Homework 2

Due Wednesday, June 3

1. Chapter 4, Exercise A4 (p. 39)
2. Chapter 4, Exercise B2 (p. 39)
3. Chapter 4, Exercise B4 (p. 39)
4. Chapter 4, Exercise B6 (p. 39)
5. Chapter 4, Exercise C6 (p. 40)
6. Chapter 4, Exercise D1 (p. 40)
7. Chapter 4, Exercise D6 (p. 40)
8. Chapter 4, Exercise H2 (p. 43)
9. Chapter 5, Exercise B4 (p. 49)
10. Chapter 5, Exercise C2 (p. 49) (Solve for n positive integer; may use Problem 8)
11. Chapter 5, Exercise D1 (p. 50)
12. Chapter 5, Exercise D3 (p. 50)
13. List all cyclic subgroups of $\langle \mathbb{Z}_8, + \rangle$.
14. Let $G = \{e, a, b, ab, ba, aba\}$ be a group (with identity e), whose element satisfies the conditions $a^2 = e$, $b^2 = e$, $(ab)^2 = ba$. Write the operation table of G.
15. In an operation table for finite groups, note that all elements of a group appear no more than once in each row (and in each column). Prove this. (HINT: Chapter 4, Exercise F2, p. 41).
16. Recall the set G of nonsingular 2×2 real matrices, from Homework 1, Problem 7. It was shown that G is a group with matrix multiplication. Let S be the set of nonsingular 2×2 real matrices with the additional property that the determinant of the matrix is one, i.e., if $A \in S$, then $\det(A) = 1$. Show that S is a subgroup of G. (Feel free to state and use the properties of determinants from linear algebra).