Mathematics 3260H – Geometry II: Projective and non-Euclidean geometry
TRENT UNIVERSITY, Fall 2017

Assignment #9
More Collineations
Due on Wednesday, 22 November.

1. Suppose γ is a collineation with centre P and axis ℓ. Verify that γ^{-1} is also a collineation, and that it also has centre P and axis ℓ. *[2]*

2. Suppose α is a collineation of a projective plane with axis ℓ and such that $P^\alpha = P$ and $Q^\alpha = Q$ for two points $P \neq Q$ which are not on ℓ. Show that α must be the identity collineation, *i.e.* $R^\alpha = R$ and $m^\alpha = m$ for every point R and every line m of the projective plane. *[5]*

3. Find an example of a collineation of the real projective plane which is neither central nor axial, or show that there is no such collineation. *[3]*