

Abstract Algebra

Assignment #2

Kenneth Levasseur
Mathematical Sciences
UMass Lowell
Kenneth_Levasseur@uml.edu

■ **Due October 3.**

Instructions: Write out your proofs using clear, concise logic. Use separate sheets of paper for each problem.

1. If G is an abelian group that contains a pair of cyclic subgroups of order 2, show that G must contain a subgroup of order 4. Does this subgroup have to be cyclic? (This is #33 of Chapter 4 in the book)
 2. Prove that if G is a finite group, and H is a nonempty subset of G that is closed with respect to the operation of G (i. e., $a, b \in H \Rightarrow ab \in H$), then H is a subgroup of G . (Compare with Proposition 3.9)
 3. What are the possible cycle structures of elements in A_6 ? (This is the second half of #11 in Chapter 5 of the book. The solution to the first half is in the solutions at the end of the book.)
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