MAT 551: Algebra I
Exercise Sheet 2

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Due: Wednesday, April 27, 2011

Exercise 5: Write the abelian group $C_3 \times C_8 \times C_{18} \times C_{20}$

1. in elementary divisors form, and
2. decomposed into direct factors as far as possible.

(2 credits)

Exercise 6: Let G be a group. Under which circumstances is the mapping $\alpha : G \to G,\ a \mapsto a^{-1}$ an automorphism of G? (2 credits)

Exercise 7: Describe all endomorphisms of the group $(\mathbb{Z}, +)$. Which are monomorphisms, epimorphisms respectively automorphisms? (2 credits)

Exercise 8: Explain why the group $(\mathbb{Z}, +)$ does not have a composition series. (2 credits)

Exercise 9: Compute

1. the numbers of conjugacy classes of the symmetric groups S_n for $n \leqslant 7$,
2. representatives and sizes of the conjugacy classes of S_5.

(4 credits)

Exercise 10: Determine the conjugacy classes of maximal subgroups of S_5. For each class give a representative and the number of groups in the class. (4 credits)