Math 3098: Modern Algebra 1. Instructor: Walton

**Homework #4 on §1.8 and 1.10 of Goodman.**

Include full statements of problems in your solution set.

**Write complete proofs, when proofs are requested.**

*Don't copy proofs from the internet!*

Be honest– show what you know.

**Due: Thursday, September 22, 2016 at the beginning of class **sharp**

(1) [1 point] Exercise 1.8.2 from Goodman.

(2) [1 point] Exercise 1.8.3 from Goodman.

(3) [1 point] Exercise 1.8.7 from Goodman.

(4) [1 point] Exercise 1.8.8 from Goodman.

(5) [1 point] Exercise 1.8.10 from Goodman.

(6) [1 point] Exercise 1.8.18 from Goodman.

(7) [1 point] Exercises 1.10.2 and 1.10.4 from Goodman.

(8) [1 point] Exercise 1.10.10 from Goodman.

(9) [2 points] Show that there is only one way to impose a group structure on the set of two elements \{e, a\}. Describe its group structure. Then give three concrete examples of groups of order 2.

(Bonus*) [+3 points] How many ways can one impose a group structure on the set of three elements \{e, a, b\}? Describe the various group structures. Then, provide two concrete examples for each group structure. (The more creative, the better.)

(Bonus*) [+5 points] How many ways can one impose a group structure on the set of four elements \{e, a, b, c\}? Describe the various group structures. Then, provide two concrete examples for each group structure. (The more creative, the better!)

* Only counts if you attempt problems (1)-(9).