

Math 3140 Fall 2026 - Review for Midterm 1

Numbers refer to Sections in Gallian, Contemporary Abstract Algebra.

1. Groups.

- axioms
- uniqueness of identity and inverses (2)

2. Subgroups.

- definition (3)
- order of elements
- generators of subgroups (3)
- center $Z(G)$ of a group G
- cyclic groups and their subgroups (4)

3. Specific groups.

- $(\mathbb{Z}_n, +)$
- $(\mathbb{Z}_n^*, \cdot)$
- dihedral groups D_{2n} of order $2n$
- symmetric groups S_n , cycle notation of permutations and their order (5),
- general and special linear group $GL(n, \mathbb{R})$ and $SL(n, \mathbb{R})$

4. Homomorphisms.

- definition (10)
- kernels and images of homomorphisms (10)
- isomorphisms (6)
- (inner) automorphism group (6)
- Cayley's Theorem (6)