Midterm 1 / 2015.2.27 / MAT 4233.001 / Modern Abstract Algebra

Name: _____

Please show all work and justify your answers.

1. Let $a, b \in \mathbf{N}$. Prove that $\operatorname{lcm}(a, b)$ divides any common multiple of a and b.
2. Sketch the subgroup lattice for $\mathbf{Z}_{45}$.
3. Prove that any nontrivial finite group has an element of prime order.
4. If G is a group, $a \in G$, and $|a| = 24$, prove that there exists $b \in G$ such that $b^5 = a$.

1	2	3	4	total (40)