Homework 7
Due: Friday, October 13

The first problem addresses the extra credit on the midterm:

1. If f is a function, and $S = z_1, \cdots, z_n$ is a finite set of complex numbers, then the average value of f on S is
$$\langle f(z) \rangle_S = \frac{1}{n} \sum_{j=1}^{n} f(z_j).$$
   Fix a number $n \geq 2$ and a nonzero number α. Let S be the set of n^{th} roots of α.
   (a) Suppose $1 \leq m < n$. What is $\langle z^m \rangle_S$?
   (b) Suppose $m = 0$. What is $\langle z^m \rangle_S$?
   (c) Let $P(z)$ be a polynomial of degree $\deg P < n$. Prove that
$$\langle P(z) \rangle_S = P(0).$$

2. [BC] 37.1

3. [BC] 37.4