Group Theory 3120B, 3rd Assignment
Due Tuesday April 8th, 2014

1. Show that any finite abelian group that is not cyclic contains a subgroup which is isomorphic to $\mathbb{Z}_p \oplus \mathbb{Z}_p$ for a prime number p.

2. Show that any abelian group of order p^k and of type $(p^{k_1}, \ldots, p^{k_t})$, where p is a prime, contains $p^t - 1$ elements of order p.

3. Prove that any group of order 200 contains a normal Sylow subgroup.

4. Show that any group of order 255 is cyclic.

5. If the order of a group is 42, show that its Sylow 7-subgroup is normal.