

MTH 520/622: Introduction to hyperbolic geometry

Practice Assignment II

1. Derive the hyperbolic distance formulas in 3.1 (ix) and 3.2 (x) of the lesson plan.
2. Consider a vertical line L in \mathbb{H} such that $\partial_\infty(L) = \{x, \infty\}$, where $x \in \mathbb{R}$.
 - (a) Where is the center of the hyperbolic circle $C = L \cup \{\infty\}$.
 - (b) Describe the horocycle associated with C .
3. Prove the assertion in 3.3 (xi) and find an explicit expression for the angle θ in terms of d .
4. Establish the conditions for congruency of hyperbolic triangles stated in 3.4 (ix).