ABSTRACT ALGEBRA 1 (MATH 3140): REVIEW SHEET

I. (a) The role of algebra. The algebraic modeling process.
(b) What are the laws of functional composition?
(c) Operations. Signature. Algebras in a given signature.
(d) Homomorphisms, isomorphisms, endomorphisms, automorphisms.
(e) Subalgebras. Subalgebra lattices.
(f) The Cayley Representation Theorem for monoids, semigroups, and groups.
(g) Cyclic groups. Dihedral groups.
(h) Symmetric groups. Cycle representation of a permutation.
(i) Cartesian products of groups.
(j) The Canonical Factorization of a Function (or Homomorphism). Image, coimage, kernel, and Kernel. Natural map, induced map, inclusion map.
(k) The First Isomorphism Theorem.
(l) Cosets. Uniform partitions.
(m) Index of a subgroup. Multiplicativity of index.
(n) Lagrange's Theorem. First consequences of Lagrange's Theorem.

General advice on preparing for a math test.
Be prepared to demonstrate understanding in the following ways.

(i) Know the definitions of new concepts, and the meanings of the definitions.
(ii) Know the statements and meanings of the major theorems.
(iii) Know examples/counterexamples. (The purpose of an example is to illustrate the extent of a definition or theorem. The purpose of a counterexample is to indicate the limits of a definition or theorem.)
(iv) Know how to perform the different kinds of calculations discussed in class.
(v) Be prepared to prove elementary statements. (Understanding the proofs done in class is the best preparation for this.)
(vi) Know how to correct mistakes made on old HW.