Problem

(AMC) In the adjoining figure, CD is the diameter of a semi-circle with center O. Point A lies on the extension of DC past C; point E lies on the semi-circle, and B is the point of intersection (distinct from E) of line segment AE with the semicircle. If length AB equals length OD, and the measure of $\angle EOD$ is $45°$, then the measure of $\angle BAO$ is

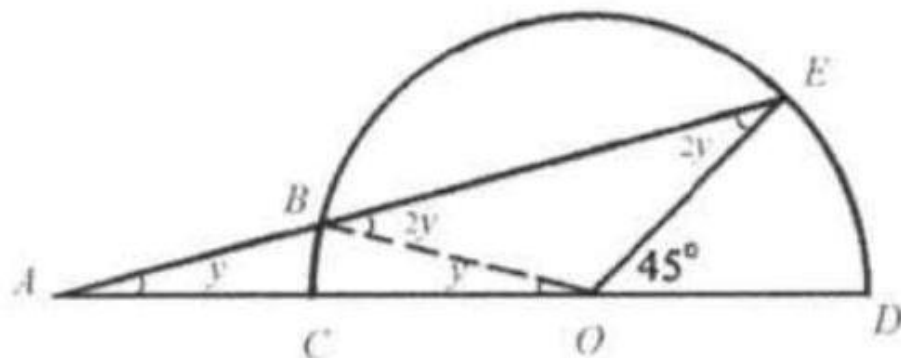(A) $10°$
(B) $15°$
(C) $20°$
(D) $25°$
(E) $30°$

Solution

(B).
Connect OB.
Since $AB = OD = OB, \angle BAO = \angle BOA = y$.
Since $\angle OBE$ is the exterior angle of $\triangle ABO$, $\angle OBE = 2y$.
Since $OB = OE, \angle OBE = \angle OEB = 2y$.
Since $\angle EOD$ is the exterior angle of $\triangle AOE$,

$\angle EOD = 2y + y = 3y = 45°.$
$y = 15°.$