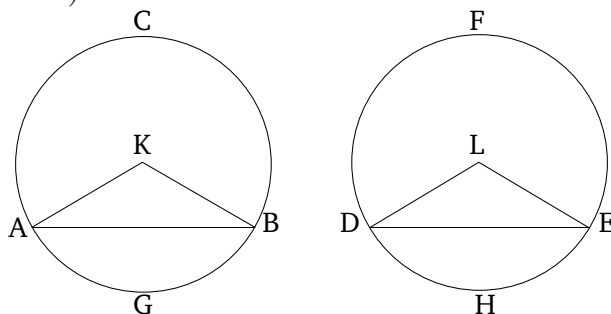


# Book 3

## Proposition 28

In equal circles, equal straight-lines cut off equal circumferences, the greater (circumference being equal) to the greater, and the lesser to the lesser.

Let  $ABC$  and  $DEF$  be equal circles, and let  $AB$  and  $DE$  be equal straight-lines in these circles, cutting off the greater circumferences  $ACB$  and  $DFE$ , and the lesser (circumferences)  $AGB$  and  $DHE$  (respectively). I say that the greater circumference  $ACB$  is equal to the greater circumference  $DFE$ , and the lesser circumference  $AGB$  to (the lesser)  $DHE$ .



For let the centers of the circles,  $K$  and  $L$ , have been found [Prop. 3.1], and let  $AK$ ,  $KB$ ,  $DL$ , and  $LE$  have been joined.

And since ( $ABC$  and  $DEF$ ) are equal circles, their radii are also equal [Def. 3.1]. So the two (straight-lines)  $AK$ ,  $KB$  are equal to the two (straight-lines)  $DL$ ,  $LE$  (respectively). And the base  $AB$  (is) equal to the base  $DE$ . Thus, angle  $AKB$  is equal to angle  $DLE$  [Prop. 1.8]. And equal angles stand upon equal circumferences, when they are at the centers [Prop. 3.26]. Thus, circumference  $AGB$  (is) equal to  $DHE$ . And the

whole circle  $ABC$  is also equal to the whole circle  $DEF$ . Thus, the remaining circumference  $ACB$  is also equal to the remaining circumference  $DFE$ .

Thus, in equal circles, equal straight-lines cut off equal circumferences, the greater (circumference being equal) to the greater, and the lesser to the lesser. (Which is) the very thing it was required to show.