

## Problem 9

### 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  $45^\circ$ , then the measure of  $\angle BAO$  is

- (A)  $10^\circ$
- (B)  $15^\circ$
- (C)  $20^\circ$
- (D)  $25^\circ$
- (E)  $30^\circ$

### Solution

(B).

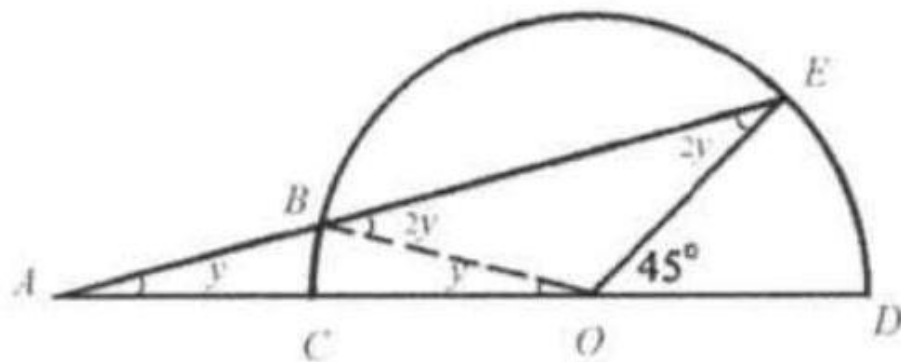
Connect  $OB$ .

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  $\triangle AOE$ ,



$$\angle EOD = 2y + y = 3y = 45^\circ.$$

$$y = 15^\circ.$$