Geometrical Constructions Ex 19.5 Q6

Answer :

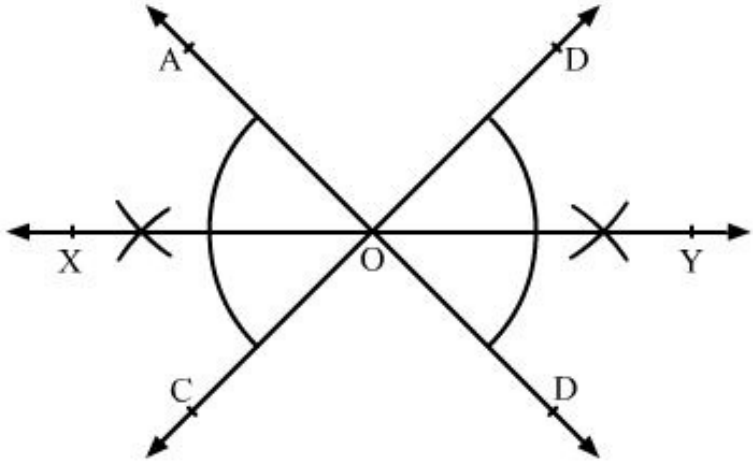
Draw two lines AB and CD intersecting each other at O.
We know that the vertically opposite angles are equal.
∴ ∠BOC = ∠AOD
and ∠AOC = ∠BOD
We bisect angle AOC and draw the bisecting ray as OX.
Similarly, we bisect angle BOD and draw the bisecting ray as OY.
Now
∠XOA + ∠AOD + ∠DOY

$= \frac{1}{2}\angle AOC + \angle AOD + \frac{1}{2}\angle BOD$

$= \frac{1}{2}\angle BOD + \angle AOD + \frac{1}{2}\angle BOD$ [As, ∠AOC = ∠BOD]

$= \angle AOD + \angle BOD$

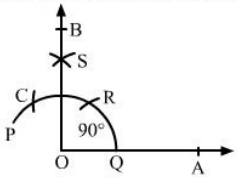
∵ AB is a line.
∴ ∠AOD and ∠BOD are supplementary angles and the sum of these two angles will be 180°.
∴ ∠XOA + ∠AOD + ∠DOY = 180°
We know that the angles on one side of a straight line will always add to 180°.
Also, the sum of the angles is 180°.
∴ XY is a straight line.
Thus, OX and OY are in the same line.



Geometrical Constructions Ex 19.5 Q7

Answer :

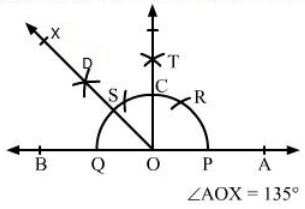
Draw a ray OA.
With a convenient radius and centre at O, draw an arc PQ with the help of a compass intersecting the ray OA at P.
With the same radius and centre at P, draw another arc intersecting the arc PQ at R.
With the same radius and centre at R, draw an arc cutting the arc PQ at C, opposite P.
Taking C and R as the centre, draw two arcs of radius more than half of CR that intersect each other at S.
Join O and S and extend the line to B.
∠AOB is the required angle of 90°.



Geometrical Constructions Ex 19.5 Q8

Answer :

We draw a line AB and mark a point O on it.
With a convenient radius and centre at O, draw an arc PQ with the help of a compass intersecting the line AB at P and Q.
With the same radius and centre at P, draw another arc intersecting the arc PQ at R.
With the same radius and centre at Q, draw one more arc intersecting the arc PQ at S, opposite to P.
Taking S and R as centres and radius more than half of SR, draw two arcs intersecting each other at T.
Join O and T intersecting the arc PQ at C.
Taking C and Q as centres and radius more than half of CQ, draw two arcs intersecting each other at D.
Join O and D and extend it to X to form the ray OX.
∠AOX is the required angle of measure 135°.

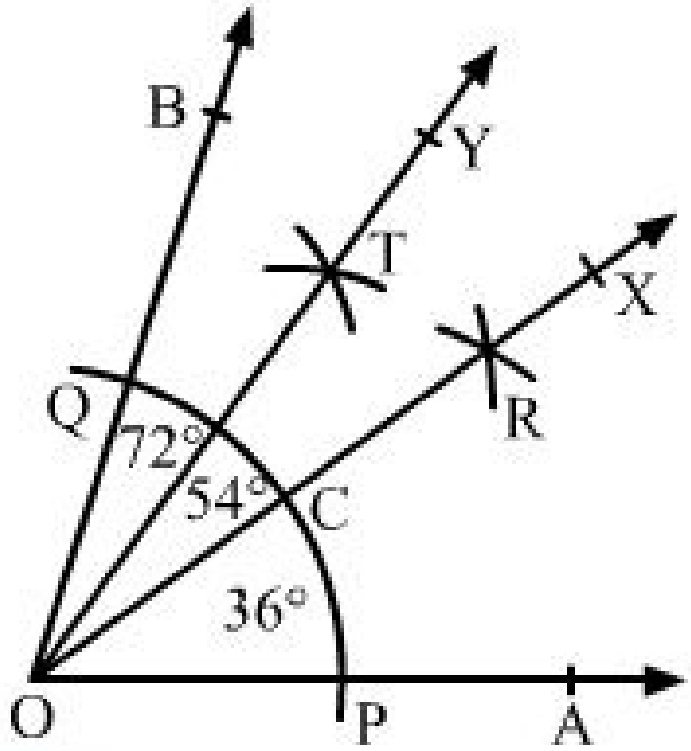


∠AOX = 135°

Geometrical Constructions Ex 19.5 Q9

Answer :

Draw a ray OA.
With the help of a protractor, draw an angle ∠AOB of 72°.
With a convenient radius and centre at O, draw an arc cutting sides OA and OB at P and Q, respectively.
With P and Q as centres and radius more than half of PQ, draw two arcs cutting each other at R.
Join O and R and extend it to X.
OR intersects arc PQ at C.
With C and Q as centres and radius more than half of CQ, draw two arcs cutting each other at T.
Join O and T and extend it to Y.
Now, OX bisects ∠AOB
∴ ∠AOX = ∠BOX = $\frac{72^\circ}{2} = 36^\circ$
Again, OY bisects ∠BOX
∴ ∠XOY = ∠BOY = $\frac{36^\circ}{2} = 18^\circ$
∴ ∠AOX is the required angle of 36° and ∠AOY = ∠AOX + ∠XOY = 36° + 18° = 54°
∴ ∠AOY is the required angle of 54°.



∠AOB = 72°

∠AOX = 36°

∠AOY = 54°

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