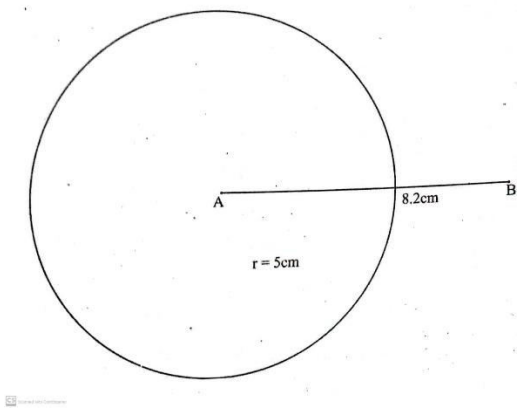
# 9th Math Exercise 11.2

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

Solution:




Steps of construction:

i. Draw $m\overline{AB} = 8.2$ cm

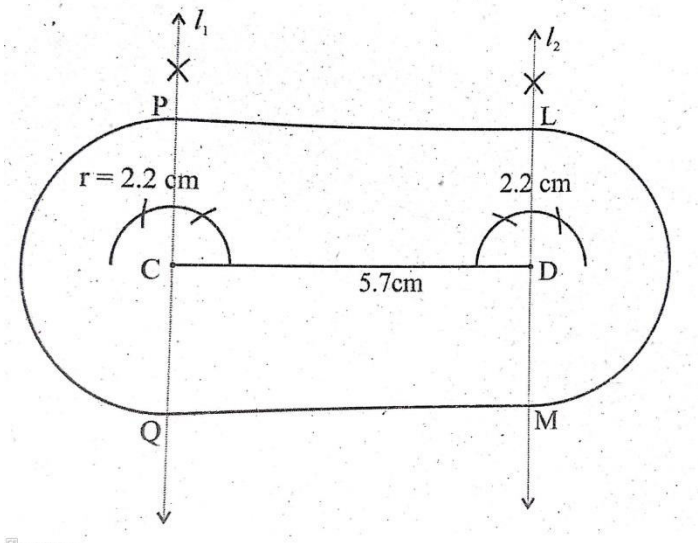
ii. With centre at A, draw a circle of radius 5 cm .

Thus the locus of a point 5 cm from the point $A$ is the circle of radius 5 cm with centre at $A$.



Q. 2 Construct a locus of point 2.2 cm from line segment CD of measure 5.7 cm.

Solution:

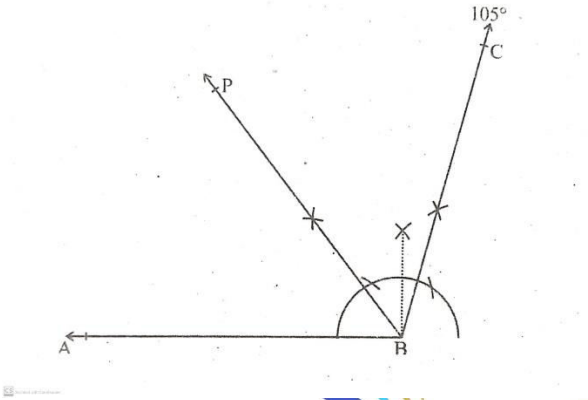



Steps of construction:

i. Using ruler draw $m\overline{CD} = 5.7$ cm.

ii. Draw two perpendicular dotted lines $l_1$ and $l_2$ at points C and D

respectively.
iii. With centre at $C$, draw a semicircle on lett side of $C$ of radius 2.2 cm cutting the line $l_1$ at two points P and Q
iv. With centre at D , draw an other semicrole on right side of D of radius 2.2 cm cutting the line $\mathrm{l}_2$ at two points L and M .
v. Join P to L and Q to M . Here, $\overline{PL}$ and $\overline{QM}$ are parallel to $\overline{CD}$ and they are at 2.2 cm from it.
Thus track PQML is the required locus of a point which is 2.2 cm from the line segment
Q. 3 Construct an angle $\mathrm{ABC} = 105°$. Construct a locus of a point P which moves such CD. that it is equidistant from $\overline{\mathrm{BA}}$ and $\overline{\mathrm{BC}}$.
Solution:

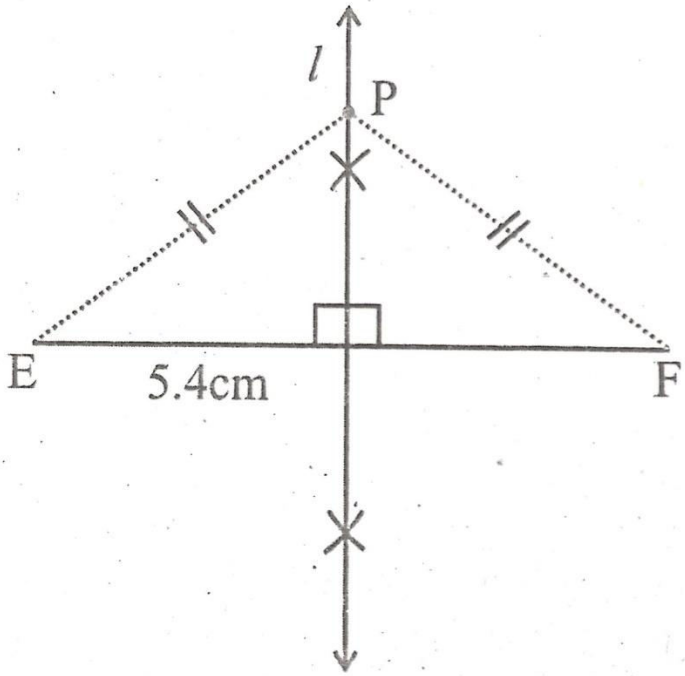





Steps of construction:
Using the ruler draw a ray BA
ii. Draw $m\angle ABC = 105°$ using the compass and ruler.
iii. Draw the bisector $\overrightarrow{BP}$ of $m\angle ABC$.
Thus locus of a point P which is equidistant from $\overrightarrow{BA}$ and $\overrightarrow{BC}$ is the bisector $\overrightarrow{BP}$ of $m\angle ABC$ Q. 4 Two points E and F are 54 cm apart. Construct a locus of a point P which moves such that it is equidistant from $E$ and $F$.

$$\mathrm{m}\overline{\mathrm{EF}} = 5.4 \text{ cm}$$

Solution:




The locus of moving point which is equidistant from two given points is the "right bisector" of the line segment joining these point.

Steps of construction:

i.Draw $m\overline{EF} = 5.4$ cm

ii. With centre at E draw two ares of radius more than half of $\mathrm{m}EF$, above and below the $\overline{EF}$.

iii. With centre at F , draw two more arcs of same radius above and below the $\overline{EF}$ cutting the previous arcs.

1v. Draw a line $l$ through the points of intersection of ares and get a right bisector of $\overline{EF}$ Thus the locus of a moving point $P$ equidistant from the two given points $E$ and $F$ is the right bisector of $\overline{EF}$

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

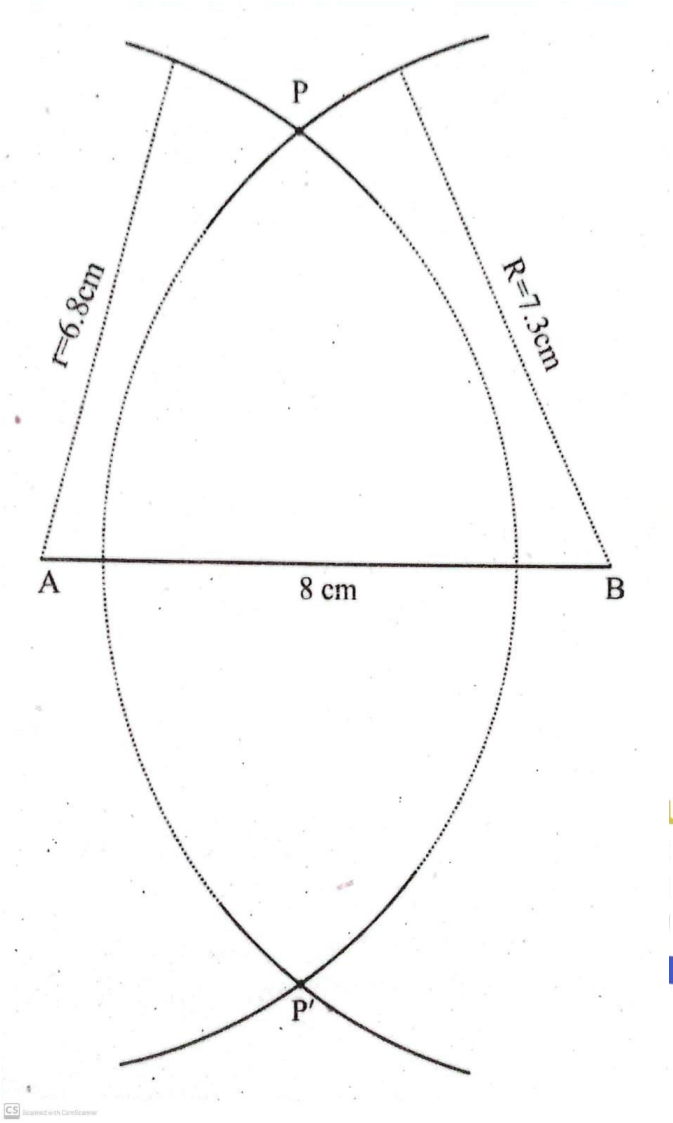
Solution:

Choose a suitable scale $= 1$ km $= 1$ cm

Actual distance between two cities A and B is $8$ km $\Rightarrow$ $\mathrm{m}\overline{\mathrm{AB}} = 8$ cm

Distance of Kashif's living place " p " from city $\mathrm{A} = 6.8$ km $\Rightarrow$ $\mathrm{m}\overline{\mathrm{PA}} = 6.8$ cm

Distance of Kashif's living place " P " from city $\mathrm{B} = 7.3$ km $\Rightarrow$ $\mathrm{m}\overline{\mathrm{PB}} = 7.3$ cm






Steps of construction:

$$\Rightarrow m\overline{AB} = 8 \text{ cm}$$

Consider two cities A and B as two points A and B

$P$ is the place where Kashif could live.

i. Draw $m\overline{AB} = 8$ cm

11. With centre at A draw two ares of radius 6.8 cm , above and below the $\overline{AB}$

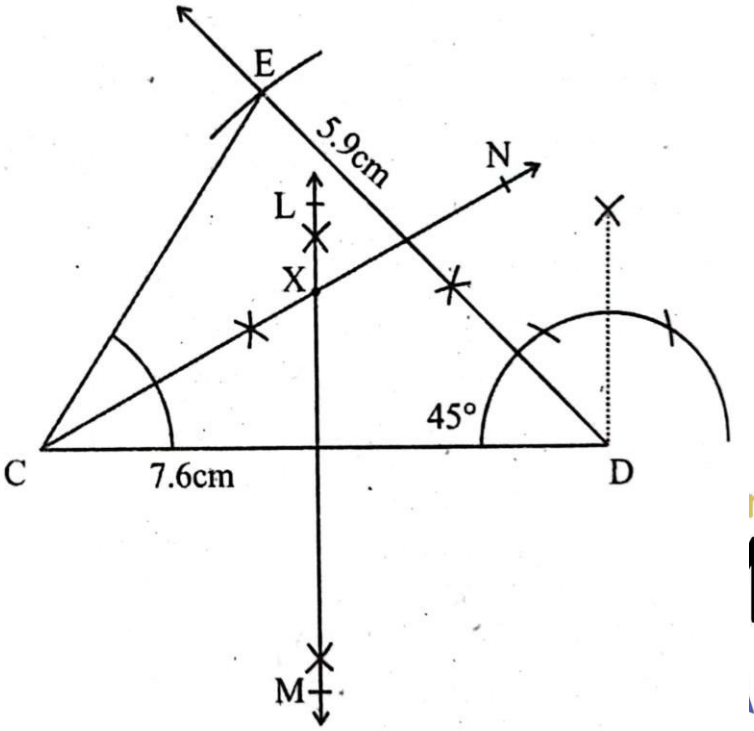
iii. With centre at B , draw no more ares of radius 7.3 cm above and below the $\overline{AB}$ which cross the previous arcs at two points P and $\mathrm{P}'$

The crossing points of two arcs $P$ and $P'$ could be the position where Kashif lives.

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

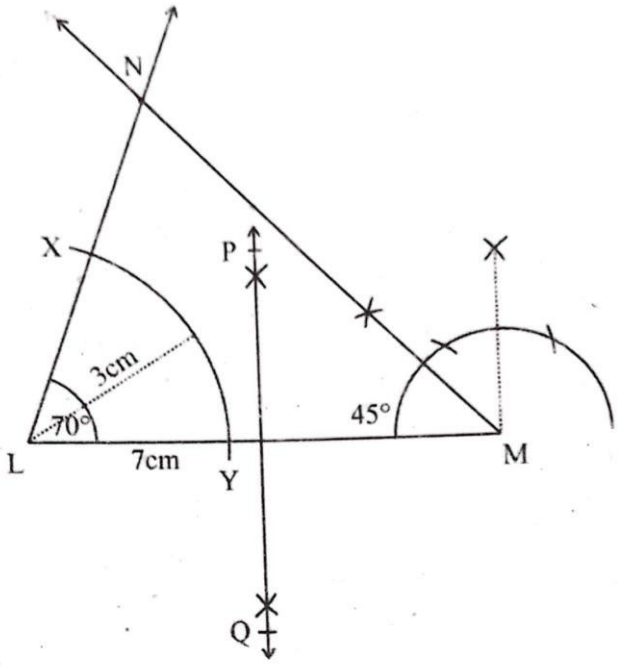
(a) Equidistant from C and D
(b) Equidistant from $\overline{\mathrm{CD}}$ and $\overline{\mathrm{CE}}$
Mark the pint X where the two loci intersect.
Solution:
$\triangle CDE$,

$$\mathrm{m}\overline{\mathrm{CD}} = 7.6 \text{ cm}, = \angle \mathrm{D} = 45°, \mathrm{m}\overline{\mathrm{DE}} = 5.9 \text{ cm}$$






Steps of construction:
i. Draw $\triangle CDE$ in which $m\overline{CD} = 76 \text{ cm} m\angle D = 45°$ and $m\overline{DE} = 5.9 \text{ cm}$
ii. Draw the right bisector $\overleftrightarrow{LM}$ of the side $\overline{CD}$ because all points on $\overleftrightarrow{LM}$ are equidistant from points C and D .
iii. Now draw the angle bisector $\overrightarrow{CN}$ of the $\angle C$ because all the points on $\overrightarrow{CN}$ are equidistant from points $\overline{CD}$ and $\overline{CE}$
iv. Mark the point of intersection of $\overleftrightarrow{LM}$ and $\overrightarrow{CN}$ as X So X is the point where two loct intersect.
Q. 7 Construct a triangle LMN with $\mathrm{m}\overline{\mathrm{LM}} = 7 \text{ cm}, \mathrm{m}\angle \mathrm{L} = 70°$ and $\mathrm{m}\angle \mathrm{M} = 45°$. Find a point within the triangle LMN which is equidistant from L and M and 3 cm from L. Solution:
$\triangle \mathrm{LMN}, \mathrm{mLM} = 7 \text{ cm}, \mathrm{m}\angle \mathrm{L} = 70°, \mathrm{m}\angle \mathrm{M} = 45°$




Steps of construction:

i. Draw $\triangle LMN$ in which $m\overline{LM} = 7$ cm $m\angle L = 70°$ and $m\angle M = 45°$

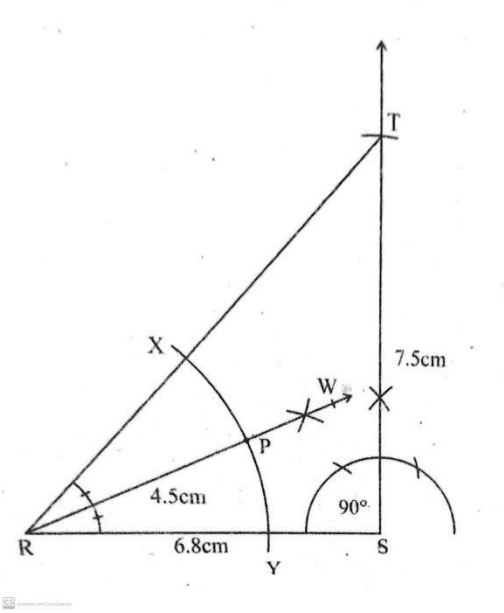
ii. Draw the right bisector $\overleftrightarrow{PQ}$ of the side LM because all points on $\overleftrightarrow{PQ}$ are equidistant from points L and M.

iii. With centre at L , draw an arc XY of radius 3 cm which does not cut $PQ$ at any point. iv. So the required point is not possible.

Q. 8 Construct a right angled triangle RST with $\mathrm{m}\overline{\mathrm{RS}} = 6.8$ cm, $\mathrm{m}\angle \mathrm{S} = 90°$ and $\mathrm{m}\overline{\mathrm{ST}} = 9.5$ cm . Find a point within the triangle RST which is equidistant from $\overline{\mathrm{RS}}$ and $\overline{\mathrm{RT}}$ and 4.5 cm from R .

Solution:

$\triangle \mathrm{RST}; \mathrm{m}\overline{\mathrm{RS}} = 6.8$ cm, $\mathrm{m}\angle \mathrm{S} = 90°, \mathrm{m}\overline{\mathrm{ST}} = 7.5$




Steps of construction:

i. Draw a right-angled $\triangle RST$ in which $m\overline{RS} = 6.8 \text{ cm}, m\angle S = 90°, m\overline{ST} = 7.5 \text{ cm}$

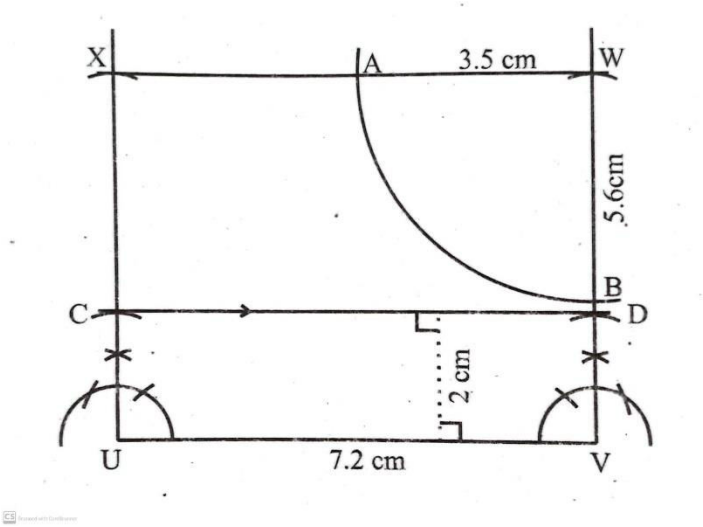
ii. Draw the angle bisector $RW$ of the $\angle R$ because all the points on $\overrightarrow{RW}$ are equidistant from points $\overline{RS}$ and $\overline{RT}$.

iii. With centre at R , draw an arc XY of radius 4.5 cm which cuts the $\overrightarrow{RH}$ at point P .

So the required point is P which is equidistant from $\overline{RS}$ and $\overline{RT}$, and 4.5 cm from R .

Q. 9 Construct are rectangle UVWX with measure $\text{m}\overline{\text{UV}} = 7.2 \text{ cm}$ and $\text{m}\overline{\text{VW}} = 5.6$ cm . Draw the locus of points at a distance of 2 cm from $\overline{\text{UV}}$ and 3.5 cm from W .

Solution:




Steps of construction:

i. Draw a rectangle UVWX with length $\overline{\mathrm{UV}}\mathrm{cm} = 7.2\ \mathrm{cm}$ and width $\mathrm{m}\overline{\mathrm{VW}} = 5.6\ \mathrm{cm}$.

ii. With the centre at $U$ and $V$ draw two arcs of radius 2 cm which cut the side $UX$ at $C$ and side VW at D . Join C to D .

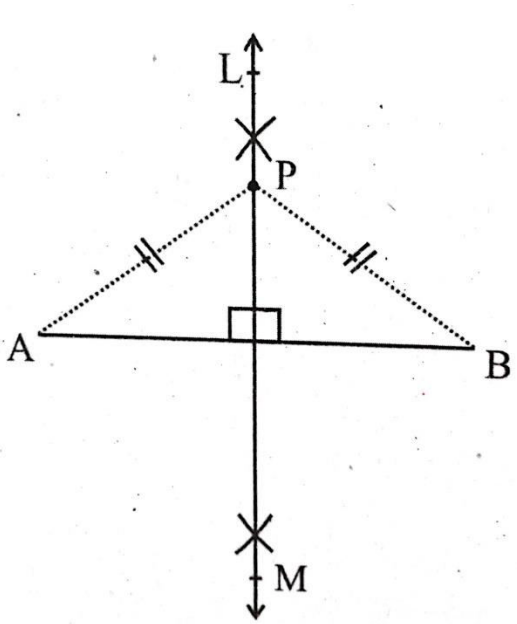
iii. Here, $\overline{\mathrm{CD}} \| \overline{\mathrm{UV}}$ and distance between them is 2 cm . So all points on $\overline{\mathrm{CD}}$ are at distance of 2 cm from side UV.

iv. With the center at W, draw a circle of radius 3.5 cm which is a locus of all such points that are at a distance of 3.5 cm from the vertex W .



Q. 10 Imagine two cell towers located at points A and B on a coordinate lane. 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:




Seps of construction:

Let points A and B are showing location of cell towers.

i. Take two points A and B at suitable distance and join them to get $\overline{AB}$

ii. With centre at A draw two arcs of radius more than half of $\overline{AB}$, above and below the $\overline{AB}$.

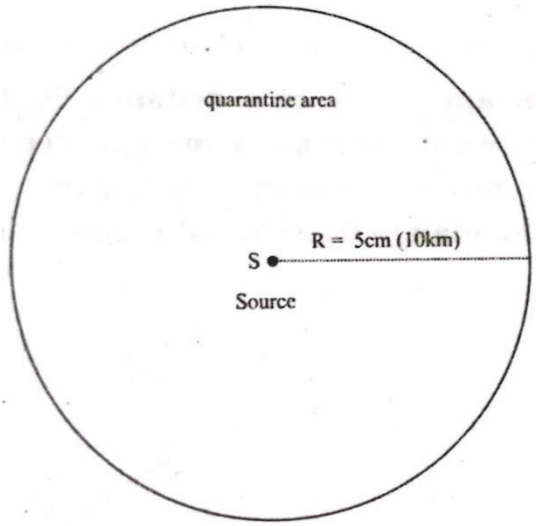
iii. With centre at B , draw two more ares of same radius above and below the $\overline{AB}$ cutting the previous arcs:

iv. Draw a line $l$ through the points of intersection of ares and get a right bisector of $\overline{AB}$.

Thus every position on the right bisector $l$ of $\overline{AB}$ is equidistant from the towers A and B .

Q. 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 autbreak, authorities might determine a quarantine zone within 10 km of the infection soarce. Draw locus of all points 10 km from the source defining the quarantine area to monitor and control the disease's spread.

Solution:




Steps of construction:

i. Mark a point " S " as infection source.

ii. Set a suitable scale i.e. $2\ \text{km} = 1\ \text{cm}$

iii. Using the scale $10\ \text{km} = 5\ \text{cm}$.

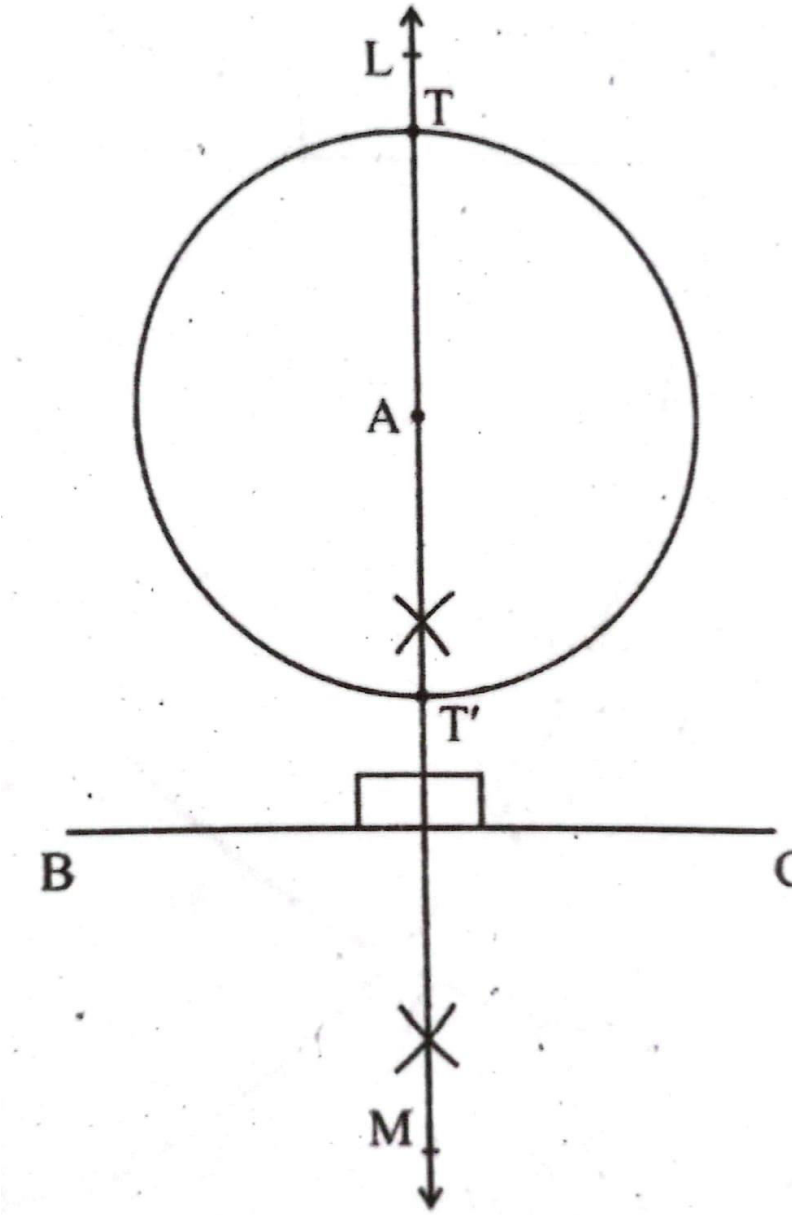
iv. With the centre at S , draw a circle of radius 5 cm .

v. This circle of radius 5 cm represents the 10 km quarantine zone. All locations within this circle are included in the quarantine area.



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

Solution:






Steps of construction:

Treasure is 24 km from $A$ and equidistant from $B$ and $C$.

i. Set a suitable scale of $10 \text{ km} = 1 \text{ cm}$

i.e. $24 \text{ km} = 2.4 \text{ cm}$

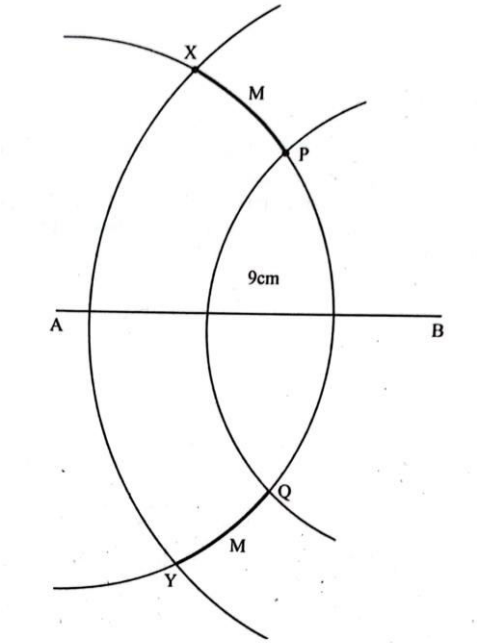
ii. Take any two points B and C in the plane at suitable distance and join them to get $\overline{BC}$.

iii. Draw right bisector $\overleftrightarrow{LM}$ of $\overline{BC}$.

iv. Take any point A on the right bisector $\overleftrightarrow{LM}$.

v. With centre at $A$, draw a circle of radius 2.4 cm such that it

intersects the $\overleftrightarrow{LM}$ at points Tand T'.
vi. Being points of a circle these points are at the distance of 2.4 cm from the cntre point A , and being the points of the right bisector of $\overline{BC}$ are equidistant from the endpoints $B$ and C.
So T and T' could the points where treasure is buried.
Q. 13 There is an apple tree at a distance 90 meters from banana tree in the garden of Sara's house. Sara wants to plant a mango tree M which is 64 meters from apple tree and between 54 and 82 meters from the banana tree. Using scale of 1 cm to represent 10 m , Find the points where the mango tree should be painted.
Solution:






Steps of construction:
Let Points A, B, and M represent the apples, bananas, and Mango trees respectively.
i. Set a suitable scale of $10\ \text{m} = 1\ \text{cm}$
Distance between A and $\text{B} = 90\ \text{m}$ i.e. $m\overline{\text{AB}} = 9\ \text{cm}$
Distance between A and $\text{M} = 64\ \text{m}$ i.e., $m\overline{\text{AM}} = 6.4\ \text{cm}.$
Distance between B and $\text{M} = 54\ \text{m}$ to 82 m i.e. $m\overline{\text{BM}} = 5.4\ \text{cm}$ to 8.2 cm .
ii. Draw a line segment AB of length 9 cm which means points A and B are $9\ \text{cm}(90\ \text{m})$ apart from each other.
iii. Taking A as centre, draw a semicircle of radius 6.4 cm on the B side. All points on the semicircle are at a distance of $6.4\ \text{cm}(64\ \text{m})$

from point A .
iv. Taking B as centre, draw an arc of radius 5.4 cm on the A side which cuts the semicircle above and below the $\overline{\mathrm{AB}}$ at points P and Q respectively.
v. Taking $B$ as centre, draw another arc of radius 8.2 cm on the $A$ side which cuts the semicircle above and below the $\overline{\mathrm{AB}}$ at points X and Y respectively.
vi. The portion P to X on the semicircle above the $\overline{\mathrm{AB}}$ and the portion Q to Y on the semicircle below the $\overline{\mathrm{AB}}$ is the suitable place for M (mango tree) because this place is at a distance of $6.4\ \mathrm{cm}(64\ \mathrm{m})$ from $A$ (apple tree) and $5.4\ \mathrm{cm}(54\ \mathrm{m})$ to $8.2\ \mathrm{cm}(82\ \mathrm{m})$ from B (Bananas Trees).