MAT 149A University of California Winter 2006

Homework 3

due Wednesday February 1 in class

1. Biggs 12.7 # 19 page 141

2. Is there a permutation of $\mathbb{N}_7$ which has order 10? Is there one of order 11? of order 9?

3. Let $\alpha = (135)(24)$. Find at least 6 permutations of $\mathbb{N}_5$ that commute with α (we say permutations α and β commute if $\alpha\beta = \beta\alpha$).

4. (a) How can you decide whether a permutation is even or odd if you know the lengths of its cycles?
(b) Prove that any permutation in S_n can be written as the product of at most $n-1$ transpositions.

5. Suppose you have an unlimited supply of water, a drain, a large container and two jugs which hold 7 and 9 liters, respectively. How would you arrange to put one liter of water in the container?

6. Biggs 13.6 # 5 page 156
What is the last digit in the base 10 representation of 7^{93}?