

REVIEW FOR M343K

FINAL EXAM ON SATURDAY DECEMBER 17TH FROM 9 AM TO 12 NOON

DEFINITIONS

- (1) Group
- (2) Commutative (Abelian) Group
- (3) Order of a group G
- (4) Order of an element $g \in G$
- (5) Subgroup
- (6) Cyclic Group
- (7) Left Coset and Right Coset
- (8) Index of a Subgroup
- (9) Group of permutations of a set X
- (10) Cycle
- (11) Even and Odd Permutations
- (12) Product of Groups
- (13) Isomorphism
- (14) Automorphism
- (15) Homomorphism
- (16) Kernel of a homomorphism
- (17) Factor (Quotient) Group
- (18) Normal Subgroups
- (19) Group Action
- (20) Isotropy Subgroup
- (21) Orbit

BIG THEOREMS

- (1) Cyclic groups are commutative
- (2) Subgroups of cyclic groups are cyclic
- (3) Cayley's Theorem: Every group G is isomorphic to a subgroup of a group of permutations.
- (4) Lagrange's Theorem: If H is a subgroup of a finite group G then the order of H divides the order of G .
- (5) Every permutation of a finite set can be written as a product of disjoint cycles
- (6) The group $\mathbb{Z}_m \times \mathbb{Z}_n$ is cyclic and isomorphic to \mathbb{Z}_{mn} if and only if m and n are relatively prime.
- (7) Fundamental Theorem of Finitely Generated Abelian Groups
- (8) Fundamental Homomorphism Theorem
- (9) Burnside's Formula