All problem numbers refer to *Foundations of Geometry* second edition by Venema.

1. 6.1.5
2. 6.1.6
3. 6.2.2
4. 6.4.1
5. Define a **distance** between two points A, B in the Poincaré disk as follows. Let γ be the unique line (Euclidean circle) passing through A and B intersecting the boundary of the Poincaré disk at points P and Q. Then the distance between points A and B is the number $d_{\mathcal{H}}(A, B)$ defined by $d_{\mathcal{H}}(A, B) = |\ln\left(\frac{d(A,P)\cdot d(B,Q)}{d(A,Q)\cdot d(B,P)}\right)|$ where $d(A, B)$ is the Euclidean distance between the points A and B. Prove the following properties of d.

   a) if $A = B$ then $d(A, B) = 0$
   b) $d_{\mathcal{H}}(A, B) = d_{\mathcal{H}}(B, A)$

6. Let C be the center of a Euclidean circle that is used to define the Poincaré disk. Let P be a point in the Poincaré disk such that the hyperbolic distance (defined above in problem 5) from O to P is r. Find a formula for the Euclidean distance from C to P.