18.440 PROBLEM SET ONE, DUE SEPTEMBER 16

A. FROM TEXTBOOK CHAPTER ONE:

1. Problems: 8, 26, 32.
2. Theoretical Exercises: 8, 9, 14, 21.
3. Self-Test Problems and Exercises: 17.

B. Consider permutations $\sigma : \{1, 2, \ldots, n\} \to \{1, 2, \ldots, n\}$.

1. How many such σ 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 σ are fixed-point-free involutions, i.e., have the property that for each j, $\sigma(j) \neq j$ but $\sigma \circ \sigma(j) = j$?