MAT 452: Introduction to Algebra II
Exercise Sheet 1

Stefan Kohl

March 29, 2011

Due: Monday, April 4, 2011

Exercise 1: Determine up to isomorphism all abelian groups of order

1. 16,

2. 24.

(4 credits)

Exercise 2: Compute the derived series of the symmetric group S_4 of degree 4, and find out whether S_4 is solvable or not, and whether it is metabelian or not.
(4 credits)

Exercise 3: Find elements of orders 2, 3, 4 and 6 in the group $GL(2,\mathbb{Z})$.
(4 credits)

Exercise 4: Let $G := \langle (1,2,3,4,5), (2,3,5,4) \rangle$.

1. Find out whether the group G is abelian or not.

2. Find out whether G is solvable or not.

3. Find out whether G is metabelian or not.

4. Determine the order of G.

(4 credits)

Exercise 5: Find out whether the set of commutators of a group always forms a group. (4 credits)