

Introduction to Algebra, MATH 5127

Test 2, #5

Due Friday November 7, 2014 at 2:30

Write in complete sentences!!! *Explain* what you are doing and convince me that you understand what you are doing and why. **Justify all steps** by quoting the relevant results from the textbook.

Test 2, #5.

- (a) Let N be a subgroup of group G . Let $g \in G$. Prove that coset gN equals N if and only if $g \in N$.
- (b) Let G be a group and p a prime number. Suppose that $H = \{x^p \mid x \in G\}$ is a subgroup of G . Prove that H is a normal subgroup of G .
- (c) For G and H of part (b), prove that every nonidentity element of G/H is of order p .