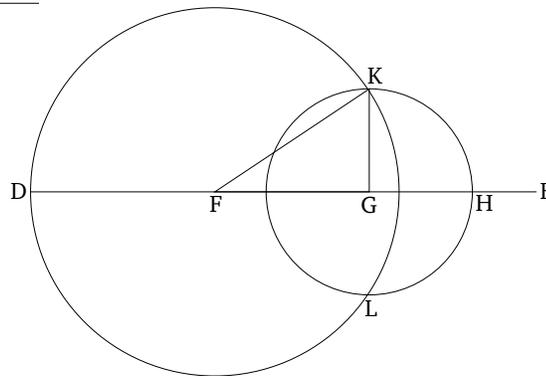


Book 1

Proposition 22

To construct a triangle from three straight-lines which are equal to three given [straight-lines]. It is necessary for (the sum of) two (of the straight-lines) taken together in any (possible way) to be greater than the remaining (one), [on account of the (fact that) in any triangle (the sum of) two sides taken together in any (possible way) is greater than the remaining (one) [Prop. 1.20]].

A _____
 B _____
 C _____



Let A , B , and C be the three given straight-lines, of which let (the sum of) two taken together in any (possible way) be greater than the remaining (one). (Thus), (the sum of) A and B (is greater) than C , (the sum of) A and C than B , and also (the sum of) B and C than A . So it is required to construct a triangle from (straight-lines) equal to A , B , and C .

Let some straight-line DE be set out, terminated at D , and infinite in the direction of E . And let DF made equal to A , and FG equal to B , and GH equal to C [Prop. 1.3]. And let the circle DKL have been drawn

with center F and radius FD . Again, let the circle KLH have been drawn with center G and radius GH . And let KF and KG have been joined. I say that the triangle KFG has been constructed from three straight-lines equal to A , B , and C .

For since point F is the center of the circle DKL , FD is equal to FK . But, FD is equal to A . Thus, KF is also equal to A . Again, since point G is the center of the circle LKH , GH is equal to GK . But, GH is equal to C . Thus, KG is also equal to C . And FG is also equal to B . Thus, the three straight-lines KF , FG , and GK are equal to A , B , and C (respectively).

Thus, the triangle KFG has been constructed from the three straight-lines KF , FG , and GK , which are equal to the three given straight-lines A , B , and C (respectively). (Which is) the very thing it was required to do.