1. Henle 10.5 interpreted as follows:

Show that the area of a hyperbolic circle is

$$A = 4\pi \sinh(R/2)^2. \tag{1}$$

2. Show that a hyperbolic circle with radius $R > 0$ has an area larger than a Euclidean circle with radius R. This is an exercise in first semester calculus. You are welcome to use the following well known facts about hyperbolic trig functions.

- $\frac{d}{dx}\sinh(x) = \cosh(x)$
- $\frac{d}{dx}\cosh(x) = \sinh(x)$ (no sign change!)
- $\sinh(x) = 0$
- $\cosh(x) = 1$
- $\cosh(x) \geq 1$ for all x.

3. Henle 10.8 interpreted as follows

Show that a figure with 4 equals sides and four equal angles $\pi/2$ is impossible in hyperbolic geometry. Find an equiangluar four sided figure with area 1. You may assume that the area of an asymptotic triangle is π.

4. Given three ideal points p_1, p_2 and p_3 in the upper half plane model, show that there is a hyperbolic transformation that takes these points to 0, 1 and ∞ (though perhaps not in this order). Conclude that all asymptotic triangles are congruent.