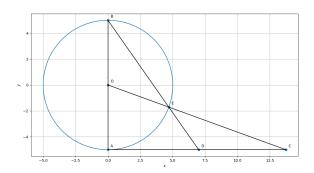
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Assignment-1 Class 10 ICSE-2019

AI21BTECH11026 SAANVI AMRUTHA

Question 7(a)

In the given figure AC is a tangent to the circle with centre O. If $\angle ADB = 55^{\circ}$, find x and y. Give reasons for your answers.



Solution:

Given,

$$\angle BDA = 55^{\circ}$$
 (1)

$$\angle OCA = x^{\circ}$$
 (2)

$$\angle AOE = y^{\circ}$$
 (3)

As AC is a tangent to the given circle,

$$\angle OAC = \angle BAD = 90^{\circ}$$
 (4)

Angle Sum Property for $\triangle OAC$,

$$\angle OAC + \angle OCA + \angle AOC = 180^{\circ}$$
 (5)

$$90^{\circ} + x^{\circ} + y^{\circ} = 180^{\circ}$$
 (6)

$$x^{\circ} + y^{\circ} = 90^{\circ} \qquad (7)$$

Angle Sum Property for $\triangle ABD$,

$$\angle ABD + \angle BAD + \angle BDA = 180^{\circ}$$
 (8)

$$\angle ABD + 90^{\circ} + 55^{\circ} = 180^{\circ}$$
 (9)

$$\angle ABD = 35^{\circ}$$
 (10)

Let the radius of the circle be r.

$$\implies OB = OE = r$$
 (11)

Then, $\triangle BOE$ is an isosceles triangle.

$$\implies \angle ABD = \angle BEO$$
 (12)

In a triangle, exterior angle is equal to sum of the two opposite interior angles.

$$\implies \angle AOE = \angle ABD + \angle BEO$$
 (13)

$$\implies \qquad y = 2(\angle ABD) \tag{14}$$

$$\implies \qquad y = 70^{\circ} \tag{15}$$

$$\implies x = 20^{\circ}$$
 (16)