

## Reading/Blogging Assignments

Come to class on

1. Monday having read and blogged on section 2.2.
2. Wednesday having read and blogged on section 2.3 up to Theorem 2.26.
3. Friday having read and blogged on the rest of section 2.3.

## Problem Set 4, Due September 24

Feel free to do some experimentation via a computer algebra system to develop intuition for the problem.

1. How many ring homomorphisms are there from  $\mathbb{Z}$  to  $\mathbb{Z}$ ? How about from  $\mathbb{Z}/n\mathbb{Z}$  to  $\mathbb{Z}$ ? (4 points)
2. Prove that all maximal ideals are prime. (10 points)
3. Problem 9 on p. 33. (10 points)
4. Prove the following two facts: (a) If  $k$  is a subfield of  $K$ , then  $k$  and  $K$  have the same characteristic. (b) If  $\alpha$  is a nonzero element of a field  $k$  and if  $n$  is some integer so that  $n\alpha = 0$ , then  $n$  is a multiple of the characteristic of  $k$ .