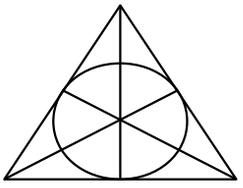
Mathematics 3260H – Geometry II: Projective and non-Euclidean geometry
TRENT UNIVERSITY, Winter 2015

Assignment #34 = 21 + 13*
Some (non-)collineations of the Fano configuration
Due on Thursday, 19 March, 2015.

Recall from Assignment #1 and class that the Fano configuration is the smallest projective plane, consisting of seven points and seven lines, with each point incident with three lines and each line incident with three points.



1. Suppose ℓ is a line of the Fano configuration, P a point not incident with ℓ, and α is a collineation of the Fano configuration which fixes every point on ℓ and every line through ℓ. Show that α is the identity collineation. *[5]*

2. Pick a line m of the Fano configuration, a point Q which is on m, and points R and S which are colinear with Q but are not on m. Show that there is a collineation β of the Fano configuration that fixes every point on ℓ and every line through Q, and for which $R^\beta = S$. *[5]*

* Toby, Toby, Toby, ...