Section 8.3: # 2, 12, 15

For problems 1–4, find an explicit formula for a_n, $n \geq 0$.

1. $a_n = 2a_{n-1} + 3a_{n-2}$ when $n \geq 2$; $a_0 = 1$, $a_1 = 0$.

2. $a_n = a_{n-1} + a_{n-2}$ when $n \geq 2$; $a_0 = 2$, $a_1 = 1$. (This is the Lucas sequence).

3. $a_n = 27a_{n-3}$ when $n \geq 3$; $a_0 = 1$, $a_1 = 9$, $a_2 = 189$.

4. $a_n = 5a_{n-1} + 8a_{n-2} - 48a_{n-3}$, when $n \geq 3$; $a_0 = 0$, $a_1 = 3$, $a_2 = -25$. (Hint: $4^3 - 5(4^2) - 8(4) + 48 = 0$)

5. Consider the recurrence relation $a_n = 5a_{n-1} - 6a_{n-2} + 2n$, $n \geq 2$

   (a) Show that the sequence $b_n = n + 3.5$ satisfies the above recurrence relation.

   (b) If $a_0 = a_1 = 3.5$, find an explicit formula for a_n.