

**MATH 351: RIEMANN SURFACES AND DESSINS D'ENFANTS
HOMEWORK #13**

Problem 13.1. An *ideal triangle* in the completed upper half-plane

$$\mathbb{H}^* = \mathbb{H} \cup \mathbb{P}^1(\mathbb{R}) = \mathbb{H} \cup \mathbb{R} \cup \{\infty\}$$

is a triangle (connected closed subset whose boundary consists of three geodesic segments intersecting in three distinct points) all of whose vertices lie in $\mathbb{P}^1(\mathbb{R})$.

Show that the area of an ideal triangle is π . [*Hint: Do the integral! Or reduce to one of the two cases we did. What is the significance of the fact that the area is independent of the location of the vertices?*]