## Homework

due on Monday, October 8

Read section 2.2 of Cameron's book. Solve problems 2.18, 2.21 (pages 46-47) and the following problems.

**Problem 1.** Let R be a finite ring. Suppose that  $a \in R$  is not a zero divisor (neither left nor right). Prove that R is unital and a is invertible. **Hint.** Prove that  $a^k = a$  for some integer k > 1. Then prove that  $a^{k-1}$  is the identity element of R.

**Problem 2.** Let I be an ideal in the ring  $M_2(\mathbb{R})$ . Prove that either  $I = \{0\}$  or  $I = M_2(\mathbb{R})$ .