Groups and Rings III 2010

Tutorial Exercise 4.

I am happy to answer questions in the tutorial about the material being covered in the mid-term exam. I will also hand out solutions to the questions below so feel free to concentrate next week on revising for the mid-term instead of preparing for the tutorial if you prefer.

1. For each of the following groups find the torsion invariants.

(a) $C_8 \times C_{30} \times C_{60}$

(b) $C_{12} \times C_{30} \times C_{150}$

(c) $C_{30} \times C_{36} \times C_{80}$

(d) $C_{35} \times C_{55} \times C_{75}$

2. Find all abelian groups of order 504.

3. Find all abelian groups of order 450.

4. Find the torsion invariants and free rank of the abelian groups below and hence write each as a product of cyclic groups.

(a) $\langle a, b, c \mid a^3b^3c^6 = 1,\ a^{-3}b^9c^6 = 1,\ b^{-9}c^{-9} = 1\rangle$

(b) $\langle a, b, c, d \mid a^3b^{-4}c^2d^{-4} = 1,\ a^3b^{-4}c^8d^8 = 1,\ a^{11}b^{-10}c^{18}d^4 = 1\rangle$.

(c) $\langle a, b, c \mid a^3b^3c^6 = 1,\ a^{-3}b^9c^6 = 1,\ b^{-9}c^{-9} = 1\rangle$