

Comprehensive Exam in Algebra June 2007

NAME _____

PLEASE TRY ALL 10 PROBLEMS.

G1. Show that the alternating group A_4 violates the converse of Lagrange's theorem. (Recall that any subgroup of index 2 is normal.)

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G2. Prove that $11^{48} - 1$ is divisible by 65.

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G3. Prove that an abelian group A with only finitely many subgroups must be finite. *Hint:* First show that every element of A has finite order.

