Comprehension questions

PROBLEM 35.1. *Romeo and Juliet start at the points* $(0,1)$ *and* $(1,1)$ *on the hyperbolic plane, and walk towards each other at speed* 1*, aiming to meet at soon as possible. Where will they meet, and after how much time?*

PROBLEM 35.2. *Look at a hyperbolic circle centered at* $(0,1)$*, with radius* $1/100, 1/10, 1, 10, 100$*; be careful to understand these data in the hyperbolic sense. What is the area of the (inside of the) circle? You should use a computer to carry out the integral (numerically); I want you to write down what you asked the computer to do, what the numbers were, and then to compare them to Euclidean geometry.*

PROBLEM 35.3. *Do the same as in the previous problem, but for arclengths rather than areas.*

PROBLEM 35.4. *There is a Gauss-Bonnet theorem for hyperbolic polygons (rather than just triangles), what does it say? Just the answer and some motivation is sufficient.*

18.900 Geometry and Topology in the Plane

Spring 2023