

Study this list with reference to your notes, handouts, and graded and ungraded HW. Strive to master the concepts, explanations, proofs, etc. in general; just memorizing specific examples we've practiced is seldom successful. Past students who've done well in my courses tell me they use each Topics List as an outline for writing their own, detailed study guide that includes restatements of definitions and explanations, thorough examples of tasks or proofs, warnings of what not to do, etc.

Non-Proof Tasks:

1. Name the four components of an axiomatic system and explain how they relate to each other.
2. Name the (three) undefined terms in Incidence Geometry (IG).
3. Know that *distinct* simply means "not the same one" for points and lines. Using \neq is okay.
4. State the mathematically precise definitions of: collinear, noncollinear, parallel, intersect. Avoid set-based notation and terminology such as \in , \emptyset , \cap , "contains," etc. Use "lies on," "is incident with," or the $P\ell$ notation instead.
5. Precisely state the three Incidence Axioms (IAs).
6. Given an interpretation, new or one we've seen, explain whether it satisfies/fails my choice of IAs.
7. Know just from the name what line and points are in: the Cartesian plane, the sphere, and the Klein disk. Draw examples in each setting when possible (such as "draw a line ℓ and two distinct lines parallel to it in the Klein disk" or "draw three non-collinear points in the Cartesian plane.")
8. Be prepared to give an interpretation (from our known ones or create your own) that satisfies or fails my choice of combinations of the IAs. Sample: "Specify (i.e., tell the meanings of the undefined terms) an interpretation that satisfies IA1 but not IA2 nor IA3."
9. State my choice of one or more of the three Parallel Postulates. Correctly spell their names.
10. Formally negate each Parallel Postulate, each IA.
11. Determine whether a given interpretation satisfies or fails one or more of the Parallel Postulates.
12. Specify or name an interpretation that satisfies or fails my choice of Parallel Postulate(s).
13. Examples that meet/fail based on false hypotheses versus conclusions are fair game!
14. Formally state:
 - (a) all three complete Betweenness Axioms (including Trichotomy)
 - (b) our shortened version of the Ruler Postulate (RP).
 - (c) your choice of version of the Plane Separation Postulate (PSP).
 - (d) the definition of between for points.
 - (e) the segment definition of same, opposite sides.
 - (f) the definitions of segment and ray
 - (g) Pasch's Theorem (Axiom).
 - (h) the definition of congruent triangles, spell out the acronym CPCTC
 - (i) SAS, ASA, SSS, HL as theorems, not just spelled out acronyms
 - (j) The Chaining Theorem
 - (k) The Segment Copying/Construction Axiom, the Angle Copying/Construction Axiom

Proof Tasks:

1. Prove 1-2 short results from IG using only IAs, and I'll tell you which other theorems from a given list may be used, and which must be avoided.
2. Prove 1-2 short results about segments, rays, or simple betweenness of points:
 - (a) Results will be about basic subsets, intersection, or union relationships.
 - (b) Definitions plus the BAs are the only knowledge you'll need to apply (besides your Modern Concepts knowledge of set proofs).
3. Prove Pasch's Theorem.
4. Prove ASA.