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

Assignment #3=2+1*
Computations in the Poincaré half-plane
Due on Thursday, 5 February, 2015.

This assignment is about some of the nuts and bolts of working in the Poincaré half-plane model of the hyperbolic plane.

1. Suppose (a, b) and (c, d) are the Cartesian coordinates of two points of the Poincaré half-plane model such that $a \neq c$. Find the centre and radius, in terms of a, b, c, and d, of the Euclidean semi-circle that is the hyperbolic line joining the given points in the Poincaré model. *[5]*

2. Consider the triangle of the Poincaré half-plane model with vertices at $(0, 1)$, $(2, 2)$, and $(3, 1)$ in Cartesian coordinates. Find the internal angles, the lengths of the sides, and the area of this triangle, each to at least two decimal places. *[5]*

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* You should still blame Toby for the numbering of this assignment . . .