Math 413 Fall 2005
Extra Problems

1. page 307–308: 1, 3, 7, 8, 10, 15.

2. page 314–315: 1, 2, 8.

3. page 335–336: 1, 2, 3, 12, 14, 16.

4. page 349–3501, 2, 5, 9, 13, 14.

5. For which values of $\theta \in \mathbb{R}$ are the following sequences convergent $\cos(n\theta), \sin(n\theta)$?

6. Let a and b be two non zero complex numbers. Study the convergence of the sequence of complex numbers (z_n) defined by $z_0 = b$; $z_{n+1} = az_n^n \, \forall n \geq 1$.

7. a) Let $u_0 \in (0, 1]$, and define $u_{n+1} = \frac{1}{2}[1 - \sqrt{1 - u_n}$. Is the sequence convergent?
b) Find an expression of u_n in terms of u_0, and compute $\lim_{n\to\infty}(u_n)^{1/n}$.

8. Let f be a continuous function from $[0, 1]$ into $\mathbb{R}$ such that for all integer $n \geq 0$, $\int_0^1 x^n f(x)\, dx = 0$. Prove that $f = 0$.