MACM 201 Homework 5 (Quiz Oct. 16)

1. Find the unique solution to each recurrence

   (a) $a_n = 5a_{n-1} + 6a_{n-2}$ for $n \geq 2$. $a_0 = 4$, $a_1 = 10$.

   (b) $a_n = a_{n-1} + 20a_{n-2}$ for $n \geq 2$. $a_0 = 5$, $a_1 = -2$.

   (c) $a_n = 4a_{n-1} - 4a_{n-2}$ for $n \geq 2$. $a_0 = 3$, $a_1 = 4$.

   (d) $a_n = 2a_{n-1} - 2a_{n-2}$ for $n \geq 2$. $a_0 = 2$, $a_1 = 2$.

2. Find a particular solution to each nonhomogeneous recurrence

   (a) $a_n - 5a_{n-1} - 6a_{n-2} = 2^n$ (for $n \geq 2$)

   (b) $a_n - a_{n-1} - 6a_{n-2} = 5 \cdot 3^n$ (for $n \geq 2$)

   (c) $a_n - a_{n-1} - 6a_{n-2} = n$ (for $n \geq 2$)

3. Find the general solution to each nonhomogeneous recurrence

   (a) $a_n - a_{n-1} - 6a_{n-2} = 5 \cdot 3^n$ (for $n \geq 2$)

   (b) $a_n - 3a_{n-1} + 2a_{n-2} = n$ (for $n \geq 2$)

4. Find the unique solution to the recurrence

$$a_0 = 7 \qquad a_1 = 5$$

$$a_n - a_{n-1} - 6a_{n-2} = 5 \cdot 3^n \quad (\text{for } n \geq 2)$$