

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 $\text{Ext}_{\mathbb{Z}}^i \mathbb{Z}/6\mathbb{Z}; \mathbb{Z}/15\mathbb{Z} \quad \mathbb{Z}/15\mathbb{Z}$ for all i .
 - b) Compute $\text{Tor}_{\mathbb{Z}}^i \mathbb{Z}/6\mathbb{Z}; \mathbb{Z}/15\mathbb{Z} \quad \mathbb{Z}/15\mathbb{Z}$ for all i .

3. Let W denote the unique irreducible two dimensional complex representation of the symmetric group S_3