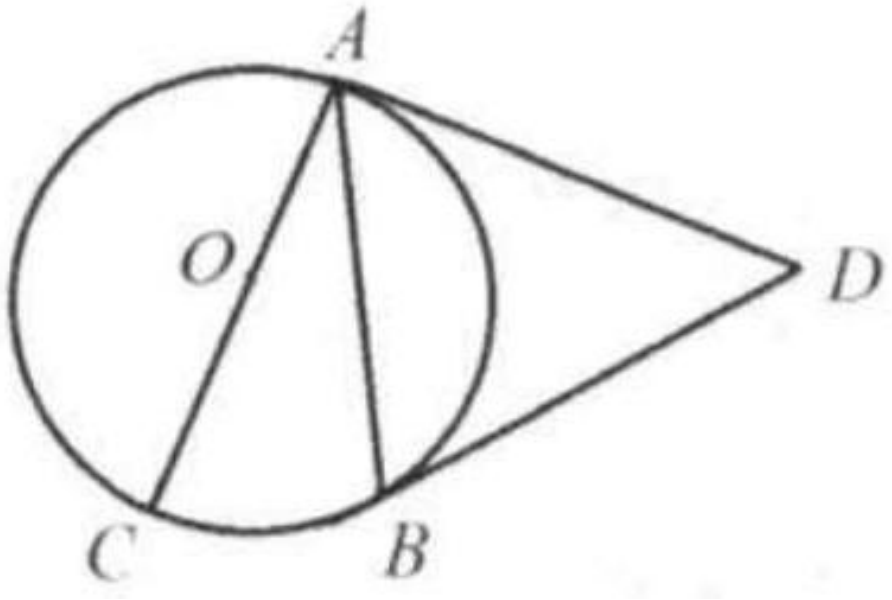
Example 2

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 OB.

Since both OA and OB are radius, $OA = OB$ and $\angle OAB$

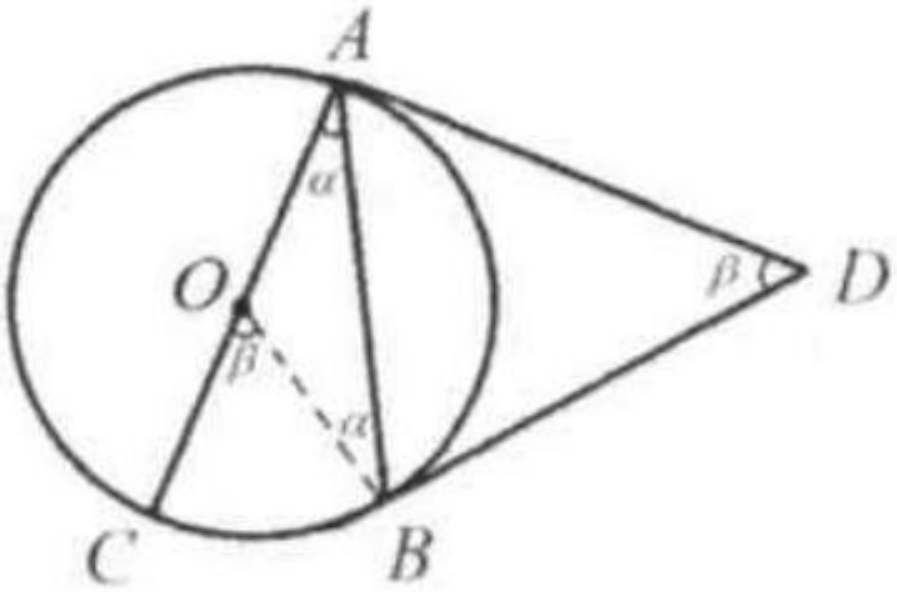


$= \angle OBA = \alpha$.

Since $\angle COB$ is the exterior angle of triangle ABO,

$\angle COB = \beta = 2\alpha$.

In quadrilateral $ADBO, \angle ADB + \angle DBO + \angle BOA +$
$\angle OAD = 360° \Rightarrow \quad \angle ADB + 90° + \angle BOA + 90° = 360°$



$\Rightarrow \quad \angle ADB + \angle BOA = 180^\circ$

Since $\angle BOA = 180^\circ - \beta$, (1) becomes $\angle ADB + 180^\circ - \beta = 180^\circ$

$\Rightarrow \quad \angle ADB = \beta = 2\alpha.$

That is, $\angle ADB = 2\angle BAC$.