Math 313 **Homework 7** **Due Mon., Apr. 5, 2004**

---

1. – (ungraded) §7.8 – 10.

2. – (ungraded) §7.8 – 15a,c.

3. – (ungraded) §7.8 – 18.

4. – §7.8 – 15b,e.

5. – §7.8 – 19.

6. – ($\mathcal{E}$) Let $a_n = 2^n + 3^n - (-2)^n + 313$. Find constants c_1, c_2, c_3, c_4 so that for $n \geq 4$

$$a_n = c_1 a_{n-1} + c_2 a_{n-2} + c_3 a_{n-3} + c_4 a_{n-4}.$$

7. – ($\mathcal{E}$) We are interested in a_n, defined to be the number of quaternary sequences of length n (that is, sequences of "0", "1", "2", "3") with the property that the patterns "00" and "12" do not occur Determine a constant coefficient recurrence satsified by a_n. **You do not have to solve the recurrence!** (Hint: for $k = 0, 1, 2, 3$, let $a_k(n)$ be the number of such sequences whose last digit is k. Find a first-order homogeneous linear system satisfied by the $a_k(n)$'s and note that $a_n = a_0(n) + a_1(n) + a_2(n) + a_3(n)$.

8. ($\mathcal{E}$) Solve the recurrence relation

$$a_n = 2a_{n-1} + 3a_{n-2}, \quad n \geq 2; \qquad a_0 = 1, \quad a_1 = 2$$

by any correct method.

9. ($\mathcal{E}$) Solve the recurrence relation

$$a_n = 2a_{n-1} + 3a_{n-2} + 1, \quad n \geq 2; \qquad a_0 = 1, \quad a_1 = 2$$

by any correct method.

10. ($\mathcal{E}$) Solve the recurrence relation

$$a_n = 2a_{n-1} + n, \quad n \geq 1; \qquad a_0 = 1$$

by any correct method.