

# Introduction to Algebra, MATH 4127

## Homework 7, Section II.10

Due Friday March 22, 2013 at 2:30

- 10.6 & 7.** Recall that  $H = \{\rho_0, \mu_2\}$  is a subgroup of  $D_4$  (see Table 8.12 on page 80). Find all left cosets and right cosets of  $H$ . Are the left cosets the same as the right cosets? Show your computations for each coset.
- 10.13. (Modified from the text's version.)** Consider the subgroup  $H = \langle \rho_1 \rangle$  of  $S_3$ . Find the index of the subgroup in  $S_3$ ,  $(S_3 : H)$ . Use Table 8.8 on page 79 and explain your reasoning.
- 10.45.** Prove that a finite cyclic group of order  $n$  has exactly one subgroup of each order  $d$  dividing  $n$ . Prove that there are no other subgroups. HINT: Lagrange's Theorem.