

### Section 1.1 - Axiomatic Systems

- Understand the definition of an axiomatic system and its 4 components: undefined terms, defined terms, axioms, and theorems.
- Know what a model for an axiomatic system is and be able to determine whether or not a model satisfies the axioms of a given axiomatic system.
- Understand what it means for an axiomatic system to be consistent and why this is an essential property for an axiomatic system.
- Understand what it means for an axiomatic system to be complete and be able to use models to show that a given axiomatic system is not complete.
- Understand what it means for an axiomatic system to be independent and be able to determine whether or not a given axiomatic system is independent.
- Given two models, be able to determine whether or not the models are isomorphic.
- Understand the principle of duality and be able to find the dual of a given axiom.
- Given an axiomatic system, be able to prove theorems about the axiomatic system and be able to find one or more models for the given system.

### Section 1.2 - A Finite Geometry

- Given the Axioms for Fano's Geometry, be able to prove theorems about this geometry.
- Memorize the standard model for Fano's geometry and know how many points and lines are in this geometry.

### Section 1.3 - A Finite Projective Plane Geometry

- Given the axioms of a projective geometry, be able to determine whether or not a given model satisfies these axioms.
- Be able to show that Fano's Geometry is a projective geometry of order  $n = 2$  and know that there are projective geometries of order  $p^m$  for any prime number  $p$  and positive integer  $m$ .
- Understand the definition of a *concurrent*.
- Know that finite projective geometries satisfy the principle of duality, and be able to prove the dual of any of the axioms for a projective geometry.
- Be able to prove basic theorems about projective geometries.
- Know that a projective plane of order  $n$  has exactly  $n^2 + n + 1$  points and exactly  $n^2 + n + 1$  lines.