## Algebra qualifying exam June 1, 2011

- 1. Classify the groups of order 105, up to isomorphism, and give a presentation of each group.
- 2.
- a) Compute  $\operatorname{Ext}_{Z}^{i}$  Z=6Z; Z=15Z Z=15Z for all *i*.
- b) Compute  $Tor_i^Z Z=6Z$ ; Z=15Z Z=15Z for all *i*.
- 3. Let  $\mathcal W$  denote the unique irreducible two dimensional complex representation of the symmetric group  $\mathcal S_3$