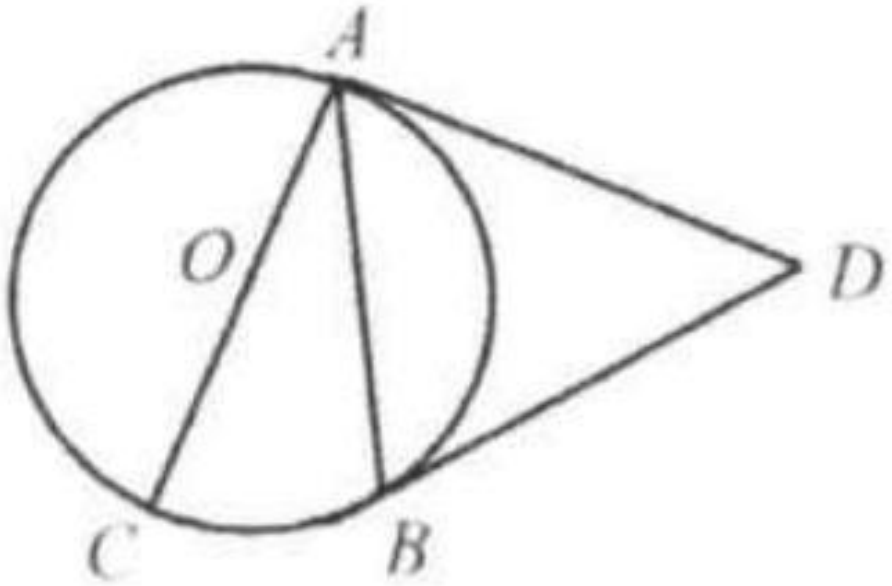
Example 2

DA and DB are tangent to circle O at A and B, respectively. AC is the diameter of circle O. Prove: $\angle ADB = 2\angle BAC$.

Solution: Connect BC.



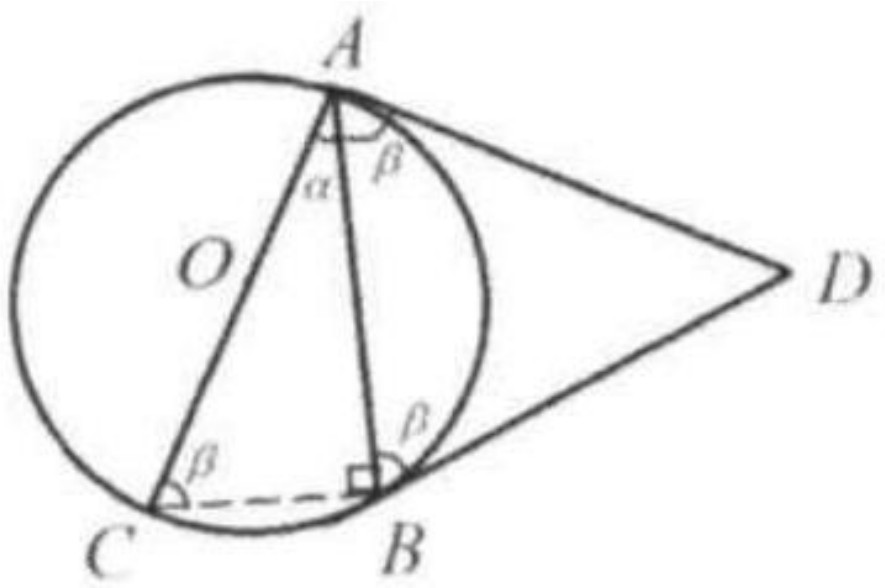
Since AC is the diameter, $\angle ABC = 90°$.

$\angle CAB + \angle ACB = \alpha + \beta = 180° - 90° = 90°$.

$\angle ACB = \angle BAD$ (both face the same arc AB).

So $\angle BAD = \beta$.

Note that $\triangle DAB$ is an isosceles triangle, $\angle DBA = \beta$.



Thus $\alpha = 90° - \beta \quad \Rightarrow \quad 2\alpha = 180° - 2\beta$
In triangle $ADB, \angle ADB = 180° - 2\beta = 2\alpha = 2\angle BAC$.