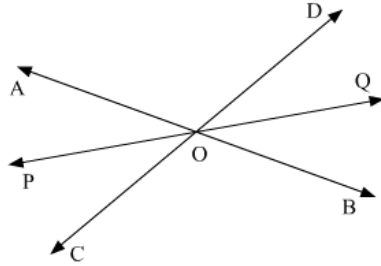## Lines and Angles Ex 8.3 Q6

Answer :

Let AB and CD intersect at a point O

Also, let us draw the bisector OP of $\angle AOC$.

Therefore,

$$\angle AOP = \angle POC \qquad \text{(i)}$$

Also, let's extend OP to Q.

We need to show that, OQ bisects $\angle BOD$.

Let us assume that OQ bisects $\angle BOD$, now we shall prove that POQ is a line.

We know that,

$\angle AOC$ and $\angle DOB$ are vertically opposite angles. Therefore, these must be equal, that is:

$$\angle AOC = \angle DOB \qquad \text{(ii)}$$

$\angle AOP$ and $\angle BOQ$ are vertically opposite angles. Therefore,

$$\angle AOP = \angle BOQ$$

Similarly,

$$\angle POC = \angle DOQ$$

We know that:

$$\angle AOP + \angle AOD + \angle DOQ + \angle POC + \angle BOC + \angle BOQ = 360^0$$
$$2\angle AOP + \angle AOD + 2\angle DOQ + \angle BOC = 360^0$$
$$2\angle AOP + 2\angle AOD + 2\angle DOQ = 360^0$$
$$2(\angle AOP + \angle AOD + \angle DOQ) = 360^0$$
$$\angle AOP + \angle AOD + \angle DOQ = \frac{360^0}{2}$$
$$\angle AOP + \angle AOD + \angle DOQ = 180^0$$
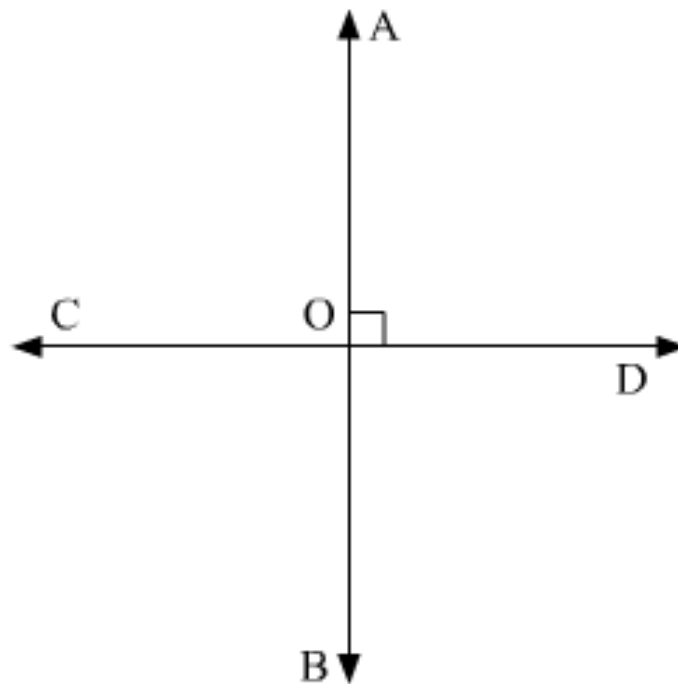
Thus, POQ is a straight line.

Hence our assumption is correct. That is,

We can say that if the two straight lines intersect each other, then the ray opposite to the bisector of one of the angles thus formed bisects the vertically opposite angles.

Lines and Angles Ex 8.3 Q7

Answer :

The given problem can be drawn as :

It is given that

$$\angle AOD = 90^0$$

Also, $\angle AOD$ and $\angle AOC$ form a linear pair.

Therefore, their sum must be equal to 180^0.

$$\angle AOD + \angle AOC = 180^0$$

Substituting, $\angle AOD = 90^0$ above, we get:

$$90^0 + \angle AOC = 180^0$$
$$\angle AOC = 180^0 - 90^0$$
$$\angle AOC = \boxed{90^0}$$

Similarly, we can prove that $\angle BOC = \boxed{90^0}$

and $\angle BOD = \boxed{90^0}$

Hence, we have proved that ,If one of the four angles formed by two intersecting lines is a right angle, then show that each of the four angles is a right angle.

********** END *********