

$a_{10} - a_1 = 12 \Rightarrow a_{10} = a_1 + 9d \Rightarrow a_1 + 9d - a_1 = 12 \Rightarrow 9d = 12 \Rightarrow d = \frac{4}{3}$
 $a_7 - a_1 = ? \Rightarrow a_7 = a_1 + 6d \Rightarrow a_1 + 6d - a_1 = 6d \Rightarrow 6 \times \frac{4}{3} = 8$
 $a_1 - a_{10} = 12 \quad -9d = 12 \rightarrow d = -\frac{4}{3}$
 $a_1 - a_7 = a_1 - a_1 - 6d \Rightarrow -6d = 12 \Rightarrow d = -2$

$\rightarrow \boxed{70}$

$a_7 = 10 \Rightarrow a_7 - a_1 = 6d = 10 - 1 = 9 \Rightarrow d = \frac{3}{2}$
 $a_1 = b_1 = 1$
 $a_7 = b_7 = a_1 + 6d = 1 + 9 = 10$
 $d = b_7 - b_1 = 10 - 1 = 9$

$a_n = 1 + (n-1) \cdot \frac{3}{2} = \frac{3n-1}{2}$
 $b_n = 1 + (n-1) \cdot 9 = 9n - 8$

$\boxed{b_n = 9n - 8}$

$t_n = \frac{1}{8}, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1, \frac{5}{4}, \dots$
 $t_n = \frac{5n-4}{4n+3}$
 $\frac{5n-4}{4n+3} < \frac{1}{2} \Rightarrow 5n-4 < 2n+3 \Rightarrow 3n < 7 \Rightarrow n < \frac{7}{3}$
 $n < 2.33 \Rightarrow n = 1, 2$

$\boxed{n=1, 2}$

$t_n = 4, 9, 16, 25, \dots$
 $t_n = An^2 + Bn$
 $4A = 4 \Rightarrow A = 1$
 $n=1 \Rightarrow 1 + B = 4 \Rightarrow B = 3$
 $4A + 3B = 4 + 9 = 13$

$\boxed{13}$

$t_n = -4, -9, -16, \dots$
 $t_n = n^2 - 5n$
 $a_7 = 11$
 $a_7 = 49 - 35 = 14$
 $a_n = n^2 - 5n$
 $n^2 - 5n = 11 \Rightarrow n^2 - 5n - 11 = 0$
 $(n-9)(n+4) = 0 \Rightarrow n = 9$

$t_9 = a_9 = 81 - 45 = 36$