

## Abstract Algebra Final Exam study problems about groups

I. Some of the questions will ask you to find or compute something. Some typical things I might ask:

- a. What is the order of a group?
- b. What are the elements in a group (list them)? (This would typically be asked for a group with 10 or fewer elements)
- c. What is the order of a specific element of a group? (see also pg. 7.2 201 # 15, 16a)
- d. What are the elements in the cyclic subgroup generated by a specified element of a group?
- e. What is the inverse of a specified element of a group?
- f. What is the product (sum, composition) of two specified elements of a group?
- g. What are all of the distinct cyclic subgroups of a group? (This would typically be asked for a group with 10 or fewer elements)
- h. Is the group abelian?

Some of the groups I might ask you to do this for are:  $D_n$ ,  $Z_n$ ,  $U_n$ ,  $S_n$ ,  $\mathbb{Q}$ ,  $\mathbb{Q}^*$ ,  $\mathbb{Q}^{**}$ ,  $\mathbb{R}^*$ ,  $\mathbb{R}^{**}$

II. Properties of groups I might ask you to prove:

Parts of theorems 7.5, 7.6, 7.8(2), 7.19(2), 7.20,

Exercises 7.2 pg. 202 # 17a, 7.4 pg, 223 # 15, 16, 18

II. Subsets that I might ask you to prove are subgroups:

Thm. 7.13, thm. 7.14,

Exercises 7.3 pg. 211 # 15a, 16, 26a, 27, 28a, 33

III. Examples of questions I might ask about homomorphisms and isomorphisms:

Exercises 7.4 pg. 223 # 1, 2, 4-10, 13, 14