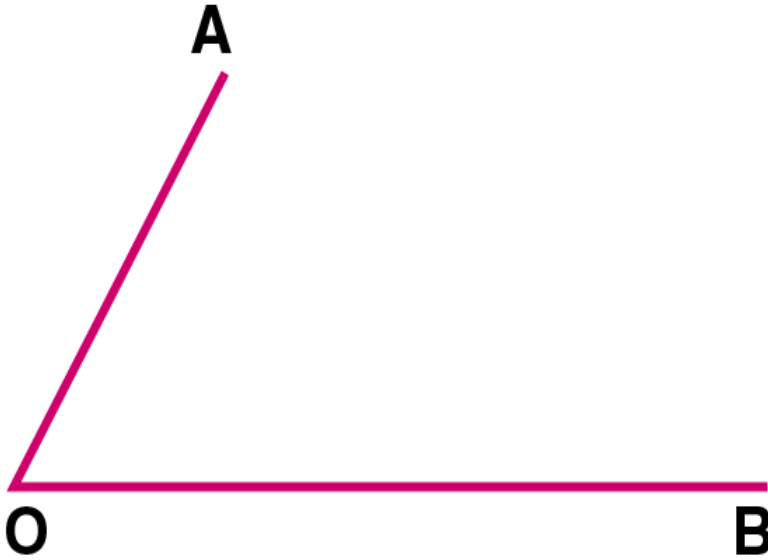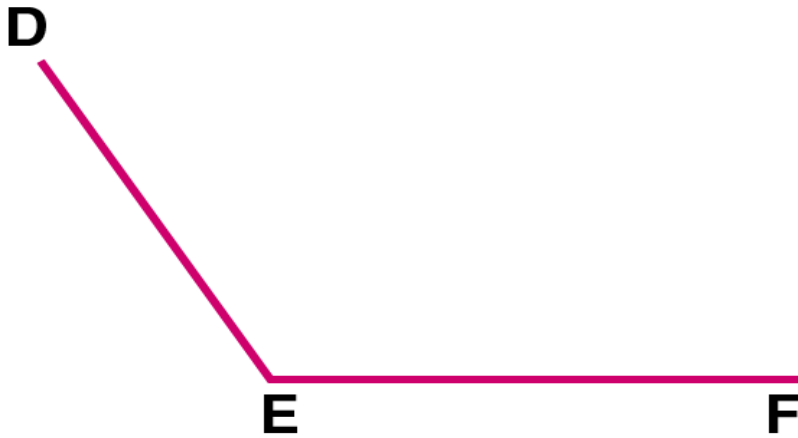EXERCISE 25(C)

1. In your note-book copy the following angles using ruler and a pair compass only.
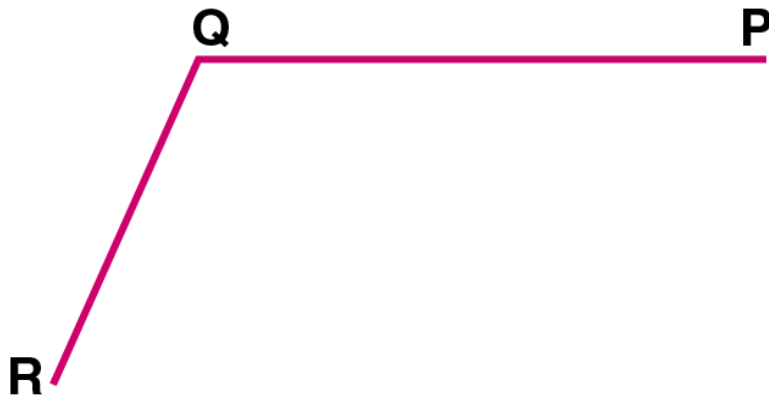
(i)

A

O   **B**

(ii)

D

E   **F**

(iii)

Q ────────────────── **P**

R

Solution:

(i) Steps of Construction:

1. Draw line QR = OB at point Q

A   **P**

D   **S**

O   **C**   **B**   **Q**   **T**   **R**
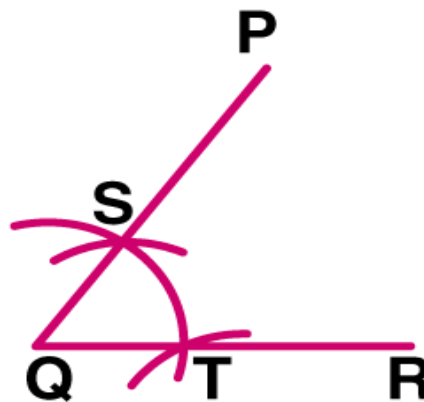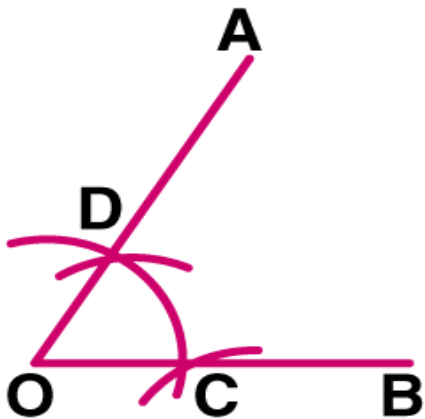
2. Keeping O as centre, draw an arc of any suitable radius, to cut the arms of the angle at points C and D

3. Keeping Q as centre, draw the arc of the same size as drawn for C and D. Let this arc line cuts line QR at point T

4. With the help of compasses, take the distance equal to distance between C and D; and then taking T as centre, draw an arc which cuts the earlier arc at point S.

5. Join QS and produce up to a suitable point P. Now, the obtained ∠PQR , is the angle equal to the given ∠AOB
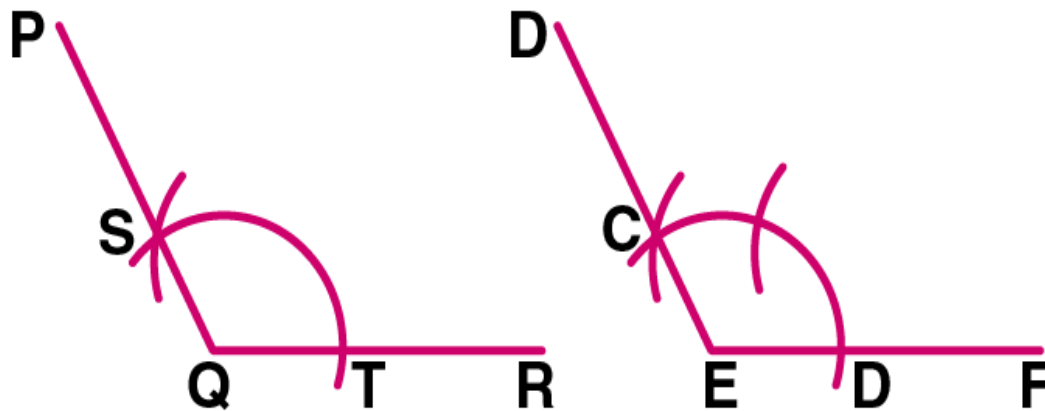
(ii) Steps of Construction:

1. Draw a line EF, at a point E

2. Taking E as centre, draw an arc of any suitable radius, to cut the arms of the angle at points C and D
3. Taking Q as centre, draw an arc of the same size as drawn for points C and D. Let this arc cuts line QR at point T
4. With the help of compasses, take the distance equal to the distance between C and D; and then taking T as centre, draw an arc which cuts the earlier arc at point S
5. Join QS and produce up to a suitable point S. Now, the obtained ∠PQR is the angle equal to the the given ∠DEF

(iii) Steps of Construction:
1. Draw a line AB = QP at a point A
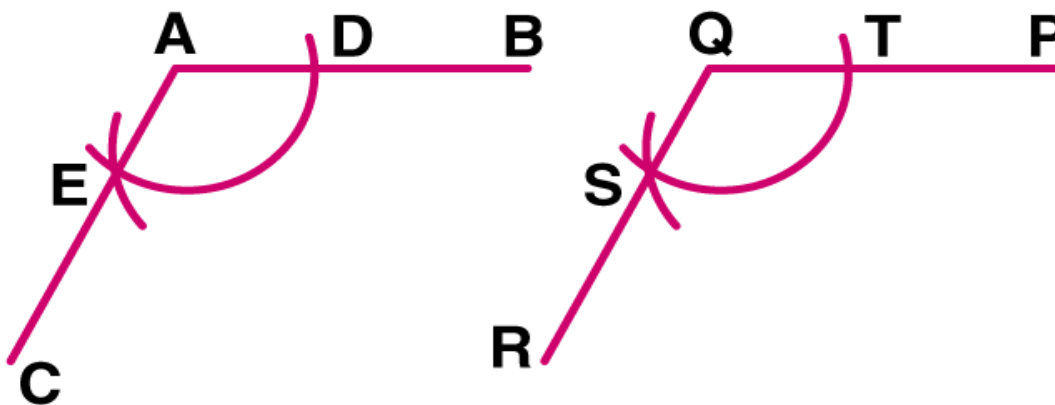
2. Taking Q as centre, draw an arc of any suitable radius, to cut the arms of the angle T and S
3. Taking A as centre, draw an arc of the same size as drawn for points T and S. Let this arc cuts the line AB at point D
4. With the help of compasses, take the distance equal to the distance between T and S; and then taking D as centre, draw an arc which cuts the earlier arc at point E

5. Join AE produced up to a suitable point C. The obtained ∠BAC is the angle equal to the given ∠PQR

2. Construct the following angles, using ruler and a pair of compass only
(i) 60⁰
(ii) 90⁰
(iii) 45⁰
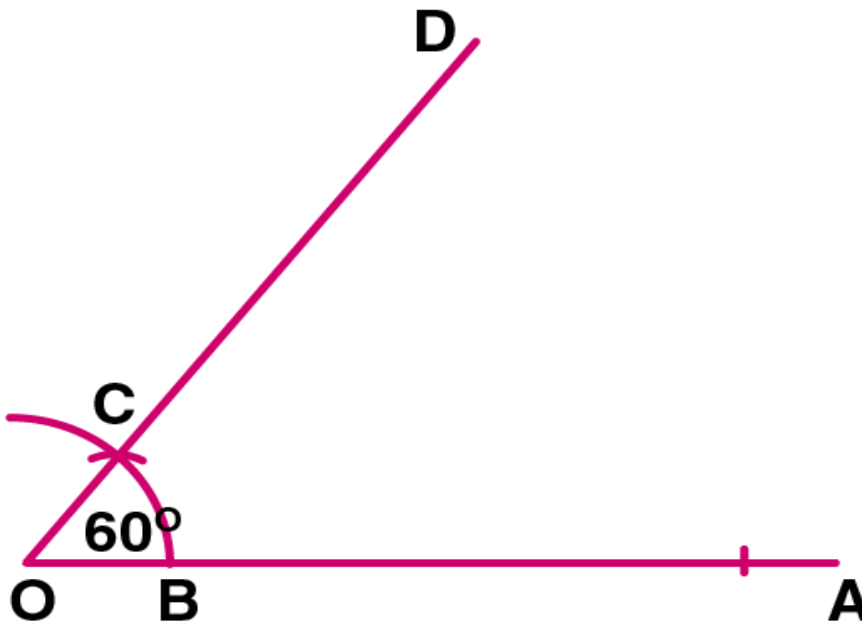**(iv) 30⁰**
(v) 120⁰
Solution:
(i) Steps of Construction:
Constructing the angle of 60⁰

1. Draw a line OA of any suitable length
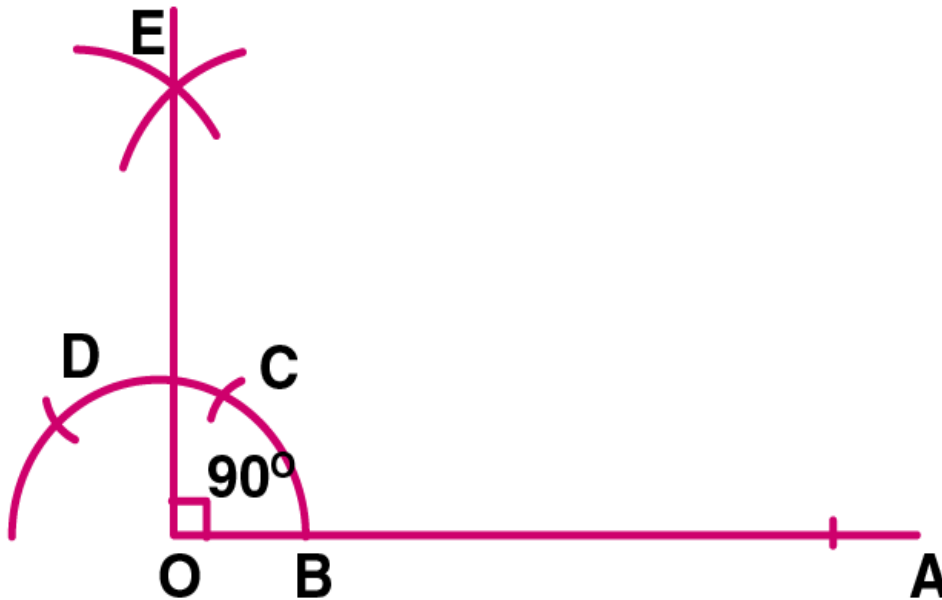2. Taking O as centre, draw an arc of any size to cut OA at point B
3. Now, taking B as centre, draw the same size arc, to cut the previous arc at point C
4. Join OC and produce up to a suitable point D. Then, the obtained ∠DOA is the angle of 60⁰
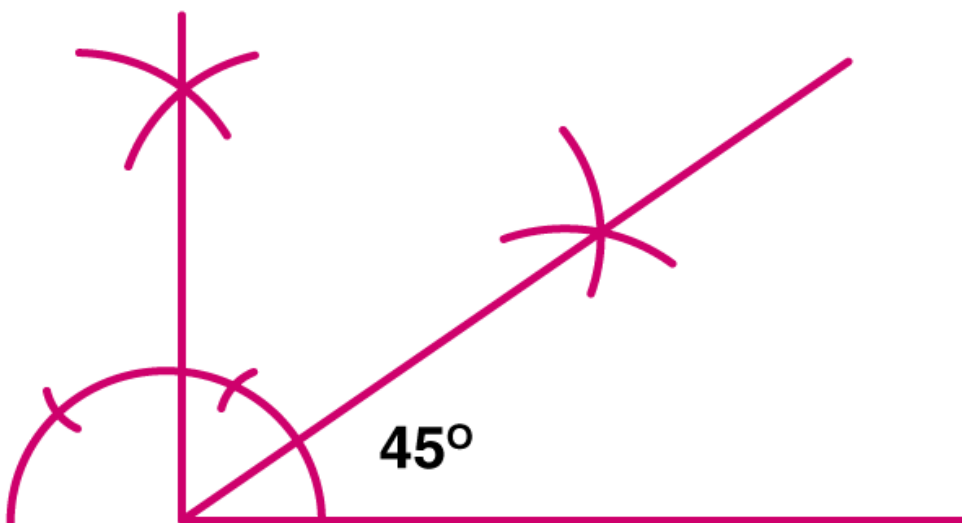
(ii) Steps of Construction:
Constructing angle of 90⁰
Let OA be the line and at point O, the angle of 90⁰ is to be drawn

1. Taking O as centre, draw an arc to cut the arm OA at point B
2. Taking B as centre, draw the same size arc to cut the previous arc at point C
3. Again with C as centre and with the same radius, draw one more arc to cut the previous arc at point D
4. Now, taking C and D as centres, draw two arcs of equal radii to cut each other at point E.
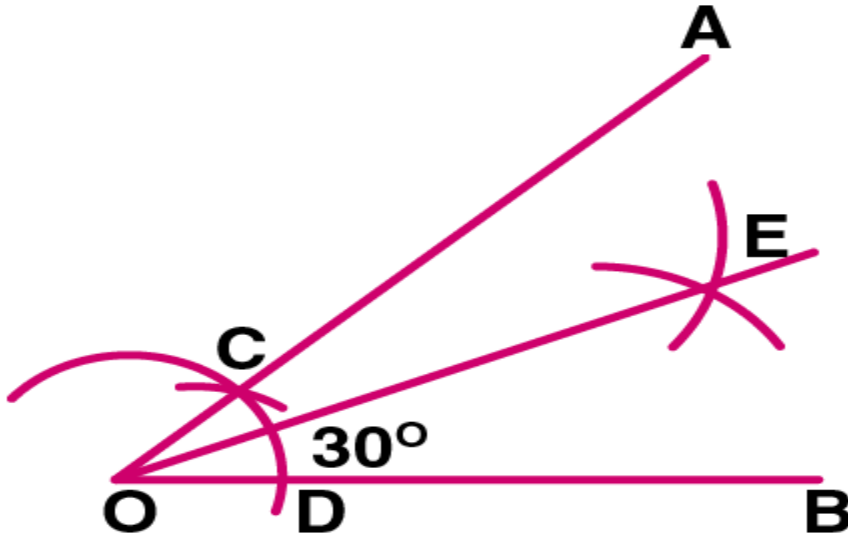5. Join O and E. Then $\angle AOE = 90^0$ is obtained

(iii) Draw an angle of 90^0, following the steps as in question (ii) and bisect it. Each angle so obtained will be 45^0
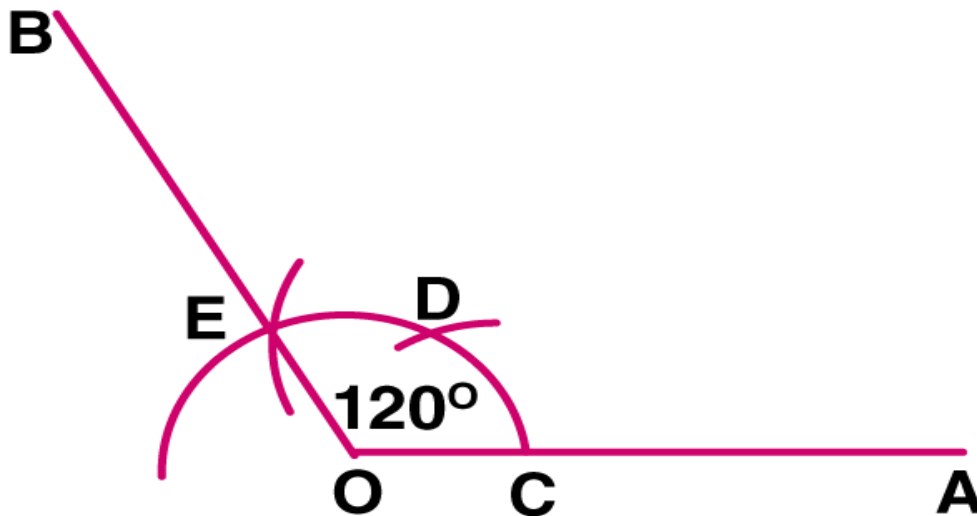
(iv) Steps of Construction:

Constructing an angle of 30^0

1. Draw an angle of 60^0 following the steps as drawn in question no.(i)

2. Now, bisecting this angle, we get two angles each of 30^0. Therefore $\angle EOB = 30^0$

(v) Steps of Construction:

Constructing an angle of 120^0

1. Taking centre as O on the line OA, draw an arc to cut this line at point C

2. Now, taking C as centre, draw a same size arc which cuts the first arc at point D

3. Taking D as centre, draw one more arc of same size which cuts the first arc at point E

4. Join OE and produce it up to point B. Now, the $\angle AOB$ is the obtained angle whose measure is 120^0

3. Draw line AB = 6 cm. Construct angle ABC = 60^0. Then draw the bisector of angle ABC.

Solution:
Steps of Construction:
1. Draw a line segment AB of length 6 cm
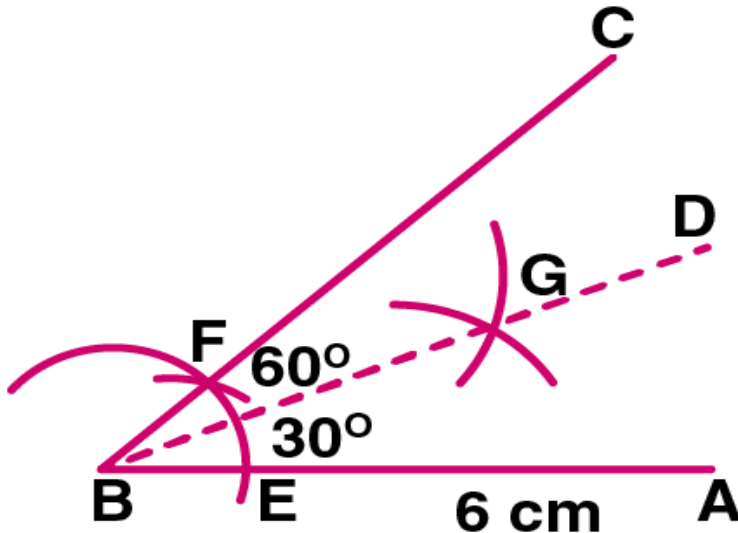
2. Using compass construct ∠CBA = 60⁰
3. Bisect ∠CBA, using compass, take any radius which meet line AB and BC at points E and F
4. Now, with the help of compass take radius more than ½ of EF and draw two arcs from point E and F, where both the arcs intersects at point G, proceed BG towards D. Now the ∠DBA is bisector of ∠CBA

4. Draw a line segment PQ = 8 cm. Construct the perpendicular bisector of the line segment PQ. Let the perpendicular bisector drawn meet PQ at point R. Measure the lengths of PR and QR. Is PR = QR?
Solution:
Steps of Construction:
1. Taking P and Q as centres, draw arcs on both sides of PQ with equal radii. The radius should be more than half the length of PQ
2. Let these arcs cut each other at point R and RS
3. Now, join RS which cuts PQ at point D
Now, RS = PQ. Also ∠POR = 90⁰
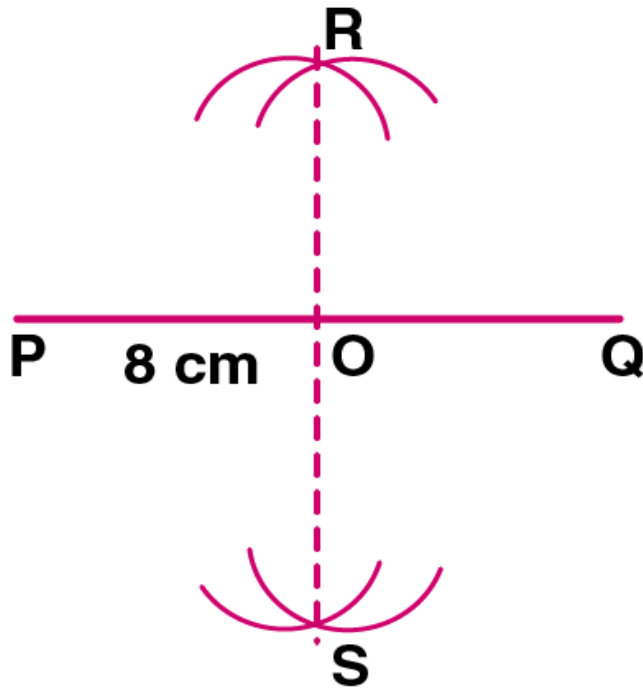
Therefore, the line segment RS is the perpendicular bisector of PQ as it bisects PQ at point P and it also perpendicular to PQ. Now, on measuring the length
PR = 4 cm
QR = 4 cm
Since, PR = QR = 4 cm
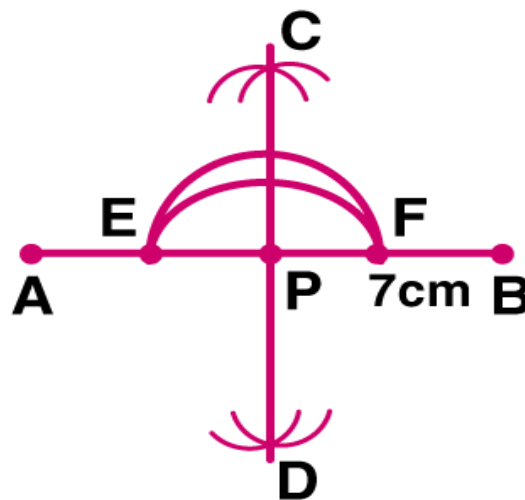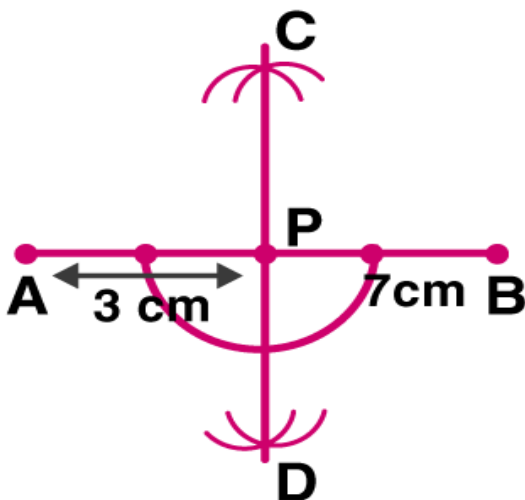Therefore, PR = QR

5. Draw a line segment AB = 7 cm. Mark a point AB such that AP = 3 cm. Draw perpendicular on to AB at point P.
**Solution:**
1. Draw a line segment AB of length 7 cm

2. Mark a point on AB such that, AB – AP = 3 cm
3. From point P, cut arc on outside of AB, and mark them as point E and F
4.Now, from point E and F cut arcs on both side intersecting each other at point C and D
5. Join point P, C and D
6. Which is the required perpendicular

6. Draw a line segment AB = 6.5 cm. Locate a point P that is 5 cm from A and 4.6 cm from B. Through the point P, draw a perpendicular on to the line segment AB.
Solution:
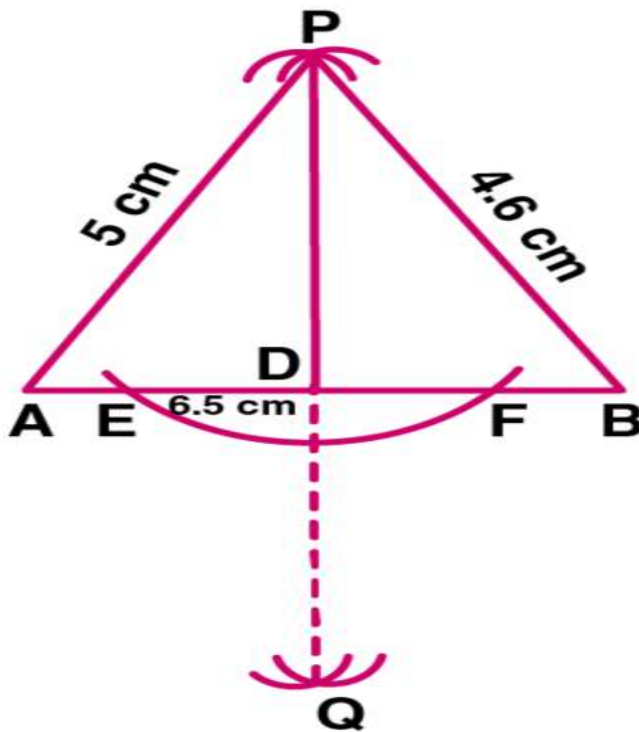
Steps of Construction:
(i) Draw a line segment AB of length 6.5 cm
(ii) Taking radius as 5 cm and with centre A, draw an arc and taking radius as 4.6 cm and with centre B, draw another arc which intersects the first arc at point P
Now, P is the required point
(iii) Taking centre A and a suitable radius, draw an arc which intersect AB at points E and F
(iv) Now, taking E and F as centres and radius greater than half of EF, draw the arcs which intersect each other at point Q
(v) Join PQ which intersect AB at point D
(vi) Now, PD is perpendicular to AB