Example 9

(AMC) In circle O chord AB is produced so that BC equals a radius of the circle. CO is drawn and extended to $D.AO$ is drawn. Which of the following expresses the relationship between angles x and y ?

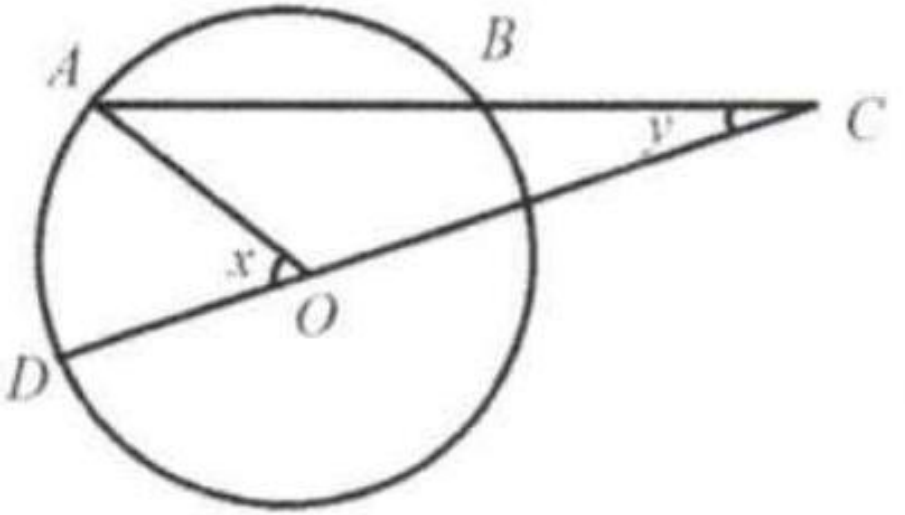
(A) $x = 3y$

(B) $x = 2y$

(C) $x = 60^\circ$

(D) there is no special relationship between x and y or $x = 3y$, depending upon the length of AB.

(E) $x = 2y$



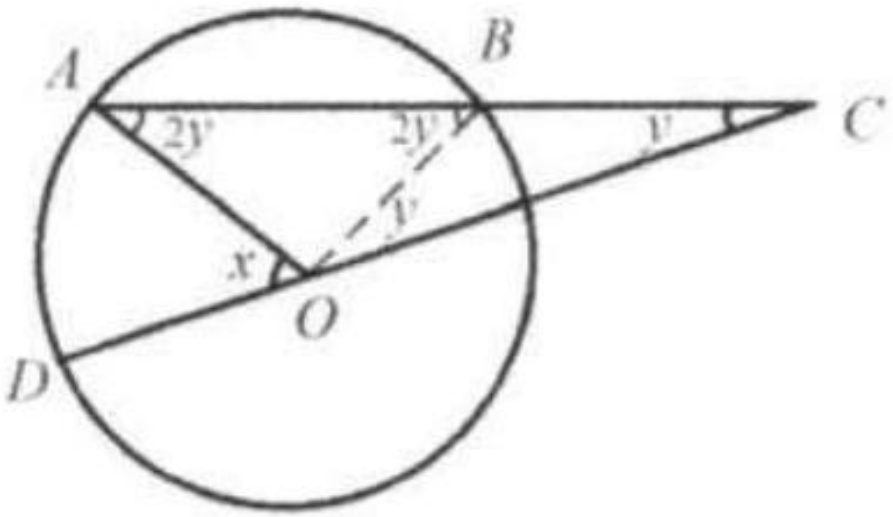
Solution: (A).

Connect OB.

Since $OB = BC, \angle BOC = \angle BCO = y$.

Since $\angle OBA$ is the exterior angle of $\triangle OBC, \angle OBA = 2y$.

Since $OB = OA, \angle OAB = \angle OBA = 2y$.



since $\angle AOD$ is the exterior angle of $\triangle AOC, \angle AOD = 2y + y = 3y$.