Example 7
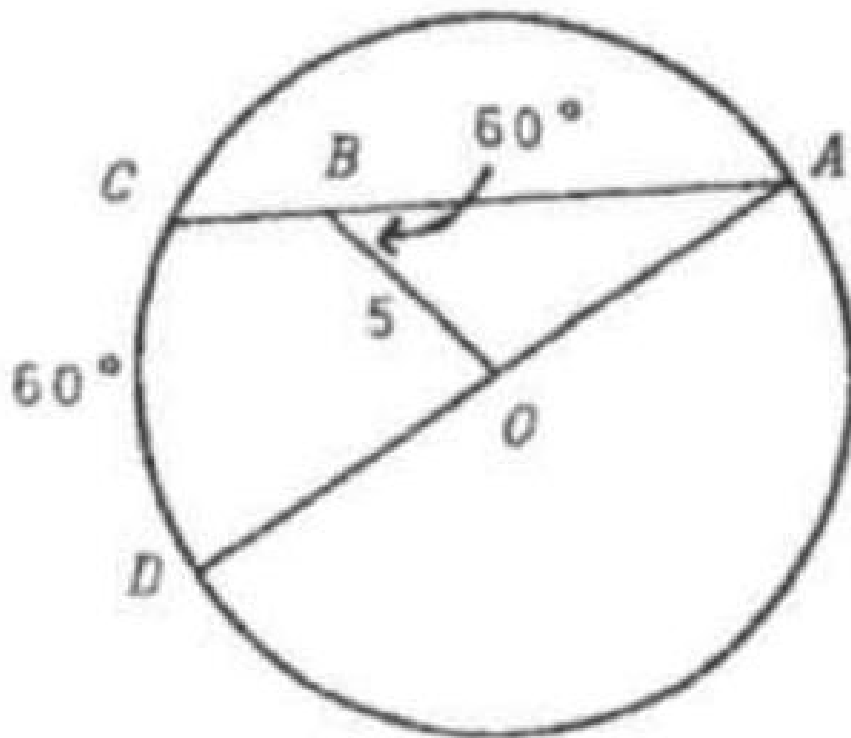
(1985 AMC) In a circle with center O, AD is a diameter, ABC is a chord, $BO = 5$ and $\angle ABO = CD = 60°$. The length of BC is

(A) 3

(B) $3 + \sqrt{3}$

(C) $5 - \frac{\sqrt{3}}{2}$

(D) 5

(E) none of the above

Solution: (D).

Since $CD = 60°$, $\angle BAO = 30°$. Therefore, $\triangle ABO$ is a $30° - 60° - 90°$ right triangle.

Since $BO = 5$, $AO = 5\sqrt{3}$, $AB = 10$.

Connect CD. Since AD is the diameter, $\triangle ADC$ is a $30°- 60° - 90°$ right triangle. $AD = 2AO = 10\sqrt{3}$.
$AC = \frac{\sqrt{3}}{2} \cdot 10\sqrt{3} = 15, BC = AC - AB = 15 - 10 = 5.$