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

Assignment #55 = 34 + 21*
Moving points and lines
Due on Thursday, 19 March, 2015.

1. Suppose $P = (u, v, w)$ and $Q = (x, y, z)$ are points of the real projective plane which are not incident with the lines $\ell = [a, b, c]$ and $m = [d, e, f]$, respectively. Show that there is a collineation δ of the real projective plane such that $P^\delta = Q$ and $\ell^\delta = m$. *[10]*

NOTE: It's perfectly possible to have P incident with m and/or Q incident with ℓ here.

HINT: A suitable linear transformation of $\mathbb{R}^3$ will give such a collineation . . .