۱) الف)

$t_n = 5, 9, 13, 17$

$+4 \quad +4 \quad +4$

$\Rightarrow t_n = 4n + b$

$t_1 = 5 = 4 + b \Rightarrow b = 1$

$\Rightarrow t_n = 4n + 1$

ب)

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

۲) الف)

$t_n = 6, 10, 14, 18$

$+4 \quad +4 \quad +4$

$\Rightarrow t_n = 4n + 2 \Rightarrow S_n = \frac{n}{2}$ (جمله اول + جمله آخر)

$\Rightarrow t_{10} = 4(10) + 2 = 42 \Rightarrow S_n = \frac{10}{2}(6 + 42) = 240$

ب)

۴ جمله هشتم $= t_{29} + t_{30} + t_{31} + t_{32}$

$\Rightarrow S_{29-32} = \frac{4}{2}(t_{29} + t_{32})$

$t_{29} = 4(29) + 2 = 118$

$t_{32} = 4(32) + 2 = 130$

$\Rightarrow S_{29-32} = 2(118 + 130) = 496$

۳)

$t_{25} - t_{23} = 2d$

$d = 2 - 1 - \sqrt{3} = 1 - \sqrt{3} \Rightarrow t_{25} - t_{23} = 2(1 - \sqrt{3}) = 2 - 2\sqrt{3}$

۴) جواب در برگه بعدی

۲۵)

$a, b, c \Rightarrow a + c = 2b$

$6x + 2x - 4 = 8x - 4 = 4x - 2 \Rightarrow 4x = 2$

$\boxed{x = \frac{1}{2}} \Rightarrow -3, 0, 3$ ($+3$, $+3$; $= d$)

$\Rightarrow t_n = 3n - 6$

$\Rightarrow t_4 = 3(4) - 6 = 6$

۶)

$a_n = 3, 5, 7, \dots$ ($+2$, $+2$) $\Rightarrow a_n = 2n + 1$

$b_n = 2, 5, 8, \dots$ ($+3$, $+3$) $\Rightarrow b_n = 3n - 1$

$\Rightarrow [2, 3] = 6$ (ک.م.م) $\Rightarrow t_n = 6n - 1$

جمله عمومی جملات مشترک

$a_{20} = 41 \Rightarrow t_n \leq 41 \Rightarrow 6n - 1 \leq 41$

$\Rightarrow n \leq 7 \Rightarrow$

$n = 1, 2, 3, 4, 5, 6, 7$

۷ جمله مشترک

$t_n = 5, 11, 17, \dots$

۷)

$a_1 + a_2 + a_3 = 21 \Rightarrow 3a_1 + 3d = 21$

$a_1 + a_4 + a_5 = 105 \Rightarrow 3a_1 + 6d = 105 \Rightarrow 3d = 84 \Rightarrow$

$d = 28$

$\Rightarrow 3a_1 + 84 = 21$

$\Rightarrow 3a_1 = -63$

$\Rightarrow a_1 = -21$

~~$a_2 + d - a_2$~~ (d)

~~$a_3 + a_2$~~ $+ a_1 = d - 21 = 28 - 21 = 7 \Rightarrow \frac{a_3 - a_2 + a_1}{a_1} = \frac{7}{-21} = \boxed{\frac{-1}{3}}$

۸)

$a_1 + a_2 + a_3 = 15 \Rightarrow 3a_1 + 3d = 15 \Rightarrow 3a_1 = 15 - 3d$

$\Rightarrow a_1 = 5 - d$

$a_4 + a_5 = 25 \Rightarrow 2a_1 + 7d = 25$

$10 - 2d \Rightarrow 5d = 15 \Rightarrow d = 3$

$\Rightarrow 3a_1 + 9 = 15 \Rightarrow a_1 = 2$

$\Rightarrow a_n = a_1 + (n-1)d = 2 + (n-1)3$

$\Rightarrow a_{10} = 2 + (9)3 = \boxed{29}$

۹)

$\frac{a_{20}}{a_7} = \frac{a_1 + 19d}{a_1 + 6d} = \frac{19/5d}{6/5d} = \textcircled{3}$ ($a_1 = 0/5d$)

$\Leftarrow 4a_1 = 2d \Leftarrow 5a_1 + 6d = a_1 + 8d$

$9S_3 = S_9$

$\Rightarrow 9(a_1 + a_2 + a_3) = a_1 + a_2 + a_3 + \dots + a_9$

$9 \times \frac{3}{2}(a_1 + a_3) = \frac{9}{2}(a_1 + a_9) \Rightarrow \frac{a_1 + a_3}{a_1 + a_9} = \frac{\frac{9}{2}}{\frac{27}{2}} = \frac{1}{3} \Rightarrow 3a_1 + 3a_3 = a_1 + a_9$

$\Rightarrow 2a_1 + 3a_3 = a_9$

$q_1 = 11$

$q_7 = 3\omega = 11 + 6d \Rightarrow 24 = 6d \Rightarrow \boxed{d = 4}$

$q_4 = q_1 + 3d = 23$

$t_4 = q_4$

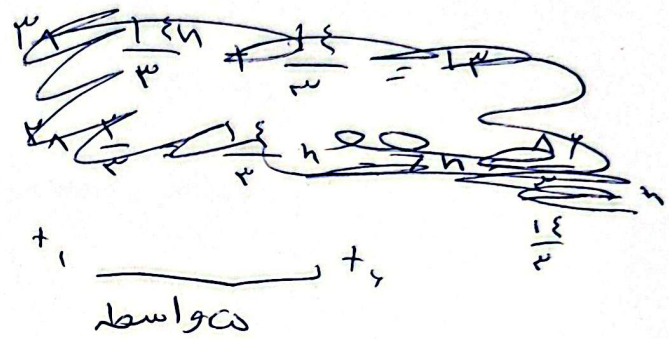
$t_1 = 23$ $\quad t_4 = 23 = t_1 + 3d \Rightarrow 3d = -10$

$t_n = 13$

$t_n = t_1 + (n-1)d$

$t_n = 38 - 5n + 5 = 13$

$\Rightarrow 5n = 30 \Rightarrow n = 7$



بنابراین $t_4 = q_4$ است

۱۱

$b_n = x, 2, y$

$x + y = 4 \Rightarrow y = 4 - x$

$q_n = \omega^{2x}, 2\omega^x, \omega^y$

$\Rightarrow \omega^{2x} + \omega^y = 2 \times \omega^{2x}$

$\Rightarrow \omega^y = \omega \times \omega^{2x} = \omega^{2x+1}$

$\Rightarrow 2x + 1 = 7 - x$

$3x = 6 \Rightarrow x = 2$

$\Rightarrow y = 2$

$\frac{1}{3} \times \frac{11}{3} = \frac{11}{9}$