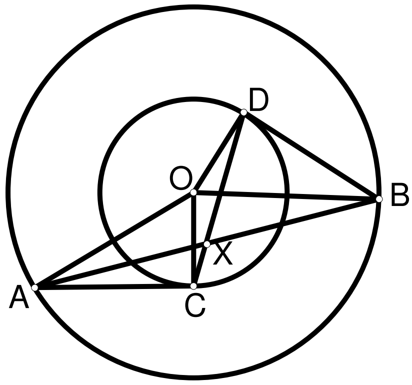

The figure shows two concentric circles with a common centre O. A and B are two points on the outer circle. AC and BD touch the inner circle at C and D respectively. AB and CD intersect at X. Prove that

(a) $AC = BD$.

(b) $\Delta OAB \sim \Delta OCD$.

(c) CD bisects AB at X.

(a) $OC = OD$; $OA = OB$ (same radii)

$\angle OCA = \angle ODB = 90°$ (tangent $\perp$ radius)

$\Delta OAC \cong \Delta OBD$ (R.H.S.)

$AC = BD$ (corr. sides $\cong \Delta$s)

(b) $OA : OC = OB : OD$ (same radii)

$\angle AOB = \angle AOC + \angle COB = \angle COB + \angle BOD$ (corr. $\angle$s $\cong \Delta$s)

$= \angle COD$

$\Delta OAB \sim \Delta OCD$ (2 sides proportional, 1 included $\angle$, S.A.S.)

(c) $\angle OBA = \angle ODC$ (corr. $\angle$s, $\sim\Delta$s)

O, X, B, D are concyclic. (converse, $\angle$s in the same segment)

$\angle OXB + \angle ODB = 180°$ (opp. $\angle$s, cyclic quad.)

$\angle OXB = 90°$

$AX = XB$ ($\perp$ from centre bisect chord)

CD bisects AD at X .