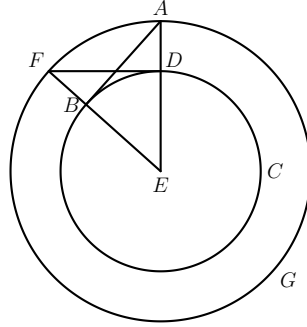# Gloss on Euclid, *Elements*, Book III, Proposition 17

Let A be a point outside the a given circle (BCD). It is required to draw a straight line from A that touches the circle.

We refer to the given circle as the *inner circle*. The centre E of this circle can be constructed (III. 1).

Draw a circle through A centred on E. We refer to this circle as the *outer circle*. Let the line segment EA cut the inner circle at D. A perpendicular to EA can be constructed at the point D. Let this perpendicular cut the outer circle at F, as shown. Join E to F, and let the line segment EF cut the inner circle at B. Join EF. Consider the triangles AEB and FED. The two sides AE, EB are respectively equal to the two sides FE, ED, and the angles AEB and FED coincide. It follows from the SAS Congruence Rule (I. 4) that the triangles AEB and FED are congruent, and therefore angles ABE and FDE are equal. But FDE is a right angle, by construction. Therefore ABE is a right angle. It follows that AB touches the inner circle at B (III 16, Porism).