

College Geometry MTG4212 Fall 2011
Homework 9
Due Monday, November 14, 2011

1. Calculate the hyperbolic lengths of the following curves:
 - (a) $y = 2x + 1$ from $(0, 1)$ to $(2, 5)$ (evaluate the integral on this one).
 - (b) $y = x^3$ from $(1, 1)$ to $(2, 8)$ (leave this one in the form of a definite integral).
2. For each ratio specified below, find a point that divides the geodesic segment from $(0, 2)$ to $(0, 5)$ into two segments such that the ratio of the hyperbolic length of the upper segment to the hyperbolic length of the lower segment is the given ratio:
 - (a) $3 : 1$
 - (b) $5 : 2$
3. Find the hyperbolic distances between each pair of the following 3 points: $(1, 1)$, $(1, 3)$, and $(5, 3)$. (Be sure to use a hyperbolic geodesic in determining hyperbolic distance.)
4. Find an inversion that takes the straight geodesic $x = 3$ to the bowed geodesic from $(1, 0)$ to $(4, 0)$. Remember: a bowed geodesic is just an arc of a circle whose center is on the x -axis.