

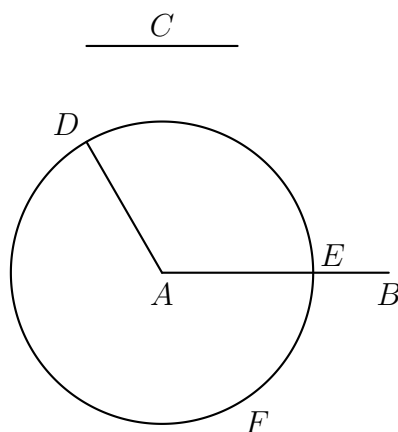
Study Note—Euclid’s *Elements*, Book I, Proposition 3

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Proposition 3 of Book I of Euclid’s *Elements of Geometry* given two line segments of unequal length contained within some plane, a part may be cut off from the greater equal in length to the smaller.

Thus suppose that AB and C are line segments, where the line segment C is shorter than the line segment AB . Applying the construction established in Proposition 2 of Book I of Euclid’s *Elements*, we can find a point D in the plane for which $AD = C$.



The circle centered on the point A and passing through the point D will intersect the line segment AB at some point E lying between A and B . Then $AE = AD$ and $C = AD$. Applying the First Common Notion, we conclude that the part AE of AB is equal in length to the line segment C , and thus the required construction has been carried through.

Note that the complete geometric construction established to carry through the task set out in the statement of this proposition is fully described in the

discussion of the first three propositions of Book I of the *Elements*. The discussion of each proposition establishes a part of the strategy required to implement the full geometric construction using straightedge and compasses alone.