

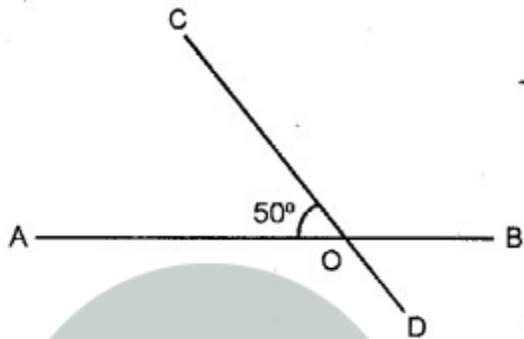
# Properties of Angles and Lines

## EXERCISE 25 (A)

### Question 1.

Two straight lines AB and CD intersect each other at a point O and angle AOC =  $50^\circ$  ; find :

- (i) angle BOD
- (ii)  $\angle AOD$
- (iii)  $\angle BOC$



### Solution:

(i)  $\angle BOD = \angle AOC$

(Vertically opposite angles are equal)

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$$\therefore \angle BOD = 50^\circ$$

(ii)  $\angle AOD$

$$\angle AOD + \angle BOD = 180^\circ$$

$$\angle AOD + 50^\circ = 180^\circ \text{ [From (i)]}$$

$$\angle AOD = 180^\circ - 50^\circ$$

$$\angle AOD = 130^\circ$$

(iii)  $\angle BOC = \angle AOD$

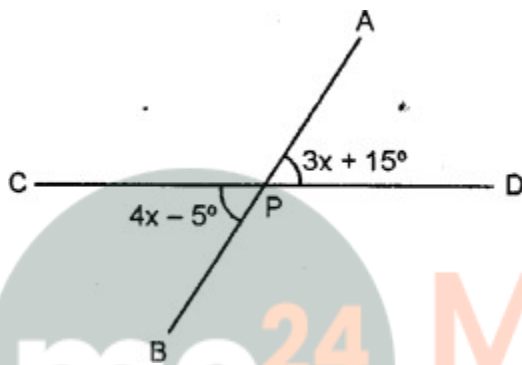
(Vertically opposite angles are equal)

$$\therefore \angle BOC = 130^\circ$$

### Question 2.

The adjoining figure, shows two straight lines AB and CD intersecting at point P.

If  $\angle BPC = 4x - 5^\circ$  and  $\angle APD = 3x + 15^\circ$ ; find :



(i) the value of x.

(ii)  $\angle APD$

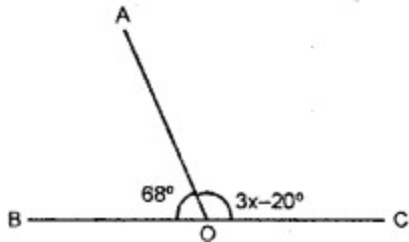
(iii)  $\angle BPD$

(iv)  $\angle BPC$

**Solution:**

### Question 3.

The given diagram, shows two adjacent angles AOB and AOC, whose exterior sides are along the same straight line. Find the value of x.



**Solution:**

Since, the exterior arms of the adjacent angles are in a straight line ; the adjacent angles are supplementary

$$\therefore \angle AOB + \angle AOC = 180^\circ$$

$$\Rightarrow 68^\circ + 3x - 20^\circ = 180^\circ$$

$$\Rightarrow 3x = 180^\circ + 20^\circ - 68^\circ$$

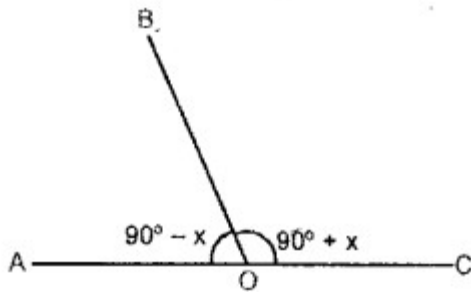
$$\Rightarrow 3x = 200^\circ - 68^\circ \Rightarrow 3x = 132^\circ$$

$$x = \frac{132}{3}^\circ = 44^\circ$$

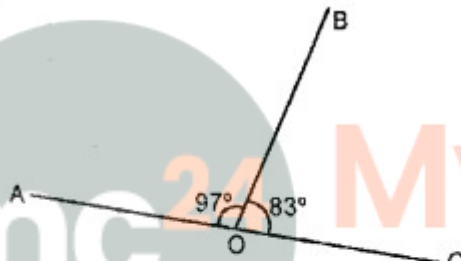
**Question 4.**

Each figure given below shows a pair of adjacent angles AOB and BOC. Find whether or not the exterior arms OA and OC are in the same straight line.

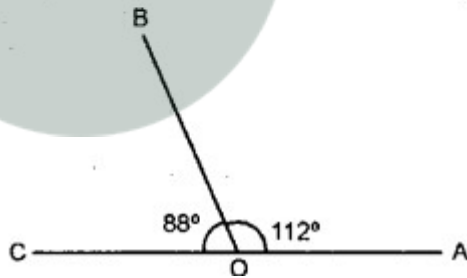
(i)



(ii)



(iii)



**Solution:**

(i)  $\angle AOB + \angle COB = 180^\circ$

Since, the sum of adjacent angles AOB and COB =  $180^\circ$

$$(90^\circ - x) + (90^\circ + x) = 180^\circ$$

$$\Rightarrow 90^\circ - x + 90^\circ + x = 180^\circ$$

$$\Rightarrow 180^\circ = 180^\circ$$

The exterior arms. OA and OC are in the same straight line.

(ii)  $\angle AOB + \angle BOC = 97^\circ + 83^\circ = 180^\circ$

$\Rightarrow$  The sum of adjacent angles AOB and BOC is  $180^\circ$ .

$\therefore$  The exterior arms OA and OC are in the same straight line.

(iii)  $\angle COB + \angle BOA = 88^\circ + 112^\circ = 200^\circ$ ; which is not  $180^\circ$ .

$\Rightarrow$  The exterior arms OA and OC are not in the same straight line.

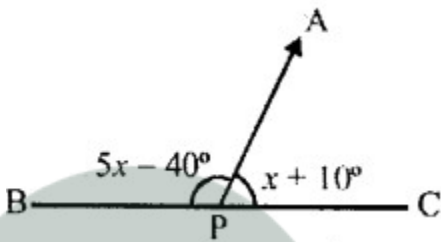
**Question 5.**

A line segment AP stands at point P of a straight line BC such that  $\angle APB = 5x - 40^\circ$  and  $\angle APC = x + 10^\circ$ ; find the value of x and angle APB.

**Solution:**

AP stands on BC at P and

$\angle APB = 5x - 40^\circ$ ,  $\angle APC = x + 10^\circ$



(i)  $\because$  APE is a straight line

$$\angle APB + \angle APC = 180^\circ$$

$$\Rightarrow 5x - 40^\circ + x + 10^\circ = 180^\circ$$

$$\Rightarrow 6x - 30^\circ = 180^\circ$$

$$\Rightarrow 6x = 180^\circ + 30^\circ = 210^\circ$$

$$x = \frac{210}{6}^\circ = 35^\circ$$

(ii) and  $\angle APB = 5x - 40^\circ = 5 \times 35^\circ - 40^\circ$

$$= 175^\circ - 40^\circ = 135^\circ$$

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