CHAPTER – 14

Practical Geometry

EXERCISE – 14.6

Q. 1

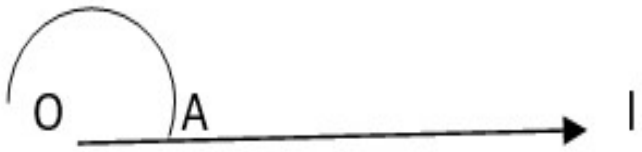
Draw ∠POQ of measure 75° and find its line of symmetry.

Answer:

Steps of Construction-

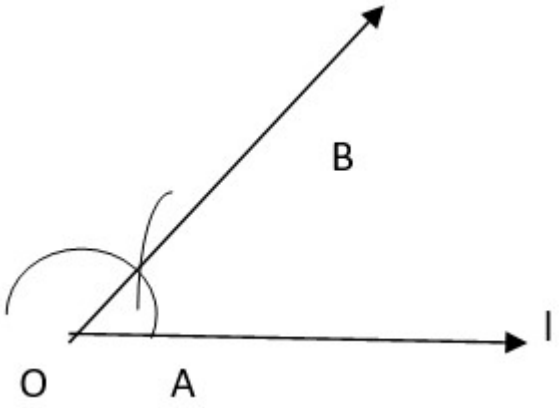
1. Draw a line l and mark a point O on it.

2. Place the pointer of the compasses at O and draw an arc of any radius which intersects the line l at A.



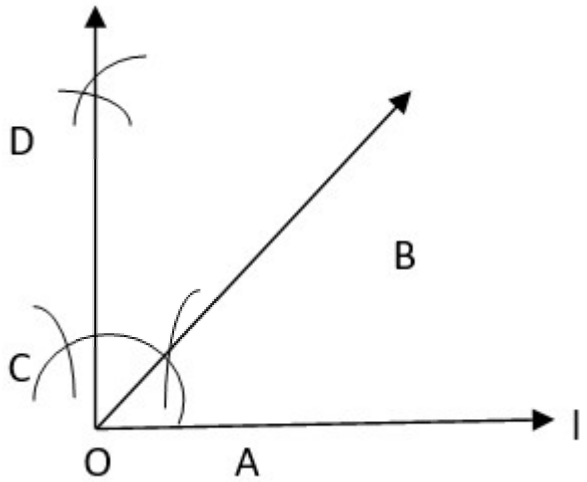
3. Taking same radius, with centre A, cut the previous arc at B.

4. Join OB, then ∠BOA = 60°.



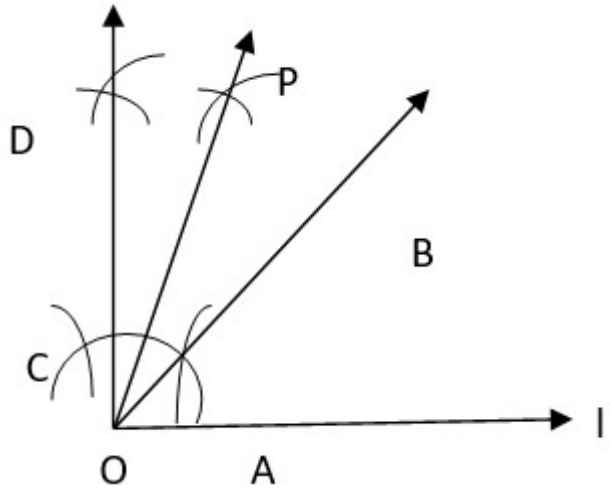
5. Taking same radius, with centre B, cut the previous arc at C.

6. Draw bisector of ∠BOC. The angle is of 90°. Mark it at D. Thus, ∠DOA = 90°



7. Draw OP as bisector of ∠DOB.

8. Thus, ∠POA = 75°



Q. 2

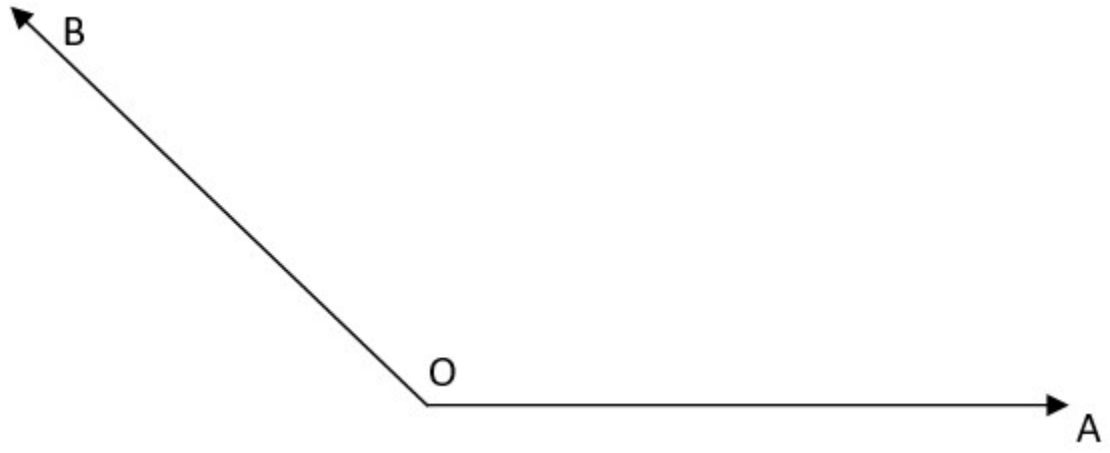
Draw an angle of measure 147° and construct its bisector.

Answer:

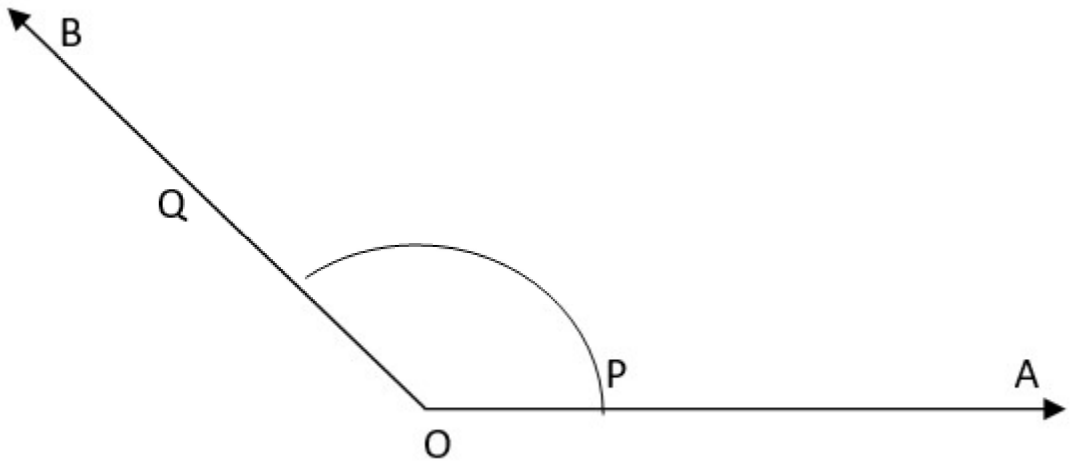
Steps of Construction-

1. Draw a ray OA

2. With the help of protractor, construct ∠AOB = 147°



3. Taking centre O and any convenient radius, draw an arc which intersects the arms OA and OB at P and Q respectively.

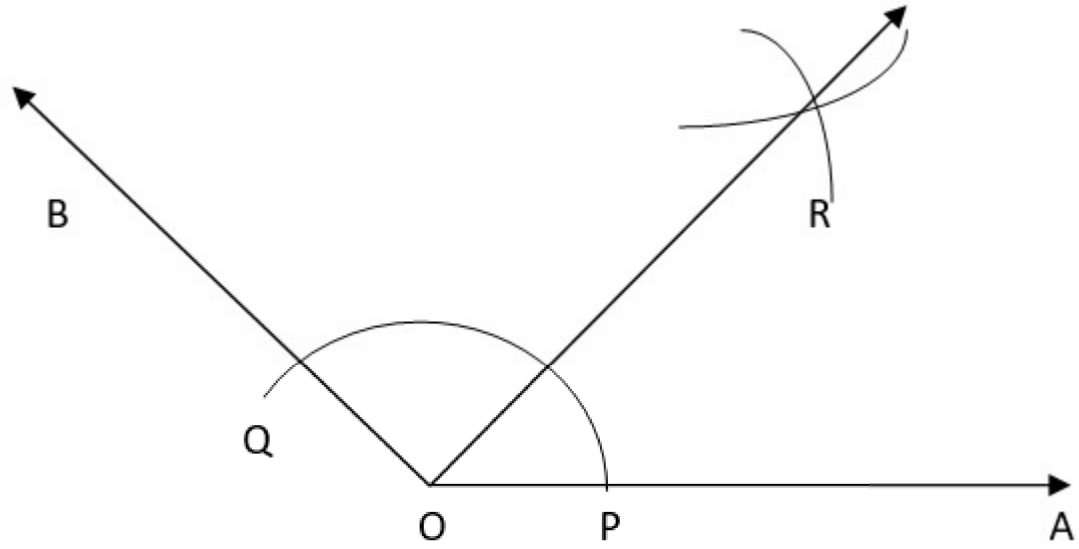


4. Taking P as centre and radius more than half of PQ, draw an arc.

5. Taking Q as centre and with the same radius, draw another arc which intersects the previous at R.

6. Join OR and produce it.

Thus, OR is the required bisector of ∠AOB.



Q. 3

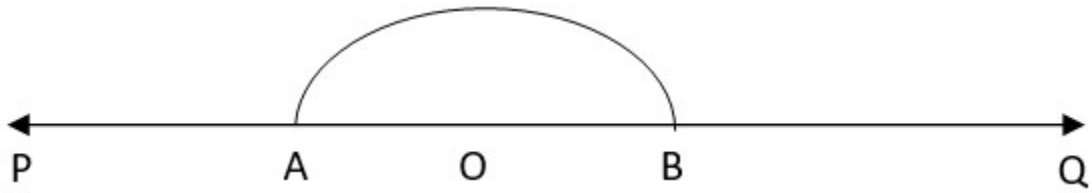
Draw a right angle and construct its bisector.

Answer:

Steps of Construction-

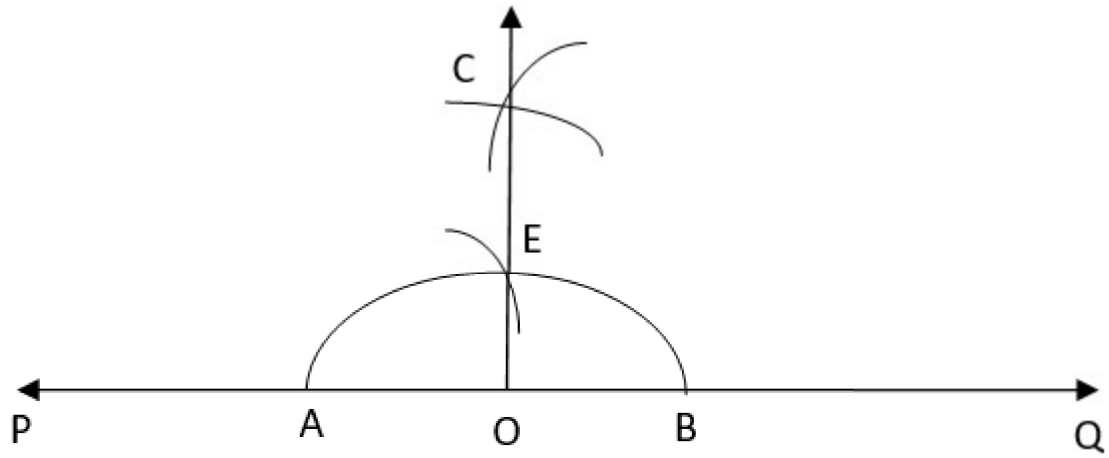
1. Draw a line PQ and take a point O on it.

2. Taking O as centre and convenient radius, draw an arc which intersects PQ at A and B.



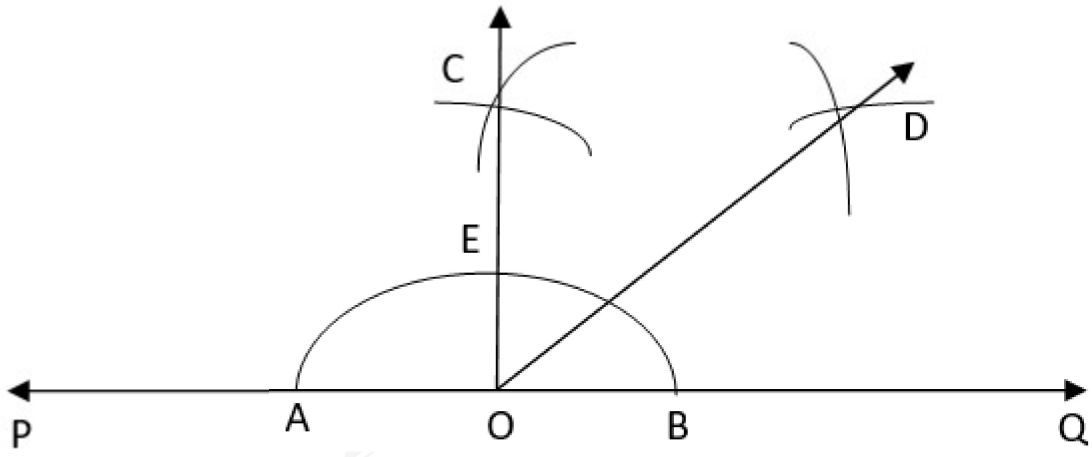
3. Taking A and B as centers and radius more than half of AB, draw two arcs which intersect each other at C.

4. Join OC. Thus, ∠COQ is the required right angle.



5. Taking B and E as centre and radius more than half of BE, draw two arcs which intersect each other at the point D.

6. Join OD. Thus, OD is the required bisector of ∠COQ.



Q. 4

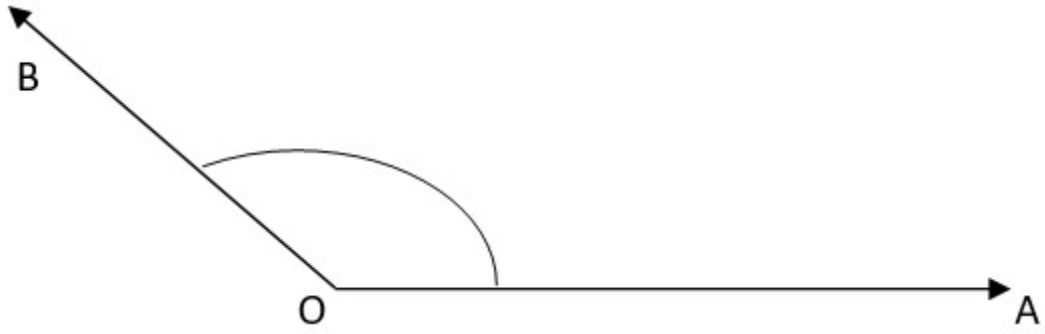
Draw an angle of measure 153° and divide it into four equal parts.

Answer:

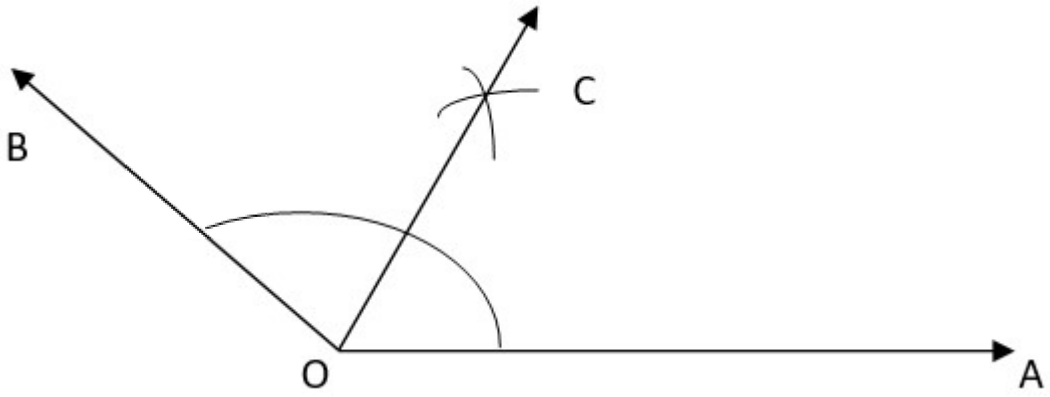
Steps of Construction-

1. Draw a ray OA

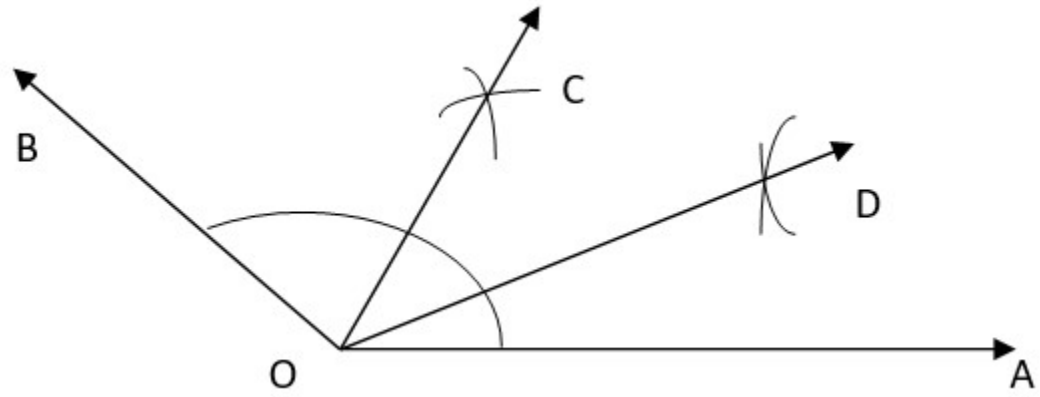
2. At O, with the help of a protractor, construct ∠AOB = 153°



3. Draw OC as the bisector of ∠AOB.

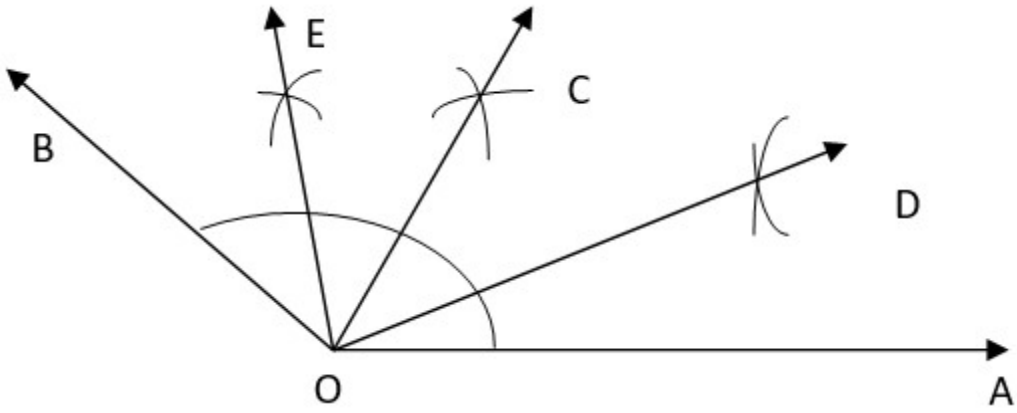


4. Again, draw OD as bisector of ∠AOC.



5. Again, draw OE as bisector of ∠BOC.

Thus, OC, OD and OE divide ∠AOB in four equal.



Q. 5

Construct with ruler and compasses, angles of following measures:

(a) 60° (b) 30°

(c) 90° (d) 120°

(e) 45° (f) 135°

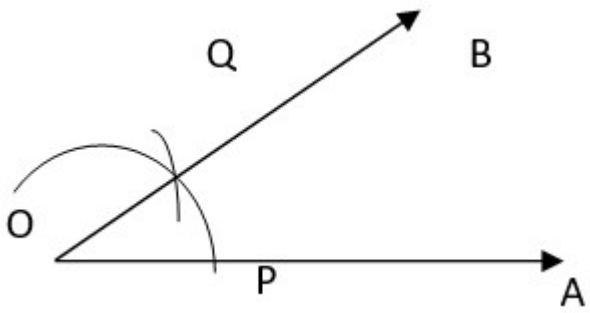
Answer:

(a) Steps of Construction-

1. Draw a ray OA

2. Taking O as centre and convenient radius, mark an arc, which intersects OA at P.

3. Taking P as centre and same radius, cut previous arc at Q. Join OQ. Thus, ∠BOA is required angle of 60°

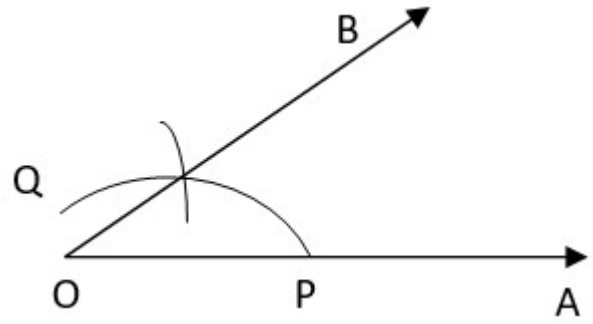


(b) Steps of Construction-

1. Draw a ray OA.

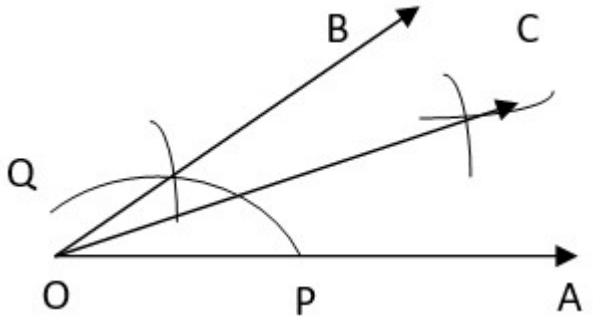
2. Taking O as centre and convenient radius, mark an arc, which intersects OA at P.

3. Taking P as centre and same radius, cut previous arc at Q. Join OQ. Thus, ∠BOA is required angle of 60°.



4. Put the pointer on P and mark an arc.

5. Put the pointer on Q and with same radius, cut the previous arc at C. Thus, ∠COA is required angle of 30°

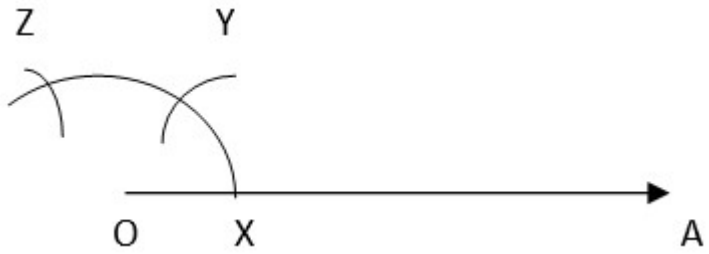


(c) Steps of Construction-

1. Draw a ray OA

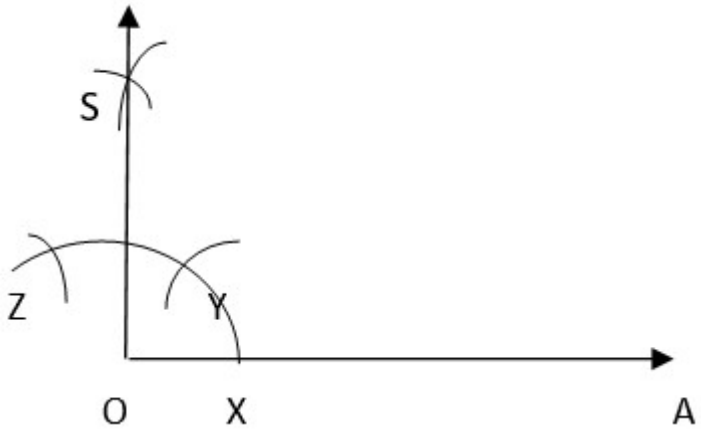
2. Taking O as centre and convenient radius, mark an arc, which intersects OA at X.

3. Taking X as centre and same radius, cut previous arc at Y. Taking Y as centre and same radius, draw another arc intersecting the same arc at Z.



4. Taking Y and Z as centers and same radius, draw two arcs intersecting each other at S.

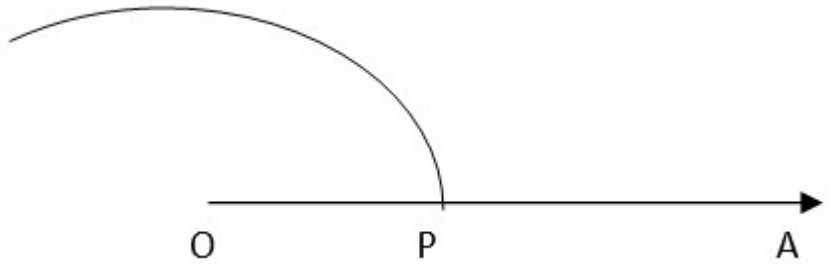
5. Join OS. Thus, ∠SOA is required angle of 90°



(d) Steps of Construction-

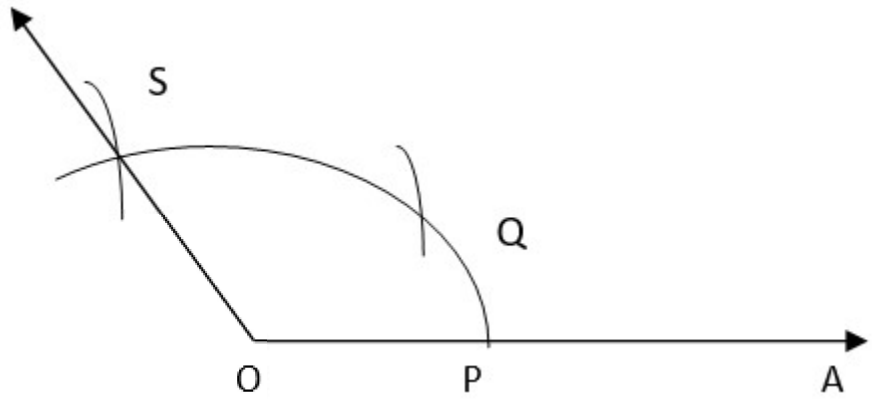
1. Draw a ray OA

2. Taking O as centre and convenient radius, mark an arc, which intersects OA at P.



3. Taking P as centre and same radius, cut previous arc at Q. Taking Q as centre and same radius cut the arc at S. Join OS.

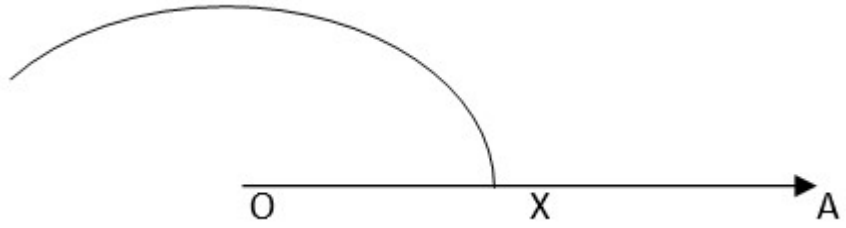
Thus, ∠AOS is required angle of 120°.



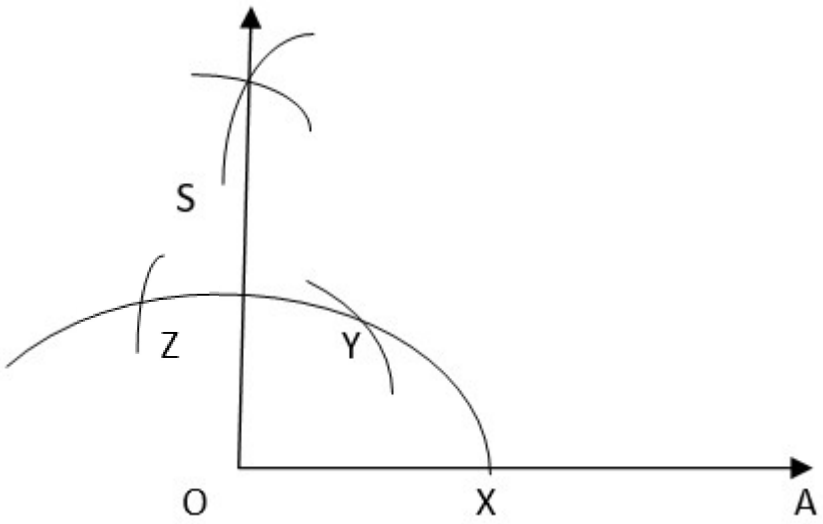
(e) Steps of Construction-

1. Draw a ray OA

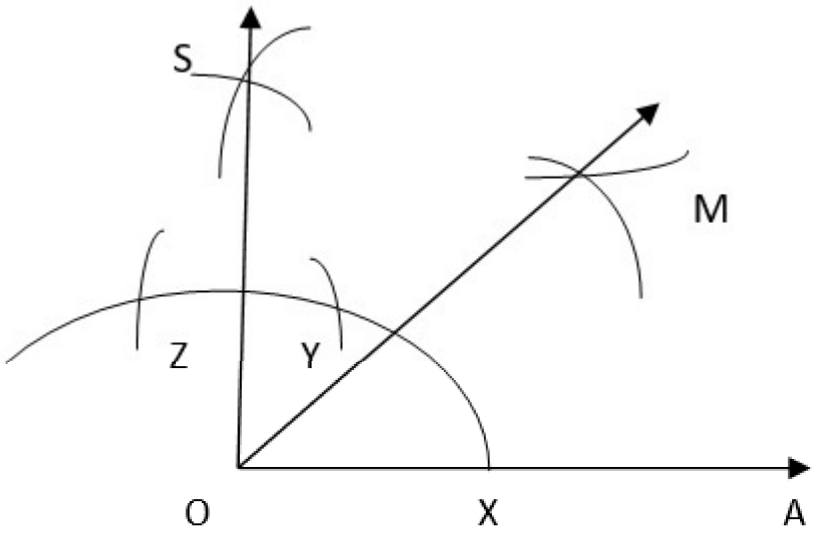
2. Taking O as centre and convenient radius, mark an arc, which intersects OA at X.



3. Taking X as centre and same radius, cut previous arc at Y. Taking Y as centre and same radius, draw another arc intersecting the same arc at Z.
4. Taking Y and Z as centers and same radius, draw two arcs intersecting each other at S. Join OS. Thus, ∠SOA is required angle of 90°.



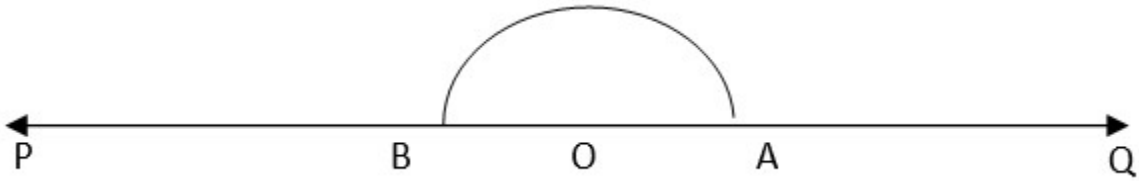
5. Draw the bisector of SOA. Hence, ∠MOA = 45°



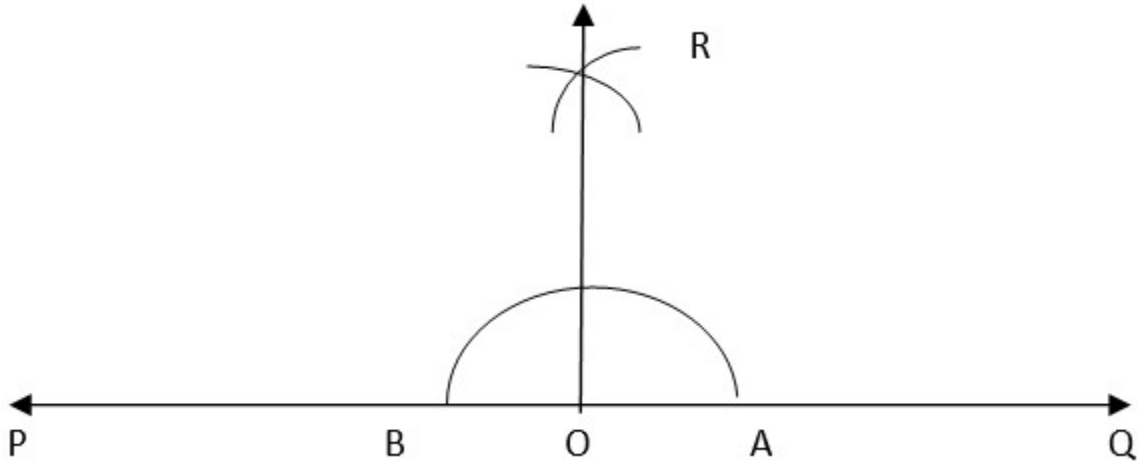
(f) Steps of Construction-

1. Draw a line PQ and take a point O on it.

2. Taking O as centre and convenient radius, mark an arc, which intersects PQ at A and B.

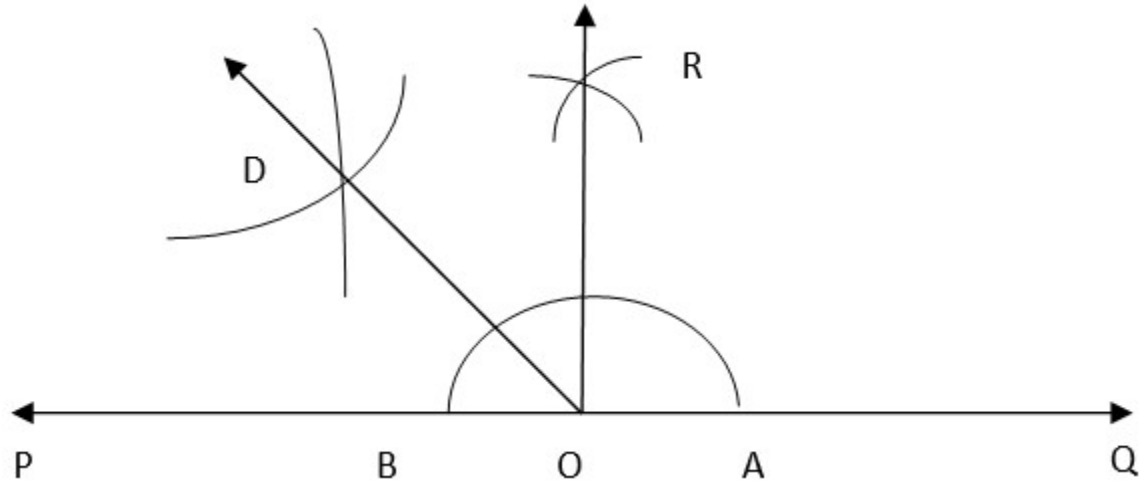


3. Taking A and B as centers and radius more than half of AB, draw two arcs intersecting each other at R. Join OR. Thus, ∠QOR = ∠POR = 90°.



4.

Draw OD the bisector of ∠POR. Thus, ∠QOD is required angle of 135°



Q. 6

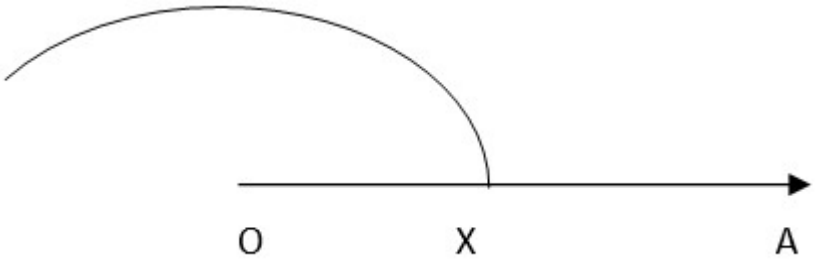
Draw an angle of measure 45° and bisect it.

Answer:

Steps of Construction-

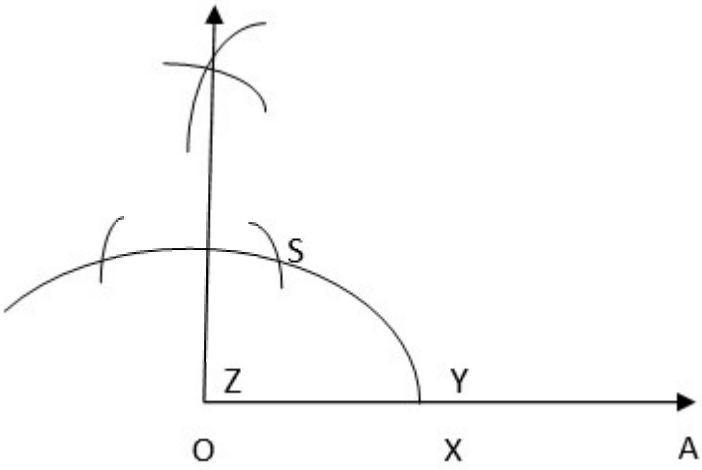
1. Draw a ray OA

2. Taking O as centre and convenient radius, mark an arc, which intersects OA at X.



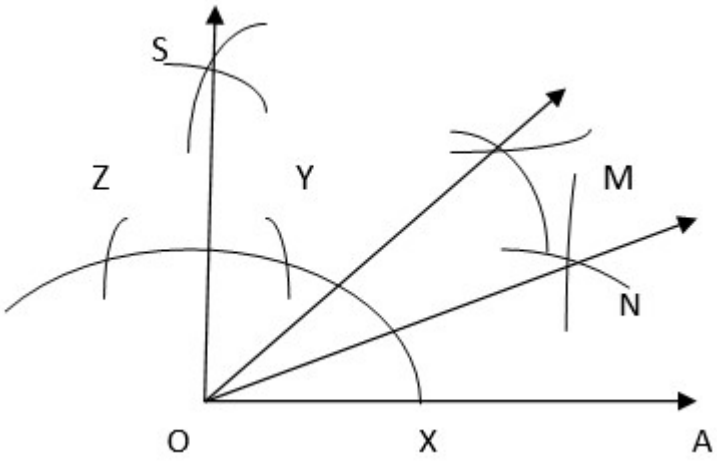
3. Taking X as centre and same radius, cut previous arc at Y. Taking Y as centre and same radius, draw another arc intersecting the same arc at Z.

4. Taking Y and Z as centers and same radius, draw two arcs intersecting each other at S. Join OS. Thus, ∠SOA is required angle of 90°.



5. Draw the bisector of ∠BOA. Hence, ∠MOA = 45°

6. Draw the bisector of ∠MOA. Hence ∠NOA = $22\frac{1}{2}°$,



Q. 7

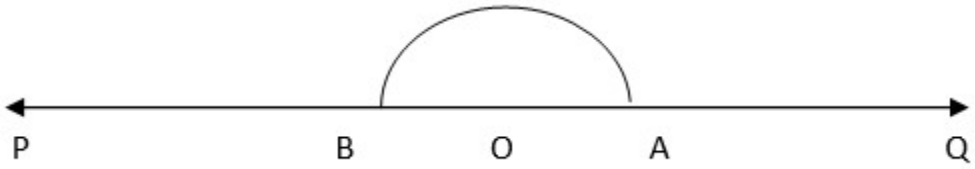
Draw an angle of measure 135° and bisect it.

Answer:

Steps of Construction-

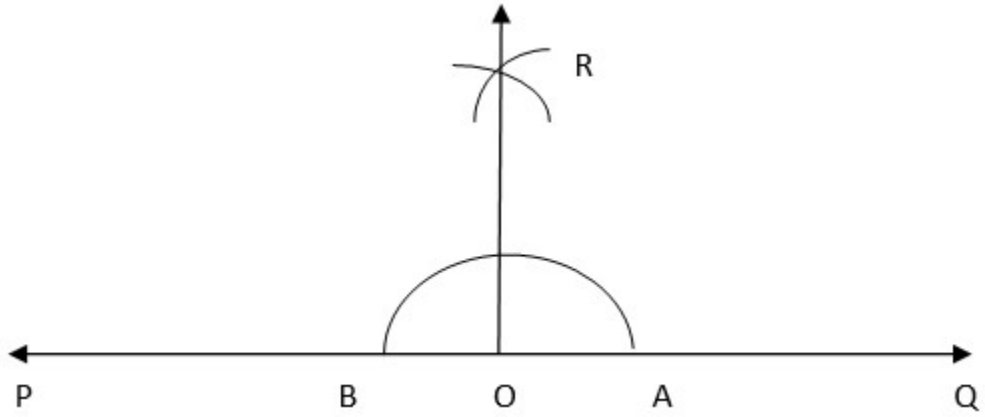
1. Draw a line PQ and take a point O on it.

2. Taking O as centre and convenient radius, mark an arc, which intersects PQ at A and B.

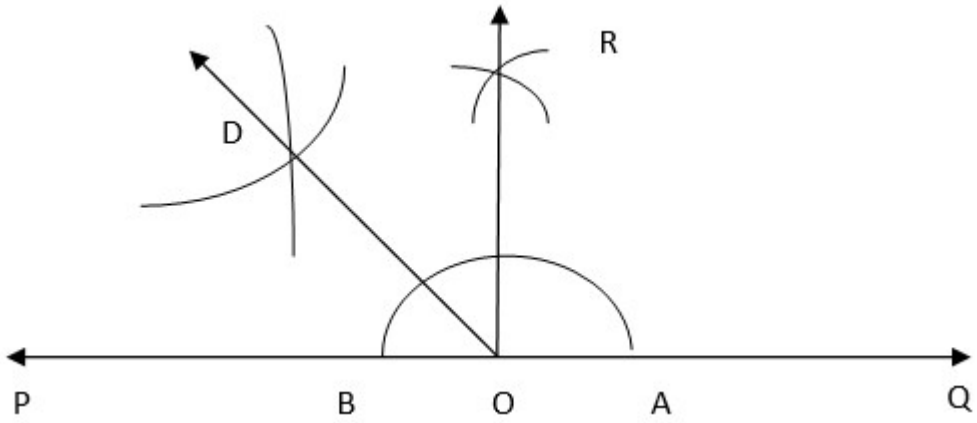


3. Taking A and B as centers and radius more than half of AB, draw two arcs intersecting each other at R.

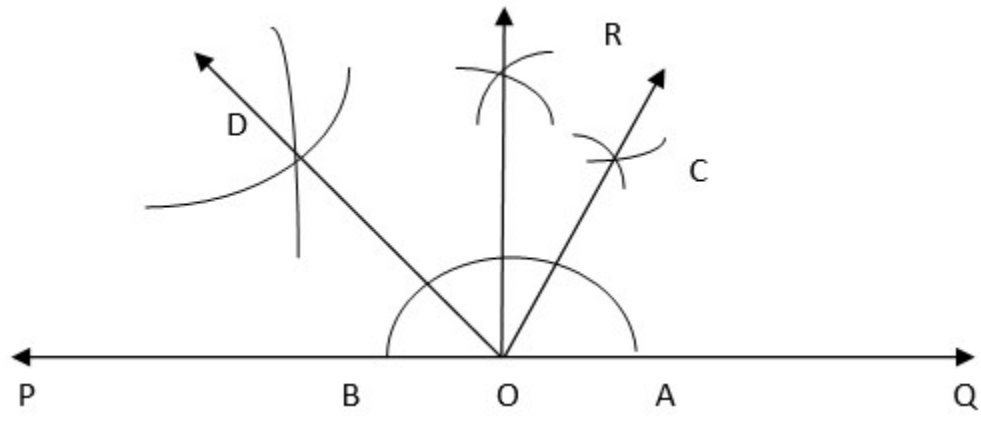
4. Join OR. Thus, ∠QOR = ∠POR = 90°



5. Draw OD the bisector of ∠POR. Thus, ∠QOD is required angle of 135°



6. Draw the bisector of ∠QOD. Hence, $\angle QOC = 67\frac{1}{2}°$



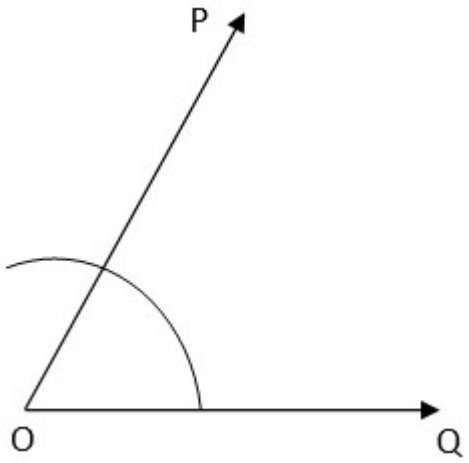
Q. 8

Draw an angle of 70°. Make a copy of it using only a straight edge and compasses.

Answer:

Steps of Construction-

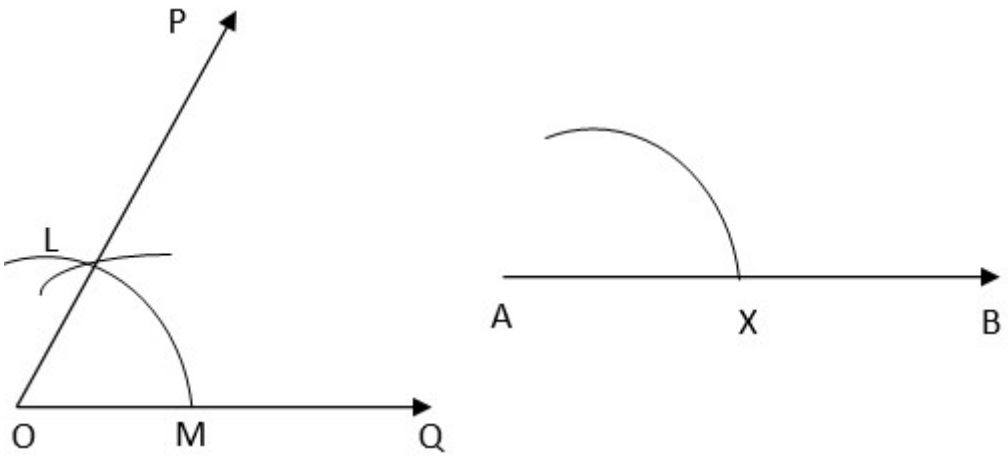
1. Draw an angle 70° with protractor, i.e., ∠POQ = 70°



2. Draw a ray AB

3. Place the compasses at O and draw an arc to cut the rays of ∠POQ at L and M.

4. Use the same compasses, setting to draw an arc with A as centre, cutting AB at X.

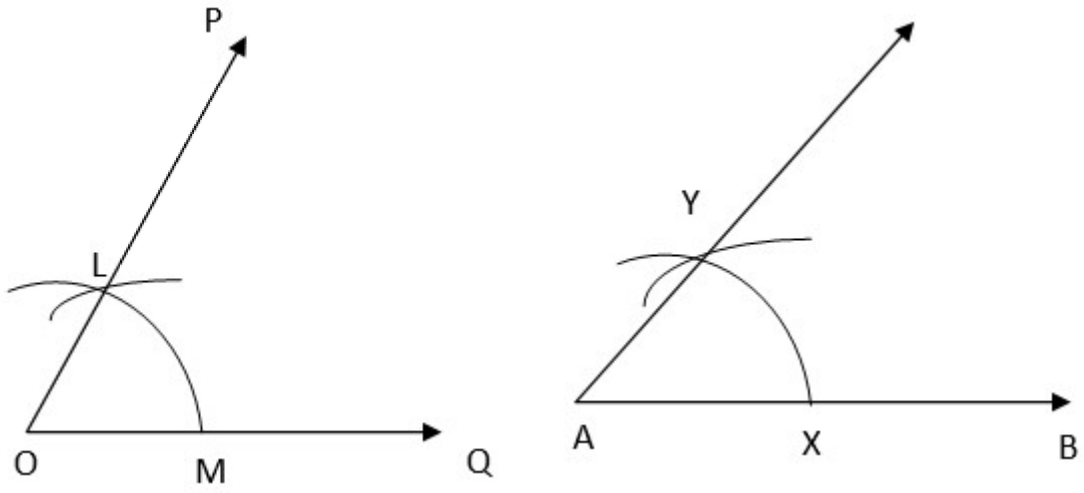


5. Set your compasses setting to the length LM with the same radius.

6. Place the compasses pointer at X and draw the arc to cut the arc drawn earlier at Y.

7. Join AY.

Thus, ∠YAX = 70°



Q. 9

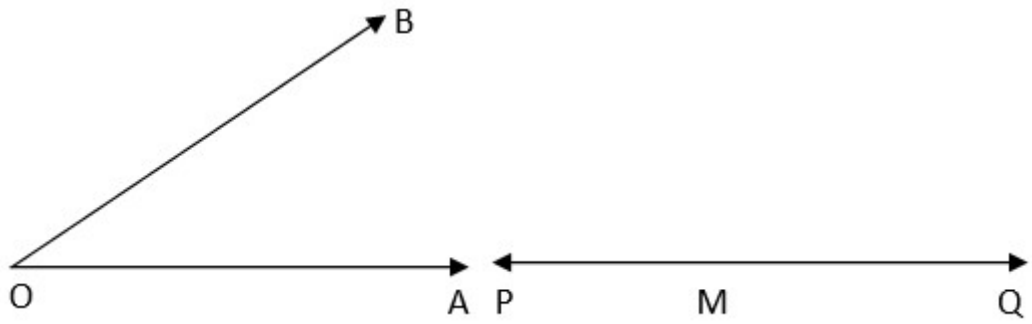
Draw an angle of 40°. Copy its supplementary angle.

Answer:

Steps of Construction-

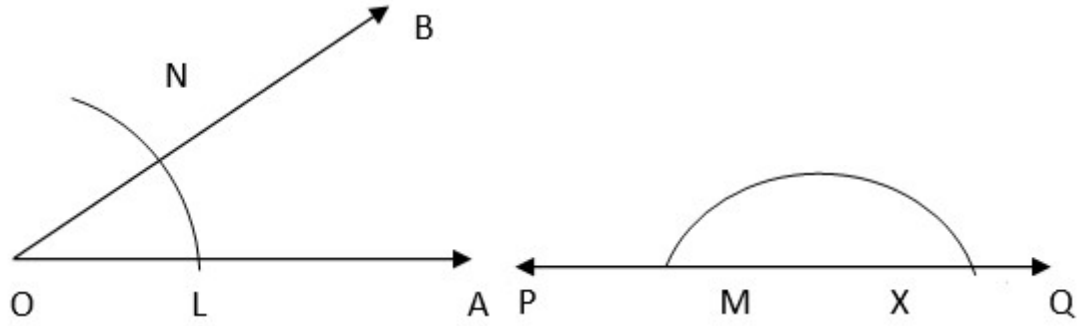
1. Draw an angle of 40° with the help of protractor, naming ∠AOB.

2. Draw a line PQ. Take any point M on PQ.



3. Place the compasses at O and draw an arc to cut the rays of ∠AOB at L and N.

4. Use the same compasses setting to draw an arc O as centre, cutting MQ at X. Set your compasses to length LN with the same radius.



5. Place the compasses at X and draw the arc to cut the arc drawn earlier Y. Join MY.

6. Thus, ∠QMY = 40° and ∠PMY is supplementary of it.