Math 104 Homework 4
David Dumas
Due Tuesday, March 7, 2006

(1) **Chords.** Complete part (a) of exercise 17 on p. 139 of Greenberg. In other words, prove (in neutral geometry) that the radius through the midpoint of a chord is a perpendicular bisector.

(2) **Theorem of Thales.** A triangle $\triangle ABC$ is said to be *inscribed* in a circle γ if A, B, and C lie on γ. Recall that a *diameter* of γ is a segment joining two points on γ that contains the center. Prove the following theorem of Thales in Euclidean geometry:

Theorem: If $\triangle ABC$ is inscribed in a circle γ and BC is a diameter, then $\angle A$ is right.

Note: This is part of exercise 18 on p. 139 of Greenberg; see Figure 4.29 for inspiration.

(3) **Klein perpendiculars.** Complete parts (a) and (c) of exercise K-2 on pp. 271-272 of Greenberg.

(4) **Right-angled polygons.** Use the Klein model to show that there is a hexagon in the hyperbolic plane with six right angles, and that there is a pentagon with five right angles. (See the hint for exercise K-5 on p .272 of Greenberg.)