

# Algebra 1 (2012)-Aalborg University

## Lecture 17, November 1st

**17th Lecture:** Thursday November 1st, 8:15-12:00 at room G5-112.

- 8:15-8:45 Repetition from last lecture. Order of a group element, cyclic groups (pages 72–75)
- 8:45-10:45 Work in groups. Exercises from [Lau], 2.11 (page 104): 31, A, B, C, D, 29, 34, 16, 17, 30.

Exercise A: How many elements are there of order 4 in  $\mathbb{Z}/28\mathbb{Z}$ ? (answer this without computing them)?, Write down all the elements of order 4 in  $\mathbb{Z}/28\mathbb{Z}$ . How many subgroups are there of order 4 in  $\mathbb{Z}/28\mathbb{Z}$ ? Write down the subgroups of order 4 in  $\mathbb{Z}/28\mathbb{Z}$ .

Exercise B: How many elements of  $(\mathbb{Z}/13\mathbb{Z})^*$  are generators of  $(\mathbb{Z}/13\mathbb{Z})^*$ ? (hint: you do not need to compute them).

Exercise C: Let  $G$  be the group  $\{1, -1, i, -i\} \subset \mathbb{C}$ . Prove that  $G$  is cyclic. Which are the generators of  $G$ ?

Exercise D: Let  $G$  be a cyclic group of order 12. Draw the lattice diagram with all the subgroups of  $G$  (a line can be drawn up from  $K$  to  $H$  whenever  $K \subset H$ ).

- 10:45-12:00 Lecture: Groups and numbers (very fast) and Symmetric group (pages 76–82).

Best regards,

Diego