Homework 3

Due Wednesday, June 10

1. Chapter 7, Exercise A1 (p. 75)
2. Chapter 7, Exercise B2 (p. 76)
3. Chapter 7, Exercise B3 (p. 76)
4. Chapter 7, Exercise C2 (p. 76)
5. Chapter 7, Exercise F2 (p. 77)
6. Chapter 7, Exercise H3 (p. 78)
7. Chapter 8, Exercise A1(f) (p. 86)
8. Chapter 8, Exercise A2(d) (p. 86)
9. Chapter 8, Exercise A3(b) (p. 86)
10. Chapter 8, Exercise B1(b) (p. 86)
11. Chapter 8, Exercise C1(c) (p. 87)
12. Let G be the group of symmetries of the equilateral triangle $\triangle$. Proceed similarly to textbook pp. 72-74, to list the elements of G and write the table of G.
13. Suppose that a set G consists of elements in S_4 where the last position is fixed (i.e., $f \in G$ will have the form $f = \begin{pmatrix} 1 & 2 & 3 & 4 \\ & & & 4 \end{pmatrix}$ where the blank positions can be filled with the numbers 1,2,3 in any order). List the elements of G and write the table of G. (Notice how this problem is related to Problem 6).
14. Let $\pi \in S_n$ be a permutation, and let m be a number of transpositions of π. Define a *signum* function of a permutation π as
$$\operatorname{sgn}(\pi) = (-1)^m$$
If $\alpha, \beta \in S_n$, it can be shown that $\operatorname{sgn}(\alpha\beta) = \operatorname{sgn}(\alpha)\operatorname{sgn}(\beta)$.
Using these facts, please complete Chapter 8, Exercises C2 and C3 (p. 87).
15. Let G be a subset of S_4 consisting of the four elements: e, $(12)(34)$, $(13)(24)$, $(14)(23)$. Write the table of G and conclude that G is a subgroup of S_4.