Math 609
Problem set 2 due January 31, 2008
Dr. Epstein

**Reading:** Chapter 2 of Stein-Shakarchi. The problems are taken from pages 64–70 of the text.

**Standard problems:** The following problems should be done, but do not have to be handed in: 3, 5, 8, 10, 13.

**Homework assignment:** The solutions to the following problems should be carefully written up and handed in.

1. Problems 1 and 2 on page 64.
2. Problem 7 on page 65.
3. Problems 9 on page 66.
4. Problem 10 on page 66.
6. Prove that if $\phi$ is a continuous function on the unit circle, then

$$u(z, \bar{z}) = \frac{1}{2\pi} \int_{0}^{2\pi} \frac{\phi(t)(1 - |z|^2)dt}{|z - e^{it}|^2}$$  \hspace{1cm} (1)

is a harmonic function in the unit disk, which is continuous in the closure of the disk and satisfies $u(e^{it}, e^{-it}) = \phi(t)$.

7. Problem 1(a) on page 68.