3560 HOMEWORK EXERCISES, DUE 04/09/09

As always, make sure to justify your answers.

From Chapter 3:

- III.4— 9, 10, 13 (think about, but do not write an answer to the last question)
- III.5— 6, 7
- III.6— 1, 2

From Chapter 4:

- IV.1— 2, 4

Additionally:

a. Prove: If G is an abelian group and $n \in \mathbb{Z}$, then the function $\varphi : G \to G$ defined by $\varphi(a) = a^n$ for all a is a homomorphism.
b. Consider the group $(\mathbb{C}^*, \times)$ and the map $\varphi : \mathbb{C}^* \to \mathbb{C}^*$ defined by $\varphi(a) = a^n$ for some fixed $n \in \mathbb{Z}$. When is this function onto? Find its kernel.
c. Same question for $(\mathbb{Z}_{12}, +)$, where $\varphi(a) = n \cdot a$ for some $n \in \mathbb{Z}$.