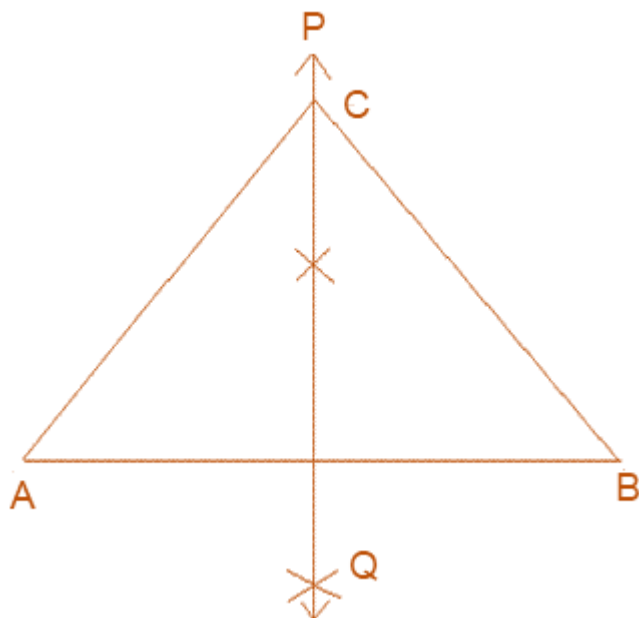


1. Draw a straight line AB of 9 cm. Draw the locus of all points which are equidistant from A and B. Prove your statement.

Solution:-



Steps to construction:

- (1) Draw a line segment AB of 9 cm
- (2) Then draw perpendicular bisector PQ of AB. PQ is the required locus.

Proof:

(a) Take any point on PQ i.e. C.

(b) Now, join CA and CB.

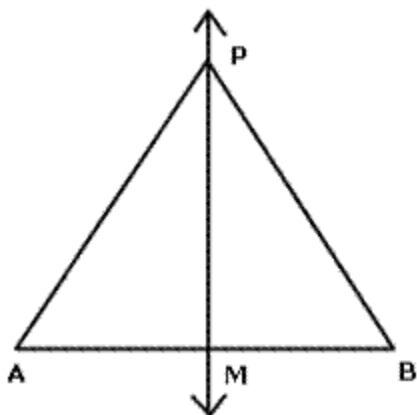
Since, C lies on the perpendicular bisector of line AB.

So, C is equidistant from A and B.

Therefore, $CA = CB$

Hence, it is proved that perpendicular bisector of AB is the locus of all points which are equidistant from A and B.

2. A and B are fixed points while P is a moving point, moving in a way that it is always equidistant from A and B. What is the locus of the path traced out by the point P?

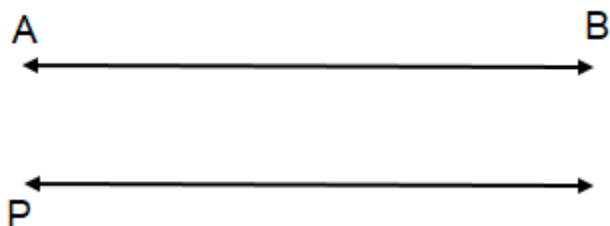


Solution:-

The locus of the path traced out by the point P is equidistant from A and B is the perpendicular bisector of the line segment joining the two points.

3. A point moves such that its distance from a fixed line AB is always the same. What is the relation between AB and the path travelled by the point?

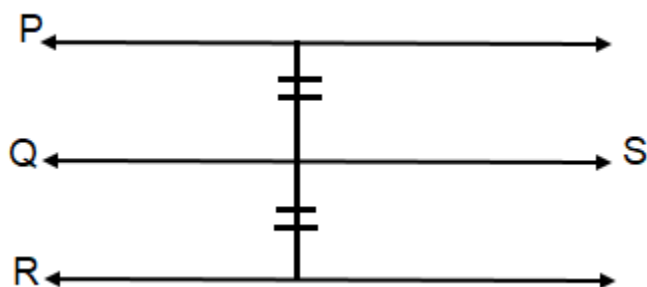
Solution:-



A point moves such that its distance from a fixed straight line AB is same as a pair of straight lines parallel to the given line, one on each side of it and at the given distance from it.

4. State the locus of a point moving so that its perpendicular distances from two given lines is always equal.

Solution:-

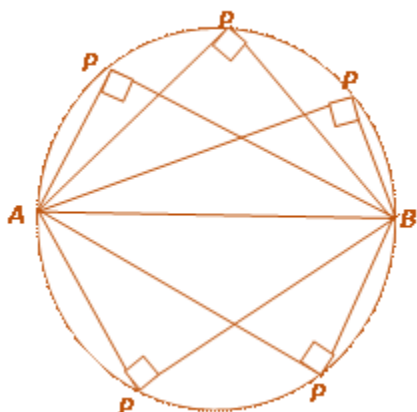


The locus of a point moving so that its perpendicular distances from two given lines is

always equal. A line QS parallel to given lines R and P.

5. AB is fixed line, state the locus of the point P such that $\angle APB = 90^\circ$.

Solution:-

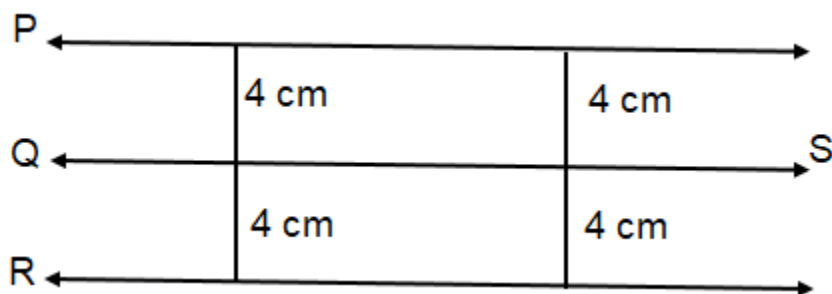


The locus of the point P such that $\angle APB = 90^\circ$, with AB as diameter.

6. Draw and describe the locus in each of the following cases:

(a) The locus of points at a distance of 4 cm from a fixed line.

Solution:-

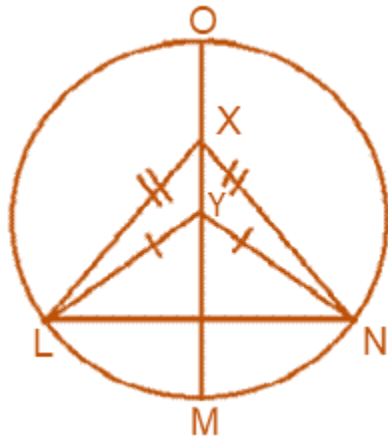


The locus of points at a distance of 4 cm from a fixed line QS are lines R and P which are parallel to QS.

(b) The locus of points inside a circle and equidistant from two fixed points on the circle.

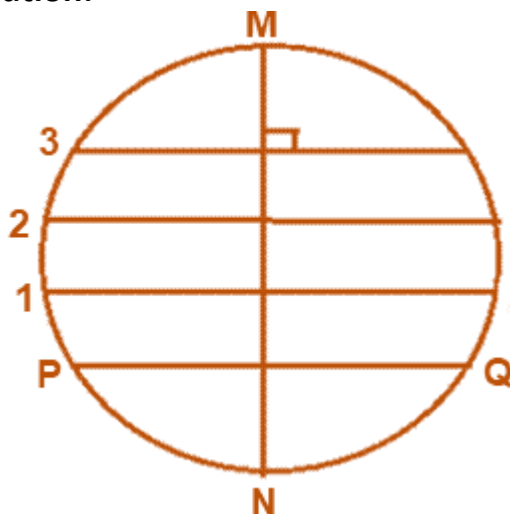
Solution:-

The locus of points inside a circle are equidistant from fixed points on the circle will be the diameter which is perpendicular bisector of the line joining the two fixed points on the circle.



(c) The locus of the mid – points of all parallel chords of a circle.

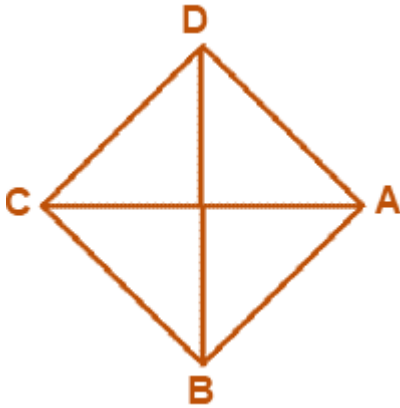
Solution:-



The locus of the mid – points of the chords which are parallel to a given chord is the diameter perpendicular to the given chords.

(d) The locus of a point in rhombus ABCD which is equidistant from AB and AD.

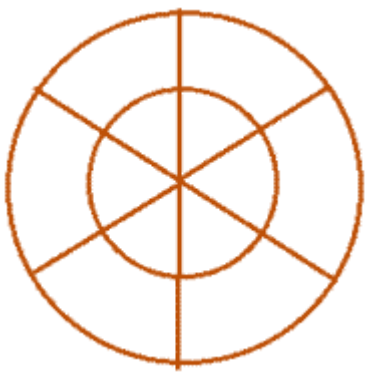
Solution:-



7. Describe completely the locus of points in each of the following cases:

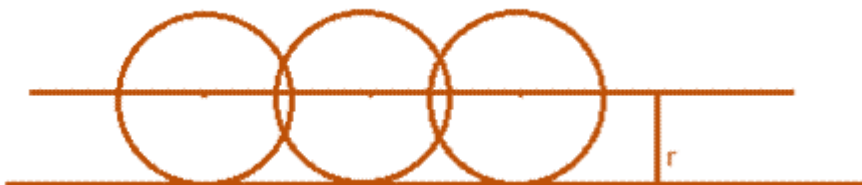
(a) Midpoint of radii of a circle.

Solution:-



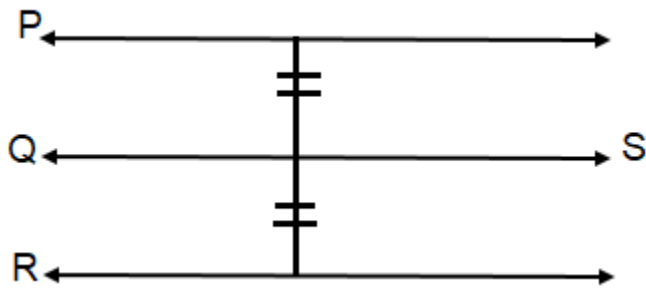
(b) Centre of a ball, rolling along a straight line on a level floor.

Solution:-



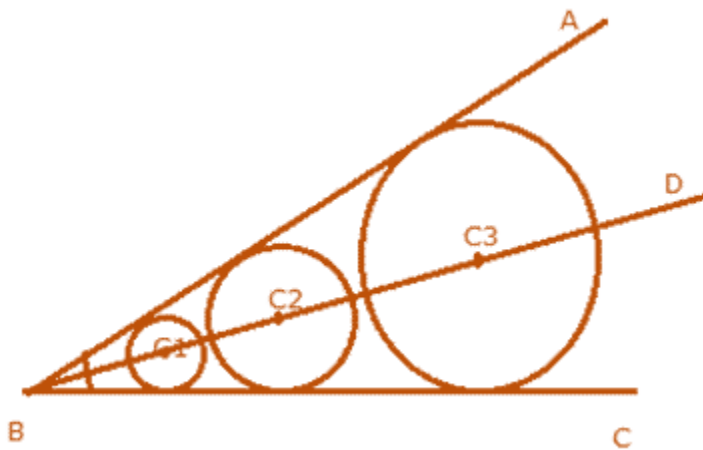
(c) Point in a plane equidistant from a given line.

Solution:-



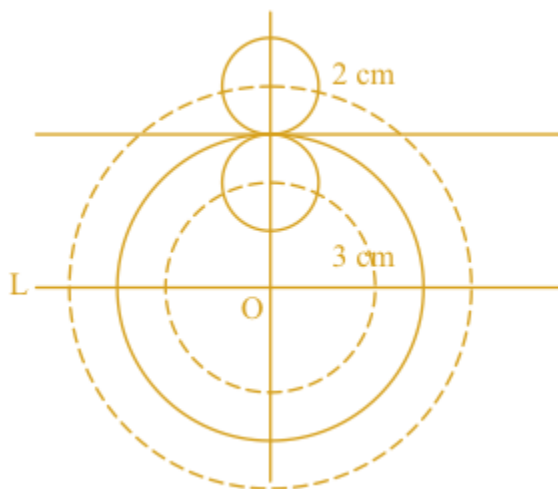
(d) Center of a circle of varying radius and touching the two arms of $\angle ABC$.

Solution:-



(e) Center of a circle of radius 2 cm and touching a fixed circle of radius 3 cm.

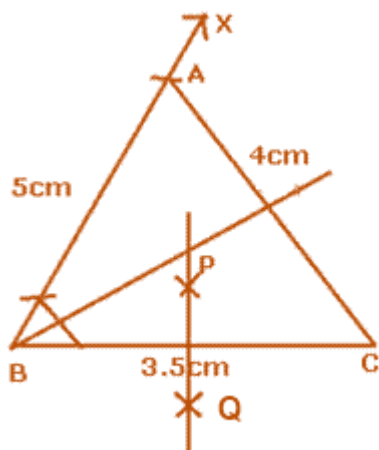
Solution:-



8. Using only ruler and compasses, construct a triangle ABC, with $AB = 5$ cm, $BC = 3.5$

cm and $AC = 4$ cm. Mark a point P, which is equidistant from AB, BC and also from B and C. Measure the length of PB.

Solution:-



Steps of construction:

1. Draw a line segment $BC = 3.5$ cm.
2. With B as a center and radius 5 cm, draw an arc.
3. With C as a center and radius 4 cm, draw another arc, cutting the previous arc at A.
4. Join AB and AC.

Then, $\triangle ABC$ is the required triangle.

5. With B as center and radius measuring more than half of BC, draw arcs on both sides of BC.
6. With C as center and the same radius as before, draw arcs on both sides of BC, cutting the previous arcs at P and Q, as shown. Join PQ.

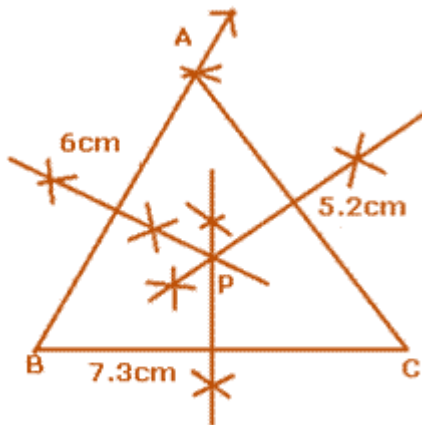
Then, PQ is the required perpendicular bisector of BC.

Therefore, P is the required point which is equidistant from AB, BC, B and C.

Length PB is 2.5 cm

9. Construct a triangle ABC, such that $AB = 6$ cm, $BC = 7.3$ cm and $CA = 5.2$ cm locate a point which is equidistant from A, B and C.

Solution:-



Steps of construction:

1. Draw a line segment $BC = 7.3$ cm.
2. With B as a center and radius 6 cm, draw an arc.
3. With C as a center and radius 5.2 cm, draw another arc, cutting the previous arc at A.
4. Join AB and AC.

Then, $\triangle ABC$ is the required triangle.

5. With B as center and radius measuring more than half of BC, draw arcs on both sides of BC.
6. With C as center and the same radius as before, draw arcs on both sides of BC, cutting the previous arcs as shown. Join them.
7. Again with B as center and radius measuring more than half of BC, draw arcs on both sides of BC.
8. With A as center and the same radius as before, draw arcs on both sides of BC, cutting the previous arcs as shown. Join them.
9. With C as center and radius measuring more than half of BC, draw arcs on both sides of BC.
10. With A as center and the same radius as before, draw arcs on both sides of BC, cutting the previous arcs as shown. Join them.

So, in triangle ABC, P is the point of intersection of AB, AC and BC.

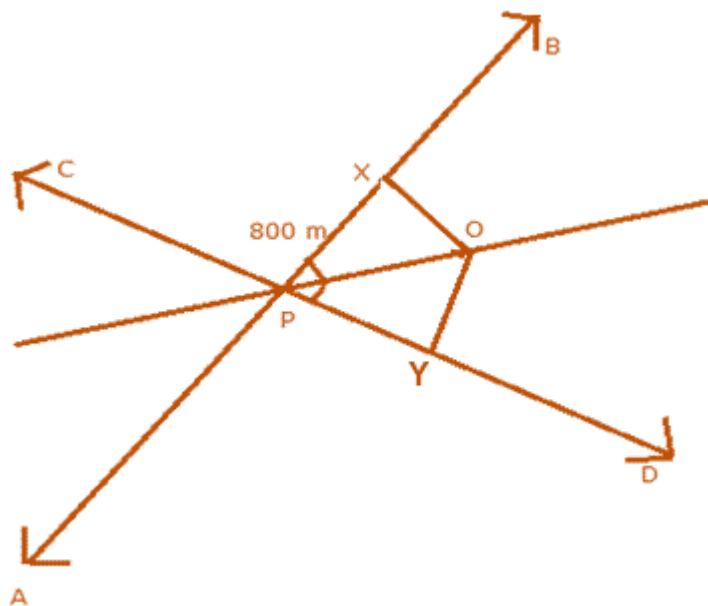
Therefore, $PA = PB$, $PB = PC$, $PC = PA$

Hence, P is the point which is equidistant from A, B and C.

10. Two straight roads AB and CD cross each other at P at an angle of 75° . X is a stone on the road AB, 800m from P towards B, By taking an appropriate scale draw a figure to locate the position of a pole, which is equidistant from P and X, and is also

equidistant from the roads.

Solution:-



Steps of construction:

As per the condition given in the question,

1. Draw two lines AB and CD crossing at an angle of 75° .
2. Then draw an angle bisector of $\angle BPD$
3. Now, draw perpendicular from X on angle bisector meeting at O.
4. From point Y, $PX = PY$, draw a perpendicular on angle bisector meeting at O.
5. So, O is the point which equidistant from P, X and both the roads.

We know that, $\cos \theta = \text{hypotenuse}/\text{base}$

$$\cos (75/2) = PO/PX$$

$$\cos (37.5) = PO/800$$

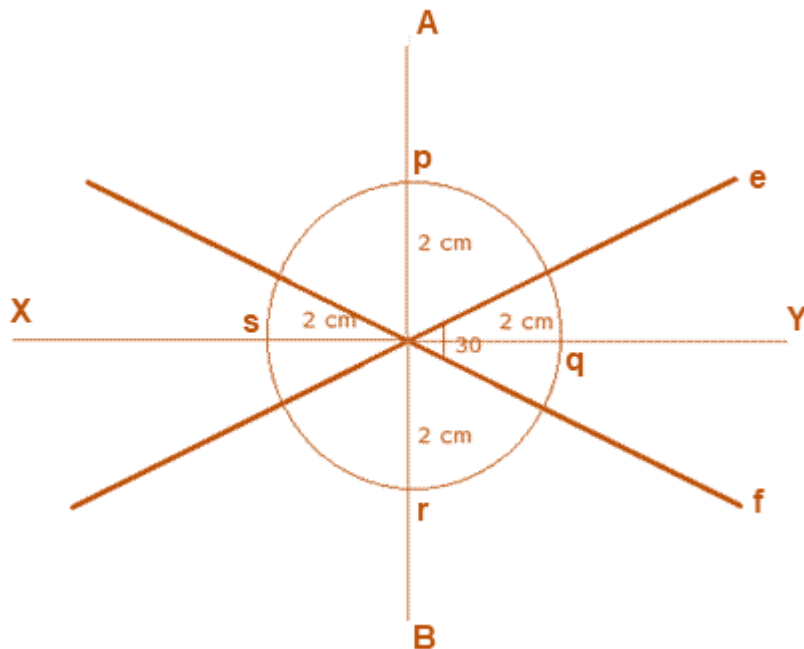
$$0.980243 = PO/800$$

$$PO = 0.980243 \times 800$$

$$PO = 784.19 \text{ m}$$

11. Draw two intersecting lines to include an angle of 30° . Use ruler and compasses to locate points which are equidistant from these lines and also 2 cm away from their point of intersection. How many such points exist?

Solution:-



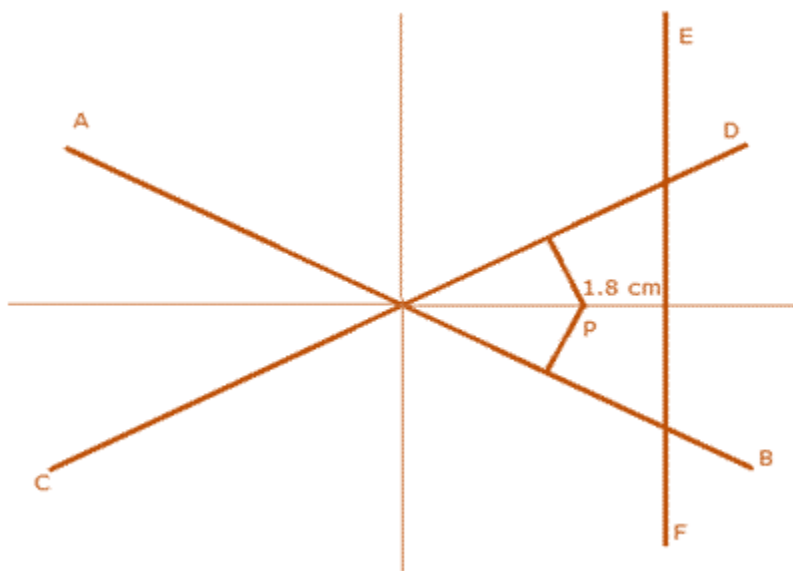
As per the condition given in the question,

1. First draw an angle bisector AB and XY of angles formed by the lines e and f.
2. Now, from center draw a circle with radius 2 cm, which intersect the angle bisector at p, q, r and s respectively.

Therefore, p, q, r and s are the required four points.

12. AB and CD are two intersecting lines. Find a point equidistant from AB and CD, and also at a distance of 1.8 cm from another given Line EF.

Solution:-



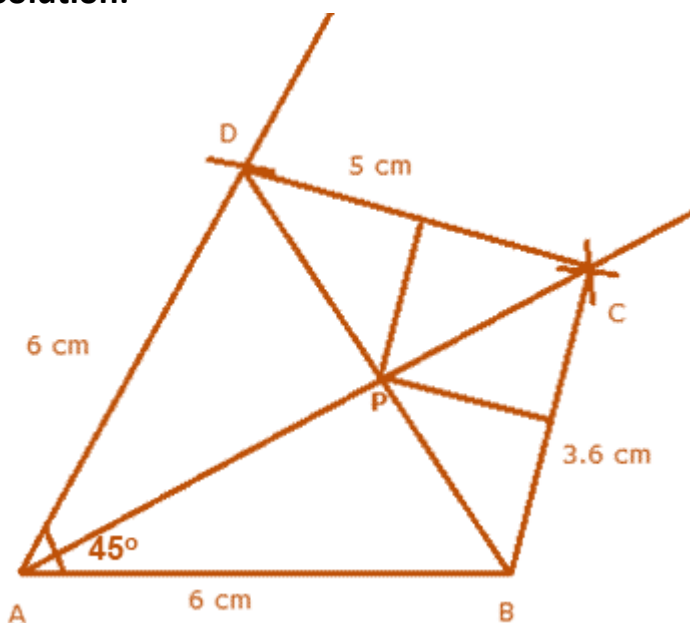
As per the condition given in the question,

1. First draw an angle bisector AB and CD.
2. Then draw perpendicular from AB and CD on angle bisector i.e. P.

Therefore, P is the point equidistant from AB and CD, and also at a distance of 1.8 cm from another given Line EF.

13. Without using set squares or protractor, construct a quadrilateral ABCD in which $\angle BAD = 45^\circ$, $AD = AB = 6$ cm, $BC = 3.6$ cm and $CD = 5$ cm. Locate the point P on BD which is equidistant from BC and CD.

Solution:-



Steps of construction:

1. Draw a line segment $AB = 6$ cm.
2. With B as a center and radius 6 cm, draw an arc.
3. With C as a center and radius 5.2 cm, draw another arc, cutting the previous arc at A.
4. Join AB and AC.

Then, $\triangle ABC$ is the required triangle.

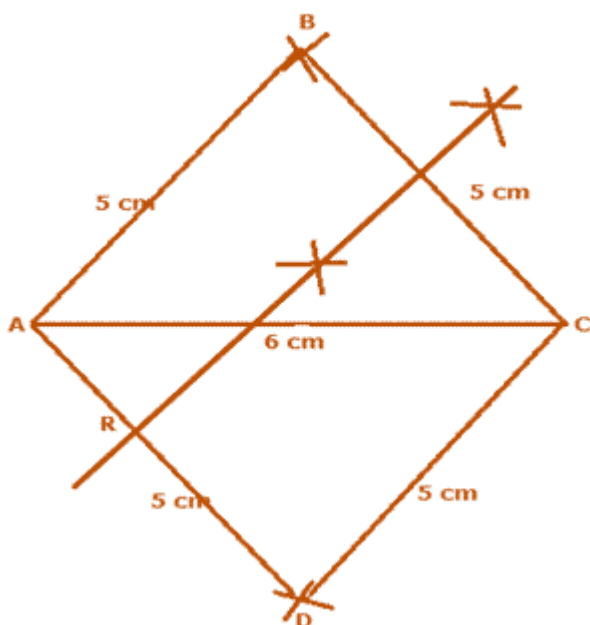
5. With B as center and radius measuring more than half of BC, draw arcs on both sides of BC.
6. With C as center and the same radius as before, draw arcs on both sides of BC, cutting the previous arcs as shown. Join them.
7. Again with B as center and radius measuring more than half of BC, draw arcs on both sides of BC.
8. With A as center and the same radius as before, draw arcs on both sides of BC, cutting

the previous arcs as shown. Join them.

9. With C as center and radius measuring more than half of BC, draw arcs on both sides of BC.

14. Construct a rhombus ABCD with sides of length 5 cm and diagonal AC of Length 6 cm. Measure $\angle ABC$. Find the point R on AD such that $RB = RC$. Measure the length of AR.

Solution:-



Steps of construction:

1. Draw a line segment $AC = 6$ cm.
2. With A as a center and radius 5 cm, draw two arcs on both sides of line AC.
3. With C as a center and radius 5 cm, draw another two arcs, cutting the previous arcs at B and D both side.

4. Join AB, AD, BC and CD.

Then, ABCD is the required rhombus.

5. With B as center and radius measuring more than half of BC, draw arcs on both sides of BC.

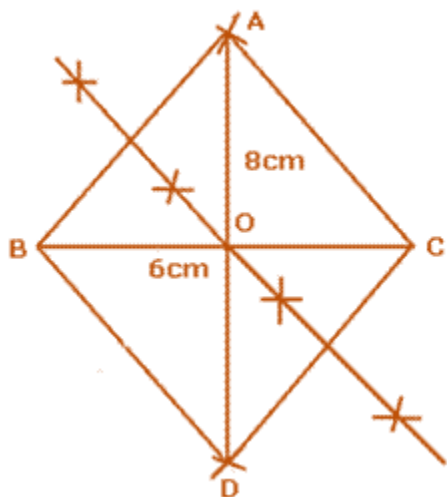
6. With C as center and the same radius as before, draw arcs on both sides of BC, cutting the previous arcs as shown. Join them.

7. Then, PQ is the required perpendicular bisector of BC.

Therefore, P is the required point which is equidistant from AB, BC, B and C.

15. Construct a rhombus ABCD whose diagonals AC and BD are 8 cm and 6 cm respectively. Find by construct a point P equidistant from AB and AD and also from C and D.

Solution:-



Steps of construction:

1. Draw a line segment $BC = 6$ cm.
2. Then, draw perpendicular $AD = 8$ cm to BC .
3. With A as a center and radius 5 cm, draw two arcs on both sides of line AC.
4. With C as a center and radius 5 cm, draw another two arcs, cutting the previous arcs at B and D both side.
5. Join AB, AD, BC and CD.