

# Mathematics

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(Chapter – 6) (Lines and Angles)(Exemplar Problems)

(Class – IX)

## Exercise 6.4

### Question 1:

If two lines intersect, prove that the vertically opposite angles are equal.

### Answer 1:

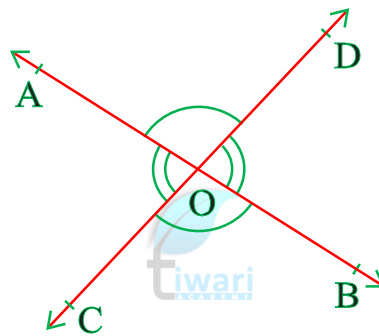
Given:

Two lines AB and CD intersect at point O.

To prove:

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

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



Proof:

(i) Since, ray OA stands on line CD.

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

... (i)

[Linear pair axiom]

Similarly, ray OD stands on line AB.

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

... (ii)

From equations (i) and (ii), we get

$$\angle AOC + \angle AOD = \angle AOD + \angle BOD$$

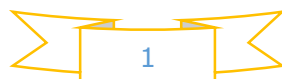
$$\Rightarrow \angle AOC = \angle BOD$$

(ii) Since, ray OD stands on line AB.

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

... (iii)

[Linear pair axiom]



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Similarly, ray OB stands on line CD.

$$\therefore \angle DOD + \angle BOC = 180^\circ \quad \dots \text{(iv)}$$

From equations (iii) and (iv), we get

$$\begin{aligned} \angle AOD + \angle BOD &= \angle DOB + \angle BOC \\ \Rightarrow \angle AOD &= \angle BOC \end{aligned}$$

