

# AI1103 Assignment-1

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$$\angle BOE + y^\circ = 180^\circ$$

$$\angle BOE = 180 - y$$

Let the radius of the circle be 'r'.

then,

$$OB=OE=r$$

Then the length of the chord BE becomes  $2r \cos 35^\circ$ .

Applying 'cosine' rule in  $\Delta BOE$ ,

$$(BE)^2 = (OB)^2 + (OE)^2 - 2 \cdot (OB) \cdot (OE) \cdot \cos(\angle BOE)$$

$$(2r \cos 35^\circ)^2 = r^2 + r^2 - 2 \cdot r \cdot r \cdot \cos(180 - y)$$

$$4r^2 \cos^2 35^\circ = 2r^2 - 2r^2 \cos(180-y)$$

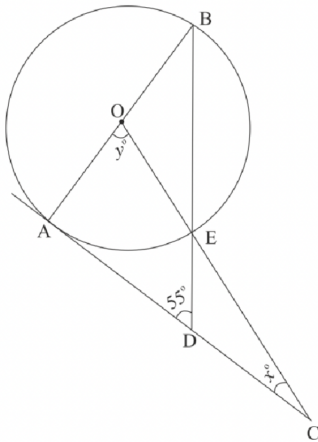
$$2\cos^2 35^\circ = 1 - \cos(180-y)$$

$$\cos(180-y) = -\cos 70^\circ \quad (\because 1-\cos^2\theta = \sin^2\theta)$$

$$\cos(180-y) = \cos(180-70)$$

$$\therefore y = 70^\circ$$

$$\therefore x = 20^\circ \quad (\because x=90-y)$$



**Solution:** Given,

$$\angle BDA=55^\circ, \angle OCA=x^\circ, \angle AOC=y^\circ$$

As AC is a tangent to the given circle,  
 $\angle OAC = \angle BAD = 90^\circ$

### Angle Sum Property for $\triangle OAC$ ,

$$\angle OAC + \angle OCA + \angle AOC = 180^\circ$$

$$90^\circ + x^\circ + y^\circ = 180^\circ$$

$$x^\circ + y^\circ = 90^\circ$$

Angle Sum Property for  $\triangle ABD$ ,

$$\angle ABD + \angle BAD + \angle BDA = 180^\circ$$

$$\angle ABD + 90^\circ + 55^\circ = 180^\circ$$

$$\angle ABD = 35^\circ$$