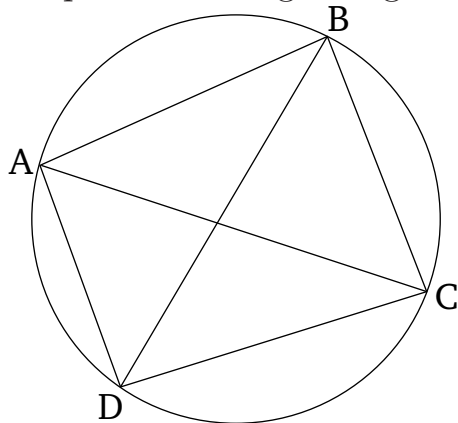


Book 3

Proposition 22

For quadrilaterals within circles, the (sum of the) opposite angles is equal to two right-angles.



Let $ABCD$ be a circle, and let $ABCD$ be a quadrilateral within it. I say that the (sum of the) opposite angles is equal to two right-angles.

Let AC and BD have been joined.

Therefore, since the three angles of any triangle are equal to two right-angles [Prop. 1.32], the three angles CAB , ABC , and BCA of triangle ABC are thus equal to two right-angles. And CAB (is) equal to BDC . For they are in the same segment $BADC$ [Prop. 3.21]. And ACB (is equal) to ADB . For they are in the same segment $ADCB$ [Prop. 3.21]. Thus, the whole of ADC is equal to BAC and ACB . Let ABC have been added to both. Thus, ABC , BAC , and ACB are equal to ABC and ADC . But, ABC , BAC , and ACB are equal to two right-angles. Thus, ABC and ADC are also equal to two right-angles. Similarly, we can show that angles BAD

and DCB are also equal to two right-angles.

Thus, for quadrilaterals within circles, the (sum of the) opposite angles is equal to two right-angles. (Which is) the very thing it was required to show.