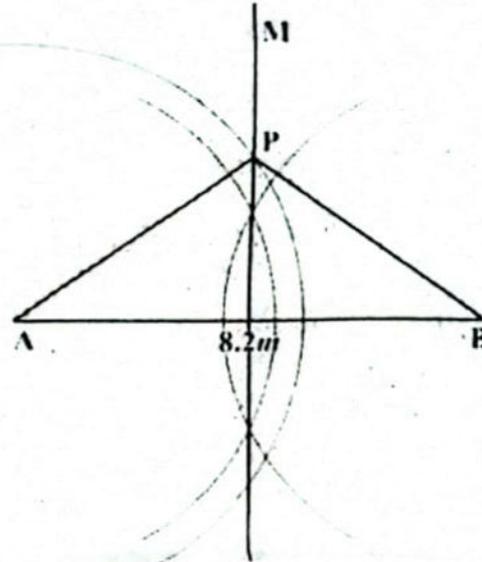1. Two points A and B are 8.2 cm apart. Construct the locus of points 5cm from point A.

Solution:

1- Take two points A and B on a line segment 8.2cm apart.

2- Draw a perpendicular bisector LM of AB.

3- With A as centre draw an arc 5cm radius. Cutting the right bisector at P.

Thus, P is a point equidistant from A and B and at a distance of 5cm from A.
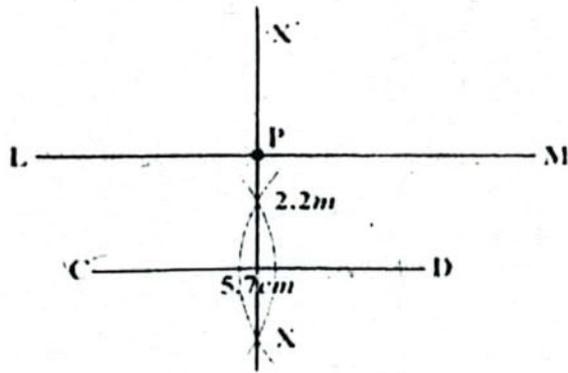
2. Construct a locus of point 2.2 cm from line segment CD of measure 5.7cm.

Solution:

1- Draw a line segment 5.7 cm.
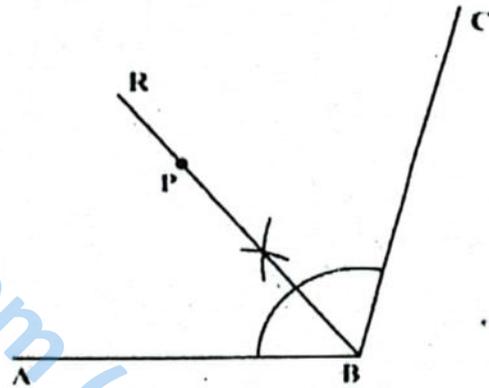
2- Draw right bisector XX' of CD.

Hence, P is a point equidistant from C and D at a distance of 2.2 cm from CD.

3. Construct an angle $ABC = 105°$. Construct a locus of a point P which moves such that it is equidistant from $\overline{BA}$ and $\overline{BC}$.

Solution:

1- Construct an angle 105° $\triangle ABC$.

2- Draw the angle bisector BR of the $\angle ABC$. Any point P on this bisector is at equidistant from AB and BC.
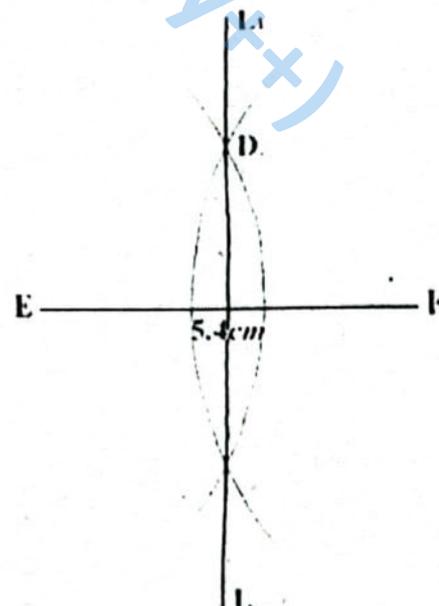
4. Two points E and F are 5.4 cm apart. Construct a locus of a point P which moves such that it is equidistant from E and F.

Solution:

1- Draw a line EF equal to 5.4cm.

2- Draw the perpendicular bisector LL_1 of EF. P which moves in such a way that its distance from E and F is always equal.

5. The island has two main cities A and B 8km apart. Kashif lives on the island exactly 6.8 km from city A and exactly 7.3km from city B. Mark with a cross the points on the island where Kashif could live.

Solution:
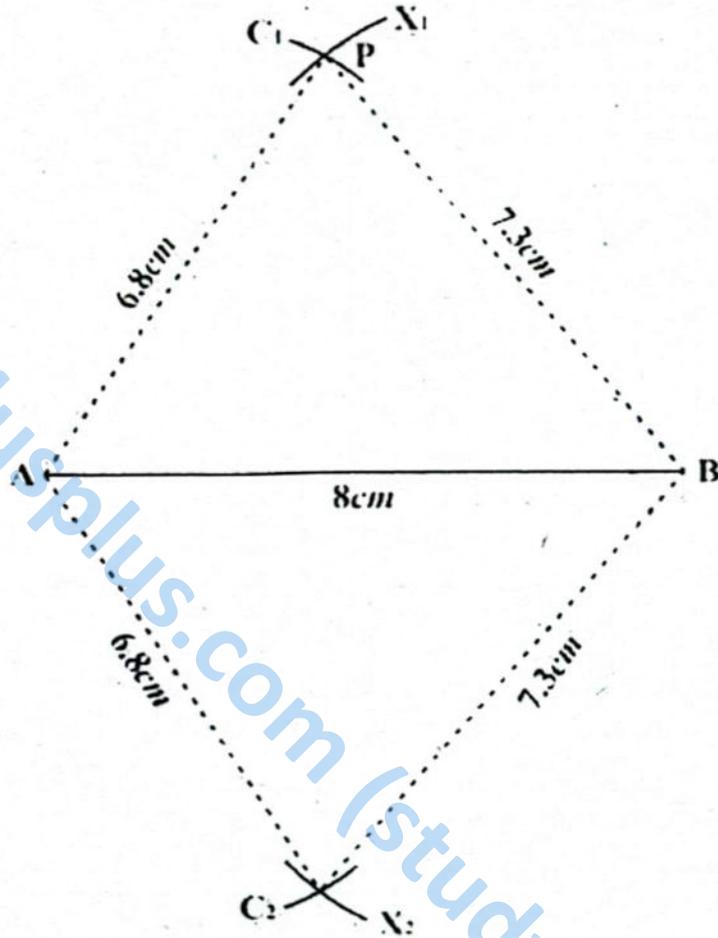
1- Draw a line segment AB 8cm in length.

2- With A as centre draw two arcs C_1 and C_2 at 6.8cm on both sides of A and B.

3- Draw an other arc X_1 and X_2 on both sides of AB. Cutting C_1 and C_2 at point P and Q. Now, P is a point at 6.8km from A and 7.3 km from B. Similarly, Q is a point 7.3 km from B and 6.8 km from A.

6. Construct a triangle CDE with $m\overline{CD} = 7.6$cm, $m\angle D = 45°$ and $m\overline{DE} = 5.9$ cm. Draw the locus of all points which are:

(a) equidistant from C and D

(b) equidistant from $\overline{CD}$ and $\overline{CE}$ Mark the point X where the two loci intersect.

Solution:

1- Draw perpendicular bisector L_1L_2 of $\overline{DE}$ and angle bisector DD_1 of the angle D.

2- L_1L_2 and DD_1 intersect at P.

3- The point P is at the
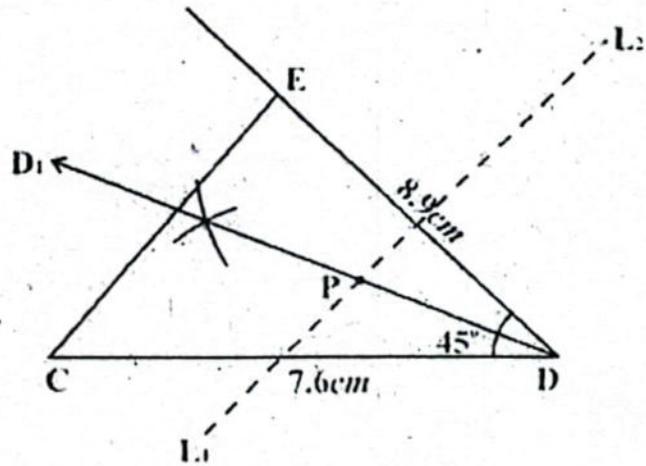
locus which is equidistant from D and E. On the line segments $\overline{CD}$ and $\overline{DE}$.

7. Construct a triangle LMN with $m\overline{LM} = 7$cm, $m\angle L = 70°$ and $m\angle M = 45°$. Find a point within the triangle LMN which is equidistant from L and M and 3 cm from $\overline{LN}$.

Solution: 1- Draw a line segment $\overline{LM}$ 7cm in length and draw M_1M_2 as its perpendicular bisector.

2- Draw a line $Y_1Y_2 \parallel$ to LN at a distance of 3cm from LN.

3- Draw two lines at L and M making and angle 70° at L and 45° at M cutting each other at N.

4- The perpendicular bisector M_1M_2 and Parallel line. Y_1Y_2 to LN cut each other P. which is a the locus at equal distance from L and M and at 3cm from $\overline{LN}$.
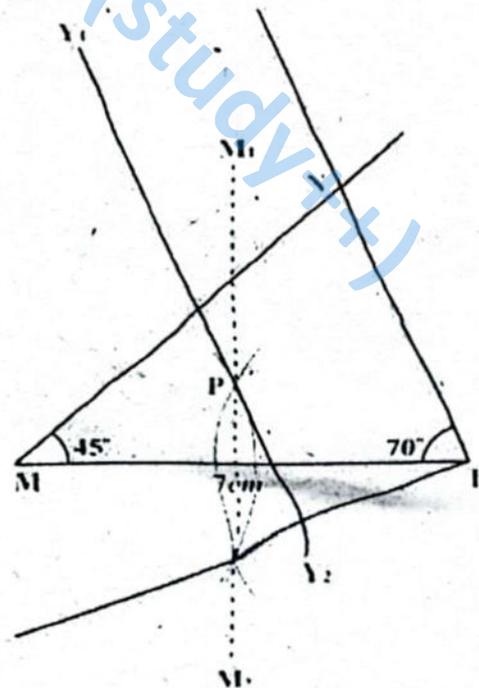
8. Construct a right angled triangle *RST* with *m* $\overline{RS}$ = 6.8 cm, *m* ∠*S* = 90° and *m* $\overline{ST}$ = 7.5 cm. Find a point within the triangle *RST* which is equidistant from $\overline{RS}$ and $\overline{RT}$ 4.5cm from *R*.

Solution:

1- Draw a right angled triangle *STR* in which ∠*S* = 90°, $\overline{ST}$ = 7.5cm and $\overline{RM}$ = 4.5cm ∥ *ST*.

2- Draw at 1.3cm perpendicular distance a line *MM'* parallel to *S.T.* Cutting the angle bisector *RR* at point *P*.
The point *P* is a required locus equidistant from $\overline{RS}$ and $\overline{RT}$ and 4.5cm from *R*.
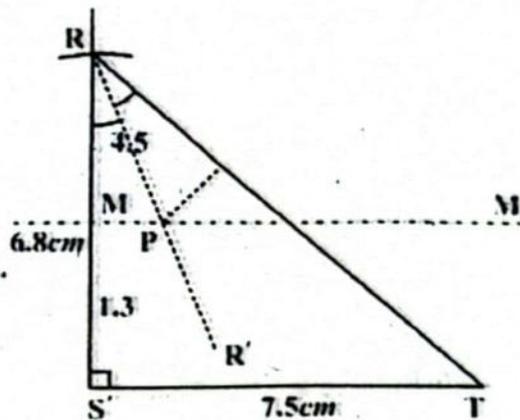
9. Construct a rectangle *UVWX* with *m* $\overline{UV}$ = 7.2cm and *m* $\overline{VW}$ = 5.6 cm. Draw the locus of points at a distance 2.1cm from $\overline{UV}$ and 3.5cm from *W*.
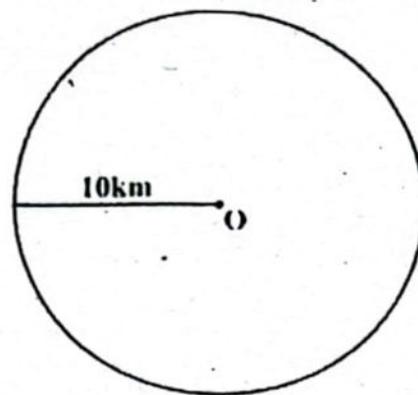
Solution:

1- Draw a rectangle *UVWX* in which *UV* = 7.2 cm and *VW* = 5.5cm.

2- Draw a line *LL'* ∥ to *UV* at *R* distance of 2.1 cm from *VV* or 3.5 cm from *R*. which is the
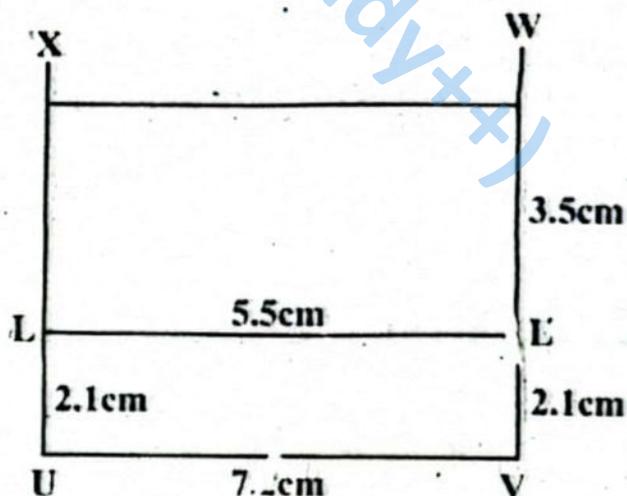
required locus fulfilling

conditions.

It is a circular region of 10km radius with centre at the point of control the infected area.

10km

10. Imagine two cell towers located at points A and B on a coordinate plane. The GPS-enabled device, positioned somewhere on the plane, receives signals from both towers. To ensure accurate navigation, the device is placed equidistant from both towers to estimate its position. Draw this locus of navigation.

Solution:

Suppose A and B are the two towers. The G.P.S position is equidistant from A and B. Naturally, the position of G.P.S is on the perpendicular bisector of A and B i.e. L_1L_2.
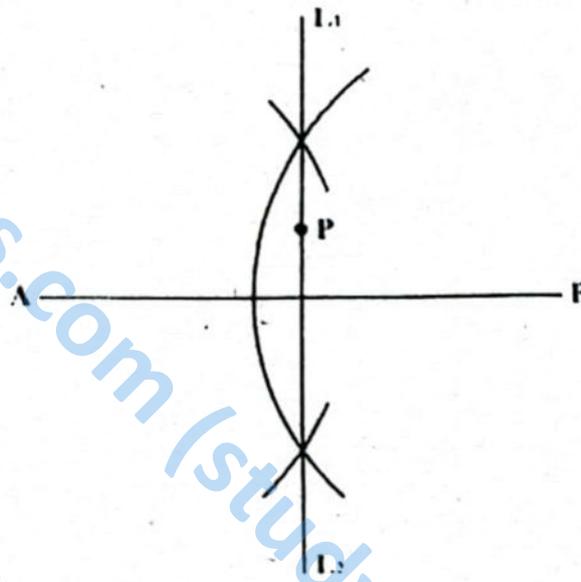

11. Epidemiologists use loci to determine infection zones, especially for contagious diseases, to predict the spread and take containment measures. In the case of a disease outbreak, authorities might determine a quarantine zone within 10 km of the infection source. Draw the locus of all points 10 km from the source defining the quarantine area to monitor and control the disease's spread.

Solution:

It is a circular region of 10 km radius with centre at the point of control the infected area.

12. There is a treasure buried somewhere on the island. The treasure is 24 kilometres from *A* and equidistant from *B* and *C*. Using a scale of 1cm to represent 10km, find where the treasure could be buried.

Solution:
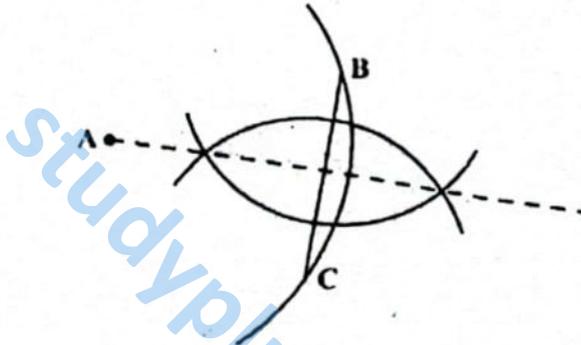
The treasure in the shaded region on the perpendicular bisector of *B* and *C*. i.e. the shaded region of the island.

13. There is an apple tree at a distance of 90 metres from banana tree in the garden of Sara's house. Sara wants to plant a mango tree M which is 64 metres from apple tree and between 54 and 82 metres from the banana tree. Using a scale of 1cm to represent 1·0m, Find the points where the mango tree should be planted.