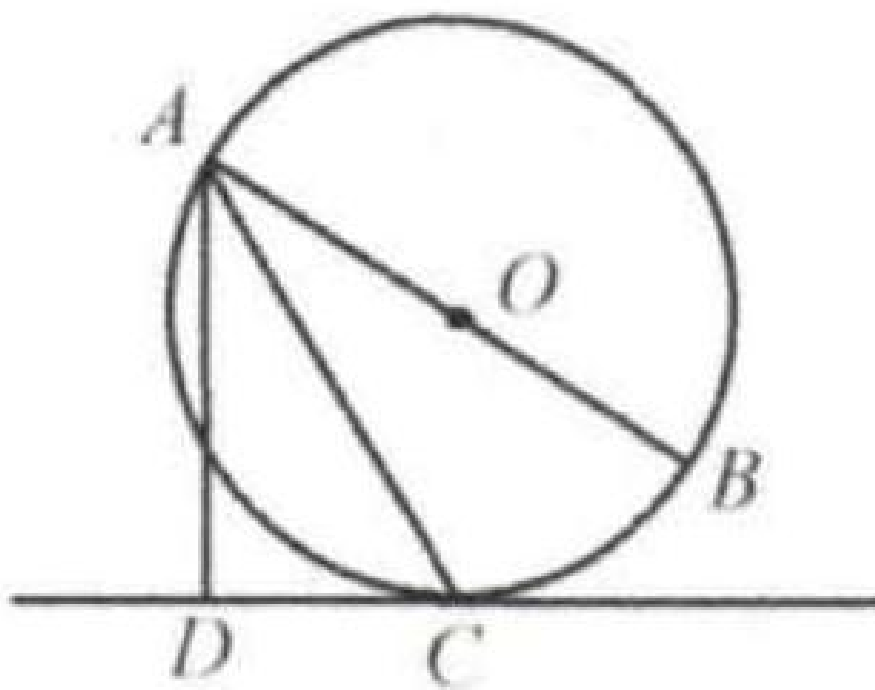# Example 4

AB is the diameter of circle O. C is a point on the circumference of circle O. AD is perpendicular to the tangent line drawn through C. Show that AC is the angle bisector of $\angle DAB$.

Solution: Method 1:

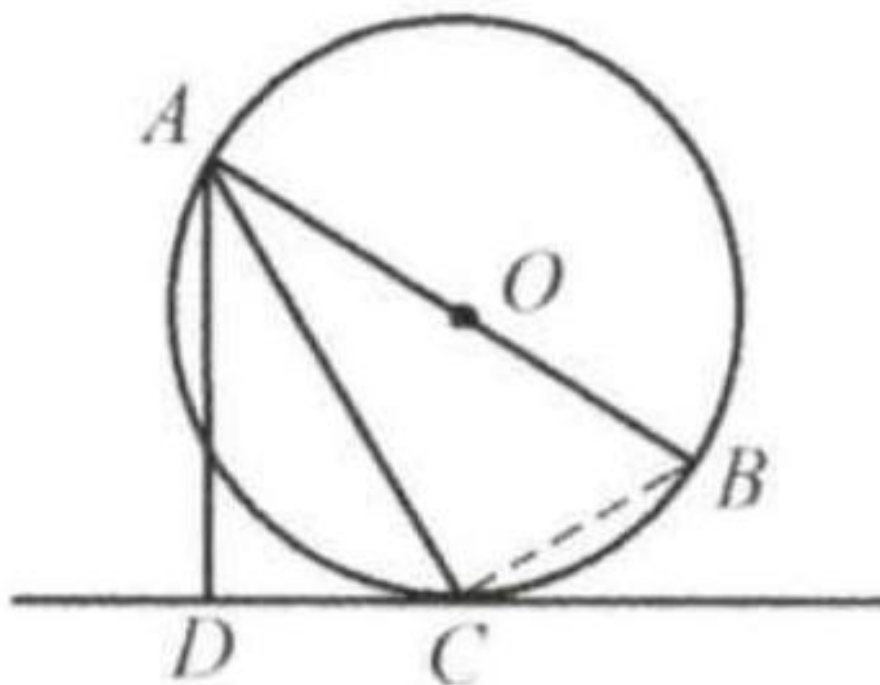Connect CB.

Since AB is the diameter, $\angle ACB = 90°$.

Since $AD \perp DC$, $\angle ADC = 90°$.

$\angle ACD = \angle ABC$ (they face the same arc AC).

Thus $\triangle ACD \sim \triangle ABC$.

So $\angle DAB = \angle CAB$.

AC is the angle bisector of $\angle DAB$.

Method 2:

Connect CB.
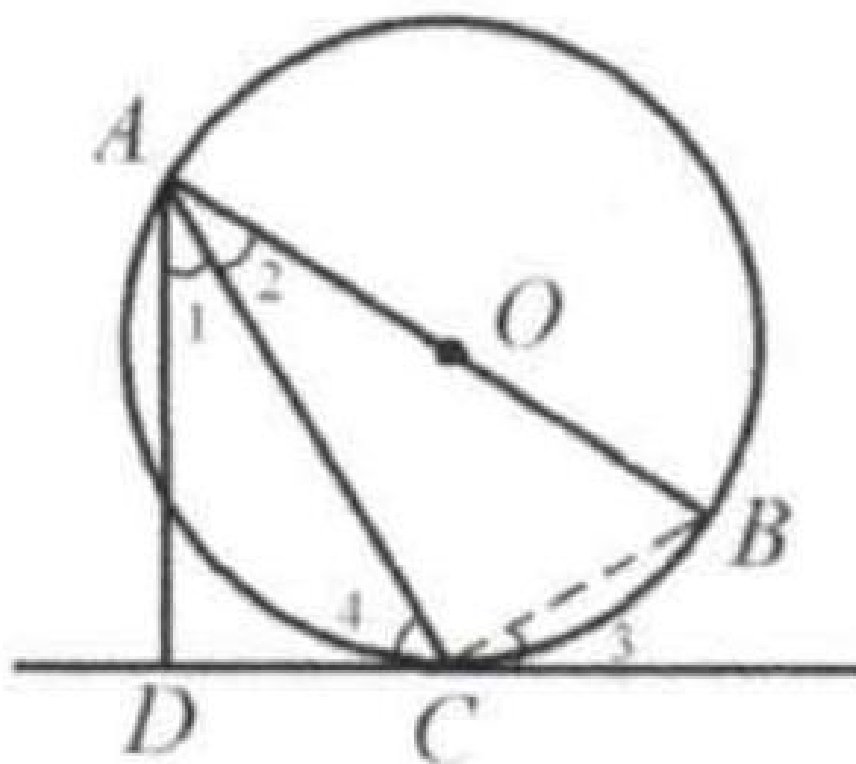
Since AB is the diameter, $\angle ACB = 90°$.

So $\angle 3 + \angle 4 = 90°$.

$\angle 3 = 90° - \angle 4$.

Since $AD \perp DC, \angle 1 + \angle 4 = 90°$.

$\angle 1 = 90° - \angle 4$.

$\angle 1 = \angle 3$.

$\angle 3 = \angle 2$ (they face the same arc AC).
Thus $\angle 1 = \angle 2$.
AC is the angle bisector of $\angle DAB$.