Geometry I — Homework 8 — Due 9th Dec

- 1. Prove that given two distinct points, A and B and an angle $\alpha \neq 0$, there exist exactly two rotations T_1 and T_2 of angle $|\alpha|$ such that $T_1(A) = B$ and $T_2(B) = A$. By convention, if α is positive then the rotation happens counterclockwise. If negative, clockwise.
- 2. Prove that an isometry sends a triangle into a congruent triangle.
- 3. Let Γ_1 and Γ_2 be two distinct circles centered at O_1 and O_2 and of radii r_1 and r_2 , $r_1 \ge r_2$. Show that if $|O_1O_2| = r_1 + r_2$ or $|O_1O_2| = r_1 r_2$, then the two circles are tangent, namely they intersect exactly at one point.
- 4. Given two distinct points A and B and an isometry T, prove that the line containing A and B is sent by T into the line containing T(A) and T(B).
- 5. Prove that an isometry sends two parallel lines into two parallel lines.