Homework #5 (Due Monday, February 10)

- Read Chapter 6 of the textbook.
- Need to know: Statements and proofs of theorem 6.1, propositions 6.1, 6.2, and 6.3.

Do the following problems:

1. For each equation below, find all complex solutions. Represent solutions in the form $z = r(\cos\theta + i\sin\theta)$, $-\pi \le \theta < \pi$ and draw them on an appropriate circle.

   a) $z^8 = 1$;

   b) $z^6 = 32(\sqrt{3} - i)$;

   c) $z^4 = -1 - i$.

2. Let $1, w, w^2, \ldots, w^{n-1}$ be n distinct solutions of $z^n = 1$. Find $1 + w + \ldots + w^{n-1}$. (Hint: use formula for geometric progression.)

3. Do #6 on p. 49 in the textbook.

4. Find a formula for $\cos(4\theta)$ in terms of $\cos\theta$ (Hint: compare real parts of $(\cos\theta + i\sin\theta)^4$ and $\cos(4\theta) + i\sin(4\theta)$