نام و نام خانوادگی: هیرشا الهی علیمی ۲۰ گروه دختران ۲

① $5, 9, 13, ...$

$d=4$, $a_1=5$ $\}$ $t_n = a_1+(n-1)d \Rightarrow t_n = 4n+1$

$t_{10} = 40+1 = 41$

② الف)

$t_n = 6, 10, 14, 18, ... \Rightarrow d=4$, $a_1=6$ $\}$ $t_n = 4n+2$

$t_{10} = 42$

$S_n = \frac{n}{2}(a+l) \Rightarrow S_{10} = \frac{10}{2}(42+6) = 5\times48 = 240$

ب) چهار جمله‌ی هشتم:

$t_{29}, t_{30}, t_{31}, t_{32}$

$t_{29} = 4\times29+2 = 118$ $\quad t_{32} = 4\times32+2 = 130$

$S = \frac{4}{2}(118+130) = 2(118+130) = 496$

③

$d = 3-\sqrt{3}-2 = 1-\sqrt{3}$

$t_{24} = a_1+(n-1)d = 1+\sqrt{3}+(23)(1-\sqrt{3}) = 24-22\sqrt{3}$

$t_{26} = 1+\sqrt{3}+(25)(1-\sqrt{3}) = 26-24\sqrt{3}$

$t_{26}-t_{24} = 2-2\sqrt{3}$

④ واسطه‌ی حسابی

$3\times2\times6^{2x} = 6^{2x}+6^y \Rightarrow 6^y = 6^{2x}(6-1) \Rightarrow 6^y = 6^{2x+1}$

$2x+1 = y$

واسطه‌ی حسابی

$x+y = 2(2) \Rightarrow x+y = 4 \Rightarrow 2x+1+x = 4 \Rightarrow 3x+1 = 4 \rightarrow x=1$, $y=3$

$x+y = 4$

⑤ واسطه‌ی حسابی

$2(2x-1) = 2x+4x-4 \Rightarrow 4x-2 = 6x-4 \Rightarrow 2x = 2 \rightarrow x = 1$

$-3, 0, 3, ... \Rightarrow d=3$, $a_1=-3$ $\}$ $t_n = -3+(n-1)\times3 = 3n-6$

$t_4 = 3\times4-6 = 6$

④

$a_n = 2n+1 \Rightarrow a_{20} = 41$
$b_n = 3n-1 \Rightarrow b_{20} = 59$
$d_{مشترک} = 4 \rightarrow c_n = 4n-1$ (مشترک)
a_1 مشترک $= 3$

$4n-1 \leq 41$
$4n \leq 42$
$n \leq 7 \Rightarrow n = 7$

⑦

$a_1 + a_1+d + a_1+2d = 3a_1+3d = 21 \Rightarrow a_1+d = 7$

$a_1 + a_1+2d + a_1+4d = 3a_1+6d = 105 \Rightarrow a_1+2d = 35$

$\begin{cases} a_1+2d = 35 \\ a_1 - d = -7 \end{cases}$ $\Rightarrow d = 28$, $a_1 = -21$

$\Rightarrow a_1+2d - a_1 - d + a_1 = a_1+d \Rightarrow 7 \Rightarrow \frac{a_{29}-a_{19}}{a_1} = \frac{-1}{3}$ برابر

①

$a_1+a_2+a_3 = 3a_1+3d = 15 \rightarrow a_1+d = 5$

$a_4+a_5 = a_1+3d+a_1+4d = 26 \Rightarrow 2a_1+7d = 26 \Rightarrow 2a_1+2d+5d = 26$

$2(\underbrace{a_1+d}_{5}) + 5d = 26 \Rightarrow 5d = 15 \rightarrow d = 3$, $a_1 = 2 \Rightarrow a_{10} = 2+9\times3 = 29$

④

$\frac{1}{2}(a_9+a_1) = \frac{3}{2}(a_1+a_2) \Rightarrow (a_9+a_1) = 3(a_1+a_2)$

$a_1+8d+a_1 = 3(a_1+a_1+2d) \Rightarrow 2a_1+8d = 6a_1+6d \Rightarrow 2d = 4a_1$

$d = 2a_1 \Rightarrow \frac{a_{20}}{a_7} = \frac{a_1+19d}{a_1+6d} = \frac{a_1+38a_1}{a_1+12a_1} = \frac{39a_1}{13a_1} = 3$

⑩

$a_1 = 11$, $a_1+4d = 35 \Rightarrow 4d = 24 \rightarrow d = 6 \rightarrow t_6 = a_1+5d = 11+30 = 41$

$38+3d = 23 \rightarrow 3d = -15 \rightarrow d = -5 \rightarrow d = \frac{b-a}{k+1} \Rightarrow -5 = \frac{13-38}{k+1}$

$\rightarrow 5 = \frac{25}{k+1} \rightarrow 6k+6 = 30 \rightarrow k = 4$