Exercise 19.5

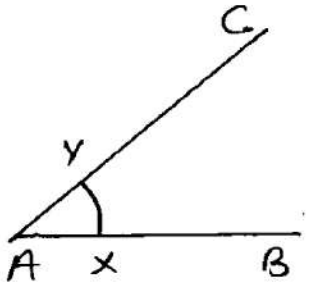
Q.1 Draw an angle and label it as ∠BAC. Construct another angle, equal to ∠BAC.

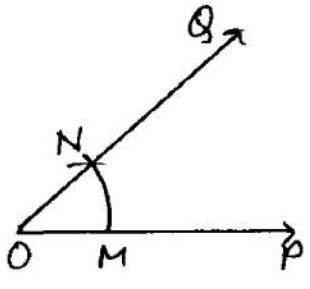
Solution: (i) Construct an angle ∠BAC and draw a ray OP.

(ii) Taking A as centre and suitable radius, construct an arc which intersects AB and AC at points X and Y.

(iii) Taking O as centre and same radius, construct an arc which intersects the arc OP at the point M. Now measure XY with the help of compass.

(iv) Taking M as centre and XY as radius construct an arc which intersects the arc at point N. Here ∠POQ is the required angle.





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Q.2 Draw an obtuse angle. Bisect it. Measure each of the angle so obtained.

Solution:

Construct an obtuse angle ∠BAC.

Taking A as centre with appropriate radius construct an arc which intersects AB and AC at points P and Q

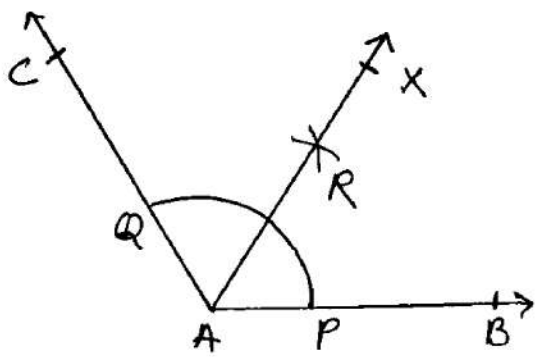
Taking P as centre and radius more than half of PQ construct an arc.

Taking Q as centre and same radius construct another arc which intersects the previous arc at the point R.

Now join A and R and extend it to the point X. So the ray AX is the required bisector of ∠BAC.

By measuring ∠BAR and ∠CAR, we get

$$\angle BAR = \angle CAR = 65^\circ$$



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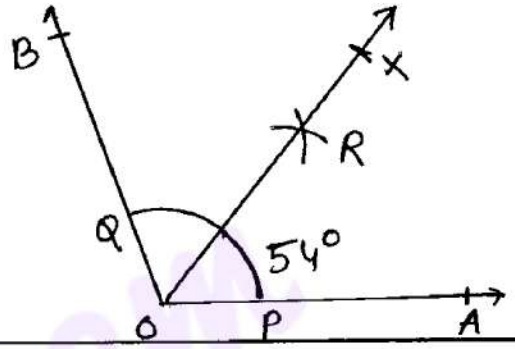
Q3 Using protractor, draw an angle of measure 108°. With this angle as given, draw an angle of 54°.

Solution: Using protractor draw an angle $\angle AOB = 108°$.

$\because \frac{108°}{2} = 54°$

In order to get 54°, we bisect the angle of 108

here $\angle XOA = 54°$



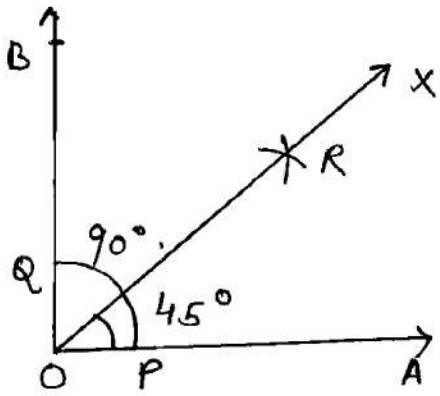
Q4 Using protractor, draw a right angle. Bisect it to get an angle of measure 45°.

Solution Draw an angle of 90° by using protractor.

$\because \frac{90°}{2} = 45°$.

In order to get 45°, we bisect the angle of 90°.

here $\angle AOR = 45°$



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Q.5 Draw a linear pair of angles. Bisect each of the two angles. Verify that the two bisecting rays are perpendicular to each other.

Solution: We know that two adjacent angles which are supplementary are known as linear pair of angles.

Draw a line AB and mark a point O on it. Draw an angle $\angle AOC$, we get $\angle BOC$.

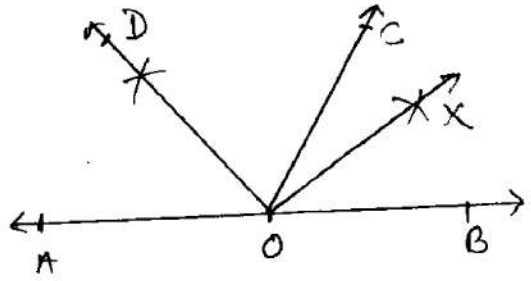
Now bisect $\angle AOC$ and $\angle BOC$ using Compasses and ruler, we get ray OX and OY.

$\because \angle XOY = \angle XOC + \angle COY$

It can be written as

$$\angle XOY = \frac{1}{2}\angle AOC + \frac{1}{2}\angle COY$$

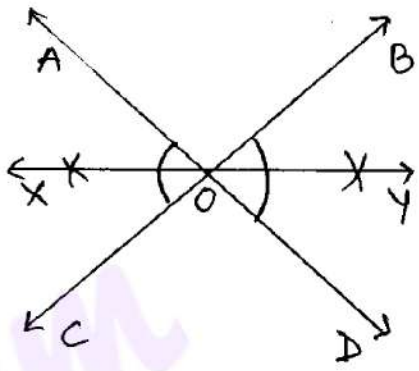
$$= \frac{1}{2}(\angle AOC + \angle COY) = \frac{1}{2} \times 180^\circ = 90^\circ$$



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Q6 Draw a pair of vertically opposite angles. Bisect each of the two angles. Verify that the bisecting rays are in the same line.

Solution: Construct two lines AB and CD which intersect each other at point O.



∵ Vertically opposite angles are equal, we get

$\angle BOC = \angle AOD$, $\angle AOC = \angle BOD$

Now ∵ . . . .

Draw OX an angle bisector of $\angle AOC$ and OY an angle bisector of $\angle BOD$. We get

$$\angle XOA + \angle AOB + \angle BOY = \frac{1}{2}\angle AOC + \angle AOB + \frac{1}{2}\angle BOD$$

$$\because \angle AOC = \angle BOD$$

$$= \frac{1}{2}\angle BOD + \angle AOB + \frac{1}{2}\angle BOD$$

$$= \angle BOD + \angle AOB$$

$$= 180^\circ \quad (\because AB \text{ is a line})$$

Hence XY is a straight line, where OX and OY are in the same line.

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Q.7 Using ruler and compasses only, draw a right angle.

Solution: Construct a ray OA

Taking O as centre and any radius draw an arc PQ

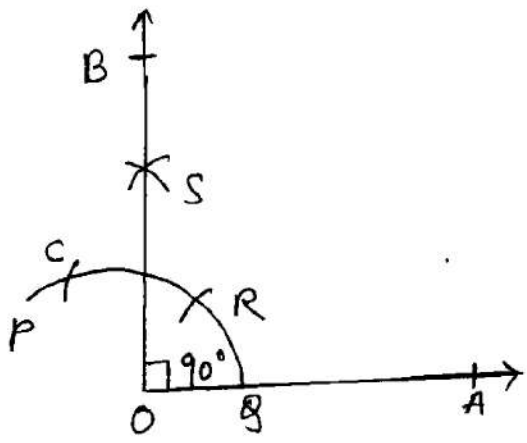
Taking Q as centre and same radius, draw an arc which intersects the arc PQ at the point R.

Again taking R as centre and same radius. draw an arc which cuts the arc at point C.

Using C and R as the centre construct two arcs of radius which is more than half of CR intersecting each other at point S.

Now join the points O and S and extend it to the point B.

Here $\angle AOB = 90^\circ$

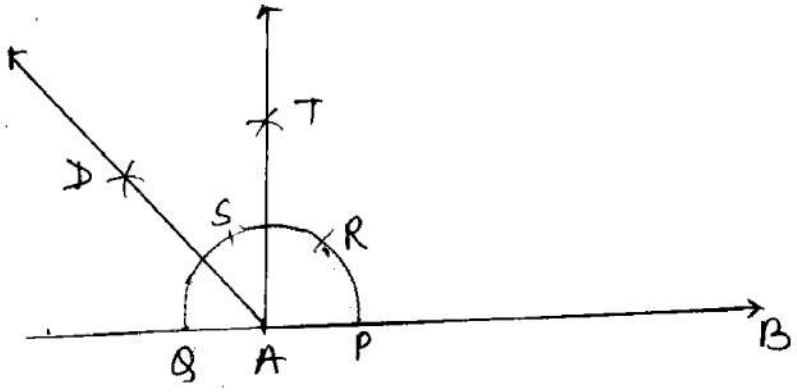


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Q8 Using ruler and compasses only, draw an angle of measure 135°.

Solution:



Here $\angle DAB = 135°$.

Q9 Using a protractor, draw an angle of measure 72°. With this angle as given, draw angles of measure 36° and 54°.

Solution: (i) Construct a ray OA.

(ii) Using protractor construct $\angle AOB = 72°$

(iii) Taking O as centre and suitable radius cuts an arc which intersects arms OA and OB at points P and Q.

(iv) Now by taking P and Q as centre and same radius cut two arcs which meet each other at point R.

(v)

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Now taking C and B as centre construct two arcs which cuts each other at point T.

Now join points O and T.

$\therefore$ OR bisects $\angle AOB$

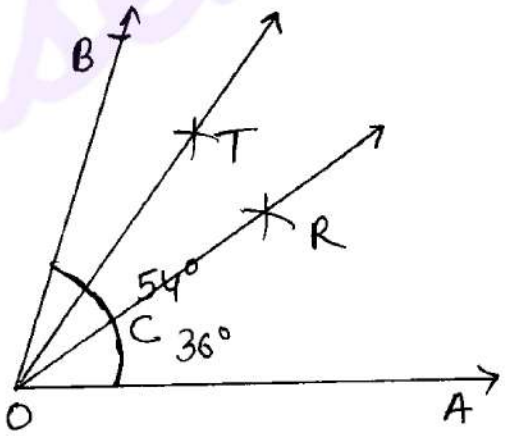
$\angle AOR = \angle BOR = \frac{1}{2} \times 72^\circ = 36^\circ$.

Also OT bisects $\angle BOR$

$\therefore \angle BOT = \angle TOR = \frac{36}{2} = 18^\circ$.

$\therefore \angle AOT = \angle TOR + \angle AOR$

$= 18 + 36^\circ = 54^\circ$.



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