

دھرم

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$$5, 9, 13, 17, \dots \quad d = 4 \quad t_n = t_1 + (n-1)d \Rightarrow t_1 = 5 \quad d = 4 \quad \boxed{t_n = 4n + 1}$$

$$t_{10} = 4(10) + 1 = \boxed{41}$$

$$7, 10, 13, 16, \dots \quad d = 3 \quad t_n = 7 + (n-1)3 = 3n + 4$$

$$S_n = \frac{n}{2} (t_1 + t_n) \Rightarrow S_{10} = \frac{10}{2} [7 + (10-1)3] \Rightarrow \underline{S_{10} = 145}$$

$$a_{19}, a_{20}, a_{21}, a_{22}$$

$$a_{20} + a_{21} = a_1 + a_{40} = 2a_1 + 39d = 2 \times 1 + 39 \times 4 = 158 \Rightarrow 2(a_{20} + a_{21}) = 2(158) = \boxed{316}$$

$$t_1 - t_2 = 2 - (1 + \sqrt{3}) = 2 - 1 - \sqrt{3} = 1 - \sqrt{3} \Rightarrow t_3 - t_2 = (3 - \sqrt{3}) - 2 = 1 - \sqrt{3} \quad d = 1 - \sqrt{3}$$

$$t_{40} - t_{39} = 2(1 - \sqrt{3}) \quad t_n = (1 + \sqrt{3}) + (n-1)(1 - \sqrt{3}) \Rightarrow t_{39} = (1 - \sqrt{3}) + 38(1 - \sqrt{3})$$

$$\Rightarrow 2 - 2\sqrt{3} \Rightarrow t_{40} = (1 + \sqrt{3}) + 39(1 - \sqrt{3}) = 1 + \sqrt{3} + 39 - 39\sqrt{3} = 40 - 38\sqrt{3}$$

$$t_{40} - t_{39} = (40 - 38\sqrt{3}) - (39 - 37\sqrt{3}) = \boxed{1 - \sqrt{3}}$$

$$b_1 - b_2 = b_3 - b_4 \quad 2 - x = y - 2 \quad x + y = 4 \quad a_1 = \Delta^2 x \quad a_2 = 3x \Delta^2 x \quad a_3 = \Delta^2 y$$

$$a_4 = 3x \Delta^2 x = 3x(\Delta^2)^2 x = 3x \Delta^4 x \quad a_4 - a_1 = a_3 - a_2 \quad 3x \Delta^4 x - \Delta^2 x = \Delta^2 y - 3x \Delta^2 x$$

$$\Delta^2 + 2x = \Delta^2 \Rightarrow 1 + 2x = y \Rightarrow x + (2x + 1) = 4 \quad 3x = 3 \Rightarrow \underline{x = 1}$$

$$y = 2(1) + 1 = 3 \quad xy = 1 \times 3 = \boxed{3}$$

$$d = t_4 - t_1 = t_4 - t_3 \Rightarrow d = (4x - 1) - (3x - 4) = 4x - 1 - 3x + 4 = x + 3$$

$$3 = 4x - (3x + 1) = 4x - 3x + 1 = x + 1 \Rightarrow x = 2 \Rightarrow t_1 = 2\left(\frac{1}{2}\right) - 1 = -1$$

$$t_2 = 2\left(\frac{1}{2}\right) - 1 = 0 \quad t_3 = 2\left(\frac{1}{2}\right) = 1 \quad t_4 = t_3 + d = 1 + 3 = \boxed{4}$$

$$a_n = 2 + (n-1)2 = 2n+1 \quad 2i+1 = 3j+1 \quad i = \frac{3j-2}{2} \quad 3j-2 = \text{باید زوج باشد}$$

$$b_n = 2 + (n-1)3 = 3n-1$$

$$j = 4, 6, 8, 10, 12, 14 \Rightarrow b_4, b_6, b_8, b_{10}, b_{12}, b_{14} \Rightarrow \underbrace{11, 17, 23, 29, 35, 41}_{\text{لا جمله مشترک}}$$

$$a_n = a_1 + (n-1)d \quad a_1 + (a_1+d) + (a_1+2d) = 21 \Rightarrow a_1 + (a_1+2d) + (a_1+4d) = 10\Delta$$

$$a_1 + 2d = 3\Delta \quad a_1 + d = 7(a_1 + 2d) - (a_1 + d) = 3\Delta - 7 = d = 28 \Rightarrow a_1 + d = 7 \Rightarrow a_1 = 7 - 28 = -21$$

$$a_3 - a_2 + a_1 = 3\Delta - 7 + (-21) = 7 \quad \boxed{-\frac{1}{3} \text{ برابر}}$$

$$a_n = a_1 + (n-1)d \Rightarrow a_1 + a_2 + a_3 = 1\Delta \Rightarrow a_1 + (a_1+d) + (a_1+2d) = 1\Delta$$

$$a_4 + a_5 = 2\Delta \Rightarrow (a_1+3d) + (a_1+4d) = 2\Delta \Rightarrow 2a_1 + 7d = 2\Delta \quad a_1 = \Delta - d$$

$$2(\Delta - d) + 7d = 2\Delta \Rightarrow \Delta = 1\Delta \Rightarrow d = 3 \quad a_1 = 2$$

$$d_{10} = a_1 + 9d = 2 + 9(3) = 29 = a_{10}$$

$$S_n = \frac{n}{2} [2a_1 + (n-1)d] \quad S_3 = \sum_1^3 [2a_1 + 2d] = 3(a_1 + d) \Rightarrow \frac{9}{2} (2a_1 + 2d) = 9[2(a_1 + d)]$$

$$2a_1 + 2d = 3(a_1 + d) \xrightarrow{\times 2} 4a_1 + 4d = 6a_1 + 6d \Rightarrow 2a_1 + 2d - 4a_1 - 4d = 0 \Rightarrow d = 2a_1 - 1$$

$$a_n = a_1 + (n-1)d \Rightarrow a_{10} = a_1 + 9d = a_1(1+38) = \boxed{39a_1} \quad a_5 = a_1 + 4d = a_1(1+12) = \boxed{13a_1}$$

$$\frac{39}{13} = \boxed{3}$$

$$a_1 = 11 \quad a_5 = 3\Delta \quad 3\Delta = 11 + 4d \Rightarrow 4d = 2\Delta \quad \underline{d = \Delta}$$

$$a_5 = 11 + 3d = 11 + 12 = 23 \Rightarrow a_5 = 38 + 3d = 23 \Rightarrow 3d = -15 \Rightarrow d = -5$$

$$a_n = 38 + (n-1)(-5) = 13 \Rightarrow n-1 = 4-2 = \boxed{2} \quad \text{و اینطوری}$$