

Essay question for the final examination
Math. 467, Fall 2015

Carefully verify that the Klein disk model satisfies all the Hilbert *incidence* and *betweenness* axioms and the *hyperbolic parallel property* (i.e., existence of multiple parallels to a given line through a given point). This is 8 statements in all. You may assume that the underlying Euclidean plane is the standard (“real”) Euclidean plane, which satisfies Dedekind’s axiom.

“Carefully” means that you can’t just say “This is obvious.” Typically, you will need to cite a Euclidean fact (which you don’t need to reprove) and then explain why it is still applicable. (For example, you might need to check that a point whose existence is guaranteed by a Euclidean axiom does not fall outside the disk.) In some cases, a drawing will help.

In preparation, consult textbook and notes, but please no web searching. You may talk among yourselves, but not to the extent of developing a joint response. Do not bring any written notes into the test.