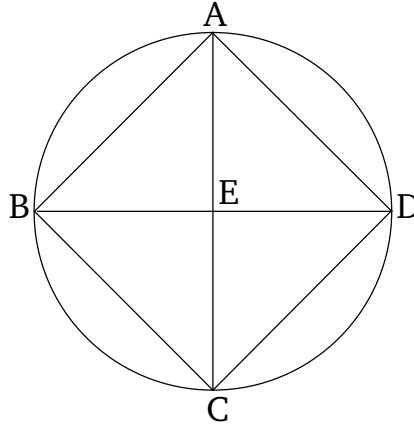


## Book 4

### Proposition 6

To inscribe a square in a given circle.



Let  $ABCD$  be the given circle. So it is required to inscribe a square in circle  $ABCD$ .

Let two diameters of circle  $ABCD$ ,  $AC$  and  $BD$ , have been drawn at right-angles to one another.<sup>†</sup> And let  $AB$ ,  $BC$ ,  $CD$ , and  $DA$  have been joined.

And since  $BE$  is equal to  $ED$ , for  $E$  (is) the center (of the circle), and  $EA$  is common and at right-angles, the base  $AB$  is thus equal to the base  $AD$  [Prop. 1.4]. So, for the same (reasons), each of  $BC$  and  $CD$  is equal to each of  $AB$  and  $AD$ . Thus, the quadrilateral  $ABCD$  is equilateral. So I say that (it is) also right-angled. For since the straight-line  $BD$  is a diameter of circle  $ABCD$ ,  $BAD$  is thus a semi-circle. Thus, angle  $BAD$  (is) a right-angle [Prop. 3.31]. So, for the same (reasons), (angles)  $ABC$ ,  $BCD$ , and  $CDA$  are also each right-angles. Thus, the quadrilateral  $ABCD$  is right-angled. And it was also shown (to be) equilateral. Thus, it is a square [Def. 1.22]. And it has been inscribed in circle  $ABCD$ .

Thus, the square  $ABCD$  has been inscribed in the given circle. (Which is) the very thing it was required to do.