Homework 4. Due Tuesday, February 14

1. You need to know the statement and proof of De Moivre's theorem and also the statement and proof of the theorem about roots of unity.

2. Finish the homework due February 9 and also do the following additional problems:

    (a) Find the real and imaginary parts of $(\sqrt{3} - i)^{10}$ and $(\sqrt{3} - i)^{-7}$. For which values of n is $(\sqrt{3} - i)^n$ is real?

    (b) Let 1, w, w^2, ..., w^{n-1} be the roots of $z^n = 1$. Prove that $1 + w + w^2 + ... + w^{n-1} = 0$.

    (c) Find a formula for $\cos(4\theta)$ in terms of $\cos\theta$.