Construction of Line Segment onto Ray

Trent Baker

April 30, 2015

This theorem was originally a hypothesis used by Mr. Maggert to complete Conjecture F.

Theorem Expensive Jasmine Tea. Given a segment BC and a ray AZ, it is possible to construct with a compass and straightedge a point J lying on AZ such that AJ is congruent to BC.

Proof. By proposition 1, construct equilateral triangle ADB. Extend segments DB and DA. Construct circle B through C, and let point G be the intersection of circle B and ray DB. By definition of a circle, segments BC and BG are congruent. Construct circle D through G. Let point H be the intersection of ray DA and circle D; by definition of a circle, segments DG and DH are congruent. Consider segment DH formed by segments AH and DA together, and segment DG formed by segments BG and DB together. By common notion 3, segment AH is congruent to segment BG. Since segments BG and BC are congruent, BC is congruent to AH by common notion 1. Construct circle A through H, and let point J be the intersection of ray AZ and circle A. AJ is congruent to AH by definition of a circle, and lies on ray AZ.

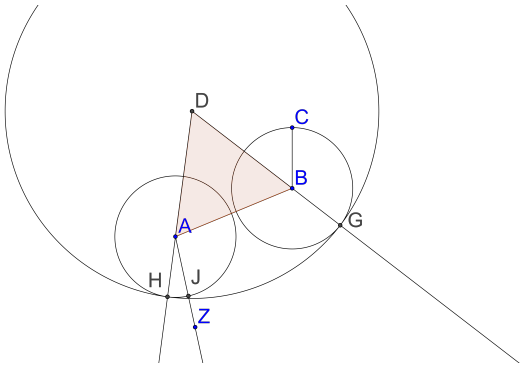

Figure 1: Construction of BC onto AZ

□