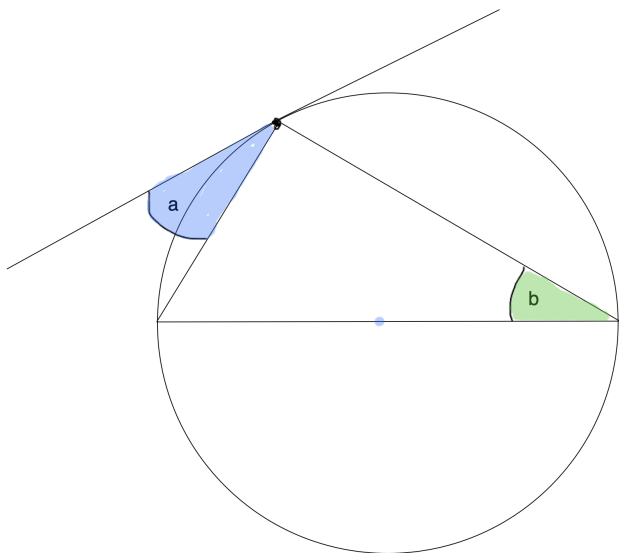# MA541 Hyperbolic Homework 2

1. Prove the tangential case of the Star Trek lemma, i.e., prove that angle a equals angle b in the figure below.

2. Let S be a circle and l a line whose intersection with S is non-trivial. Denote by α one of the angles formed by the intersection of l with S. Let ϕ denote inversion about S. Show that $\phi(S)$ intersects $\phi(l)$ at angle equal to α.

3. Let $P = 2+3i$ and $Q = 5+4i$ represent points in the upper-half plane model of the hyperbolic plane. Find the hyperbolic distance between P and Q.