

### 18.440 PROBLEM SET ONE

#### 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 $\sigma : \{1, 2, \dots, n\} \rightarrow \{1, 2, \dots, n\}$ .

1. How many such  $\sigma$  have only one cycle, i.e., have the property that  $\sigma(1), \sigma \circ \sigma(1), \sigma \circ \sigma \circ \sigma(1), \dots$  cycles through all elements of  $\{1, 2, \dots, n\}$ ?
2. How many  $\sigma$  are fixed-point-free involutions, i.e., have the property that for each  $j$ ,  $\sigma(j) \neq j$  but  $\sigma \circ \sigma(j) = j$ ?

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