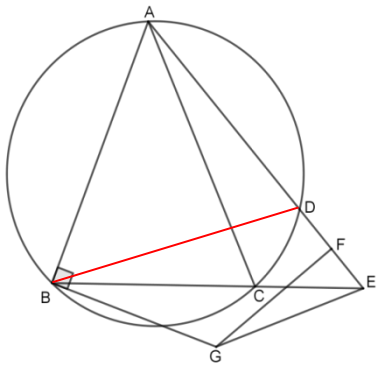
AUTHOR'S SOLUTION - NOV - 2024



Construction :

Join BD.

Proof:

In ΔABD and ΔAEB, $\angle A$ is common

$\angle ADB = \angle ABE$ (both are equal to $\angle ACB$)

⇒ Third angle, $\angle ABD = \angle AEB$

⇒ As per the converse of Tangent Chord Theorem (also known as Alternate Segment Theorem), AB is a tangent to the circumcircle of ΔBDE at B

⇒ O, [the meeting point of perpendicular to AB (tangent) through B and the perpendicular bisector of DE, the chord] is the circumcentre of ΔBDE.

⇒ Reverse ∠BOE (at the centre) = $2\angle ADB$ (at the alternate segment)

⇒ $\angle BOE = 2\,(180 - \angle BDE) = 2\angle ADB = 2\angle ACB = 2\angle ABC$ ---------- **Proved**

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