frac{a+2a}{a} = 3$$

✓

$$t_n = t_1 + (n-1)d, \quad t_n = t_{n-1} + 15$$

-v

$$15 + (n-1)d + t_1 = (n-1)d + t_1 \rightarrow 15 = 3d \rightarrow d = 5$$

$$t_9 - t_5 = (t_9 - t_5) (t_9 + t_5) = \frac{(t_1 + 4d - t_1 + 4d)}{4} (t_1 + 4d) = K_0 t_1 + 16d$$

$$\frac{t_9 - t_5}{4} = \frac{K_0 t_1 + 16d}{t_1 + 4d} = \frac{K_0 (t_1 + 4d)}{t_1 + 4d} = K_0$$

✓

$$d = \frac{1 + \sqrt{13} - 1 + 12\sqrt{13}}{13} = \frac{13\sqrt{13}}{13} = \sqrt{13}$$

-1

$$1(1 - 4\sqrt{13}) = 1 - 12\sqrt{13}$$

✓

$$d = \frac{12 - 1}{12 - 1} = \frac{11}{11} \rightarrow d = 1$$

-9

$$r+d: \text{جمله اول} \quad r+2d: \text{جمله دوم} \rightarrow r+n \cdot d = r+nd$$

$$11 = r+nd \rightarrow 9 = nd \rightarrow 9 = n \left(\frac{15}{r_{n-1}} \right) \rightarrow 9 = \frac{15n}{r_{n-1}} \rightarrow 18n - 9 = 15n \rightarrow 3n = 9 \rightarrow n = 3$$

✓

☆ نکته: شروع جمله از ۲ نیست زیرا اگر این گونه باشد جواب ۲- در می آید که غیر ممکن است

$$a_1 + (n-1)d + a_1 + (n+3)d = a_1 + 2d + a_1 + 14d \rightarrow nd - d + nd + 3d = 14d$$

-10

$$\rightarrow 2nd = 14d \rightarrow n = 7$$

$$a_7 = 3a_1$$

$$a_7 + a_{17} = a_{13} + a_{19} \rightarrow 3a_1 + a_1 + 4d = a_{13} + 19d \rightarrow 3a_1 + 4d = a_{13} + 14d$$

$$\rightarrow 4a_1 + 4d = a_{13} + 14d \rightarrow 4a_1 = -4d \rightarrow a_1 = -d$$

$$\downarrow$$

$$\frac{4a_1 + 14d + 4d}{4a_1 + 12d}$$

✓

$$\text{جمله ی دوم} = a_1 + d = -d + d = 0$$