Geometry III/IV

Exercises: Week 15, Feb 2013

Problem 1. A line decomposes a hyperbolic plane into two half-planes. How many disjoint half-planes can you find in hyperbolic plane? Draw infinitely many disjoint half-planes in each of two models you already know.

Problem 2. In the upper half-plane model draw

- a (hyperbolic) line through the points i and $i + 2$;
- a (hyperbolic) line through $i + 1$ orthogonal to the (hyperbolic) line reperesented by the ray $\{ki \mid k > 0\}$;
- a (hyperbolic) circle centered at i (just sketch it, no formula needed!);
- a triangle with all three vertices at the absolute (such a triangle is called *ideal*).

Problem 3. Is it true that each hyperbolic triangle has a circumscribed circle?

Problem 4. Prove SSS, ASA and SAS theorems of conguence of hyperbolic triangles. Hint: try the same proofs as in Euclidean and spherical cases.