## 18.440 PROBLEM SET ONE, DUE FEBRUARY 11

## A. FROM TEXTBOOK CHAPTER ONE:

- 1. Problems: 9, 24, 31.
- 2. Theoretical Exercises: 8, 9, 13, 23.
- 3. Self-Test Problems and Exercises: 14.
- B. Consider permutations  $\sigma: \{1, 2, \ldots, n\} \rightarrow \{1, 2, \ldots, n\}$ .
  - 1. How many such  $\sigma$  have only one cycle, i.e., have the property that  $\sigma(1), \sigma \circ \sigma(1), \sigma \circ \sigma \circ \sigma(1), \ldots$  cycles through all elements of  $\{1, 2, \ldots, n\}$ ?
  - 2. How many  $\sigma$  are fixed-point-free involutions, i.e., have the property that for each j,  $\sigma(j) \neq j$  but  $\sigma \circ \sigma(j) = j$ ?