In $\triangle OAC$, $OA = OC$ (radii of same ⊙)

$\Rightarrow \angle 7 = \angle 8$ (isosceles △ prop.)

let $\angle 7 = \angle 8 = c^\circ$

In $\triangle ODE$, $OD = OE$ (radii of same ⊙)

$\angle 9 = \angle 10$ (isosceles △ prop.)

let $\angle 9 = \angle 10 = d^\circ$

In $\triangle BAC$

$\angle B + \angle BAC + \angle BCA = 180^\circ$ (angle sum prop of △)

$\angle B + a + c + c + b = 180^\circ$

$\Rightarrow \angle B + 2a + 2c = 180^\circ \ldots (i)$ ($\because a = b$)

□ ACED is cyclic

$\angle ACE + \angle EDA = 180^\circ$ (opp. angles of a cyclic □)

$a + d + c + b = 180^\circ$

$2a + c + d = 180^\circ \ldots (ii)$ ($\because a = b$)

From (i) and (ii)

$\angle B + \cancel{2a} + 2c = \cancel{2a} + c + d$

$\Rightarrow \angle B = c + d - 2c$

$\angle B = d - c$

$(\times 2)$ $2\angle B = 2d - 2c$

$= \cancel{180^\circ} - \angle DOE - \cancel{180^\circ} + \angle AOC$

$\Rightarrow \angle B = \frac{1}{2}(\angle AOC - \angle DOE)$ [In $\triangle DOE$
$2d + \angle DOE = 180^\circ$
$\Rightarrow 2d = 180^\circ - \angle DOE$
In $\triangle AOC$
$2c + \angle AOC = 180$
$\Rightarrow 2c = 180 - \angle AOC$]

CBSE HOTS IX, Circles 5. Solutions by Dev Anoop (Bathinda)