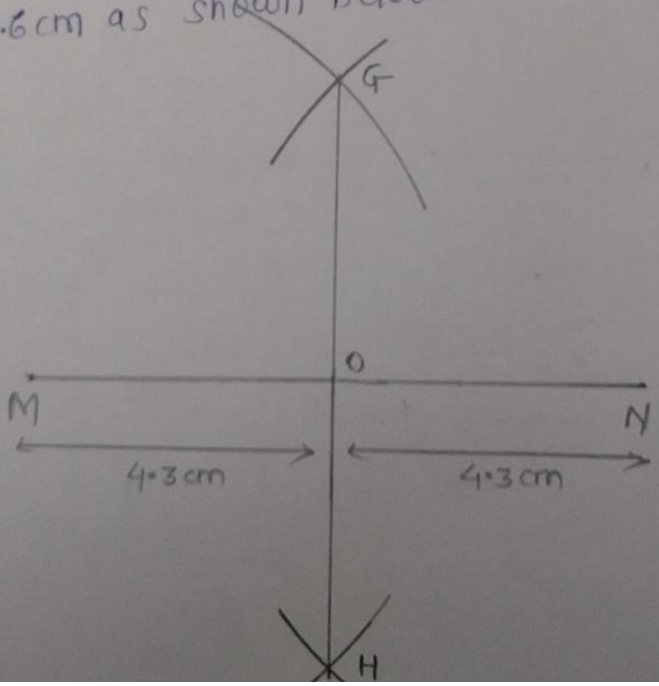
Chapter 17. Construction

Exercise 17.1

1) Draw a line segment of length 8.6 cm. Bisect it and measure the length of each part.

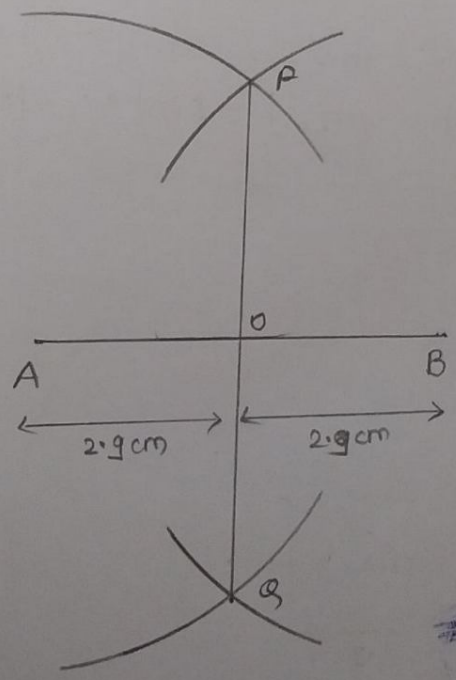
→
- First we will draw a line segment of length 8.6 cm as shown below.
  Here, MN = 8.6 cm.
- Now, we will draw an arc by taking point M as centre & the radius will be more than half of 8.6 cm distance.
- Similarly, we will draw an arc on both sides of MN by taking point as centre & the radius as already taken so that it cuts previous arc as shown in fig.
- Let us consider the points where arcs are intersecting as G & H.
- Now, we joined these two points G & H where they intersects MN at point 'O'.

Thus, Here MO = ON = 4.3 cm
- That means, here we bisected the line segment MN of length 8.6 cm as shown below.



2) Draw a line segment AB of length 5.8cm. Draw the perpendicular bisector of this line segment.

→
- Initially, we will draw a line segment AB of length 5.8 cm.
- Now, we will draw an arc on both sides of segment AB by taking point A as centre & radius will be more than half of 5.8cm as shown in fig.
- Similarly, we will draw arc which intersects previous arcs on both side of AB by taking point B as centre & radius as taken already.
- Now we will join the points of intersections of two arcs suppose PQ.
- This perpendicular PQ intersects segment AB at point 'O'.
- Thus, here AO = OB = 2.9 cm
  Hence, Here line segment AB is bisected by perpendicular bisector.

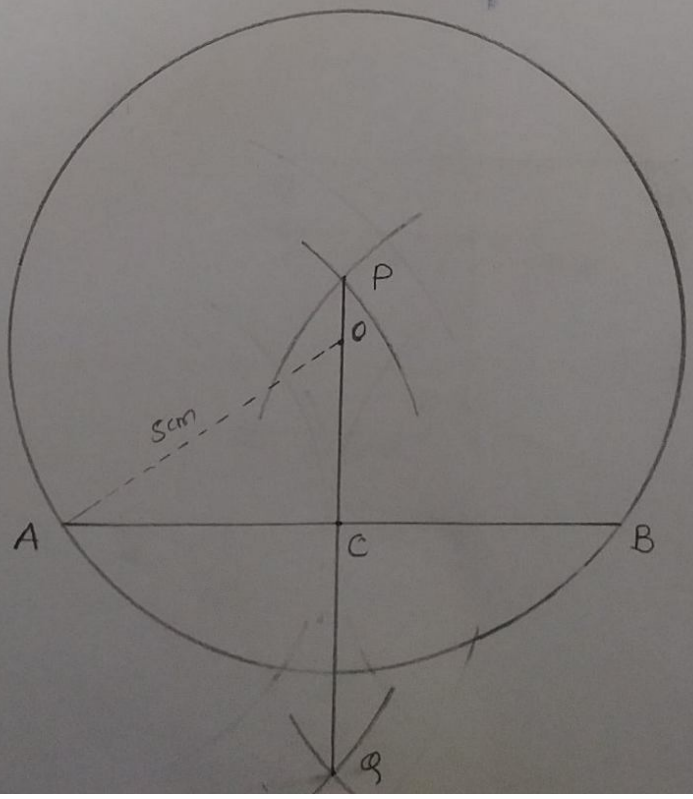


3.) Draw a circle with center at point 'O' and radius 5cm. Draw its chord AB, the perpendicular bisector of line segment AB. Does it pass through the center of the circle?

→
- Initially, we will draw a circle taking center point as 'O' and of radius 5cm as shown in fig. below.
- Here, we drawn a chord AB as shown.
- Now, we will draw arcs on both sides of chord AB by taking A as center & radius should be more than half of length of chord AB as shown.
- Now, simillarly we will draw arcs which intersects the previous arcs by taking point B as center & radius as taken already as shown below.
- Now, we will join the points of intersection of two arcs namely P and Q.
- Now, we will join points P & Q which intersects chord AB at point C as shown in figure below.

Thus, here, $AC = BC$

And we can say, that PQ is the perpendicular bisector of chord AB which passes through the center of circle.



Exercise 17.2

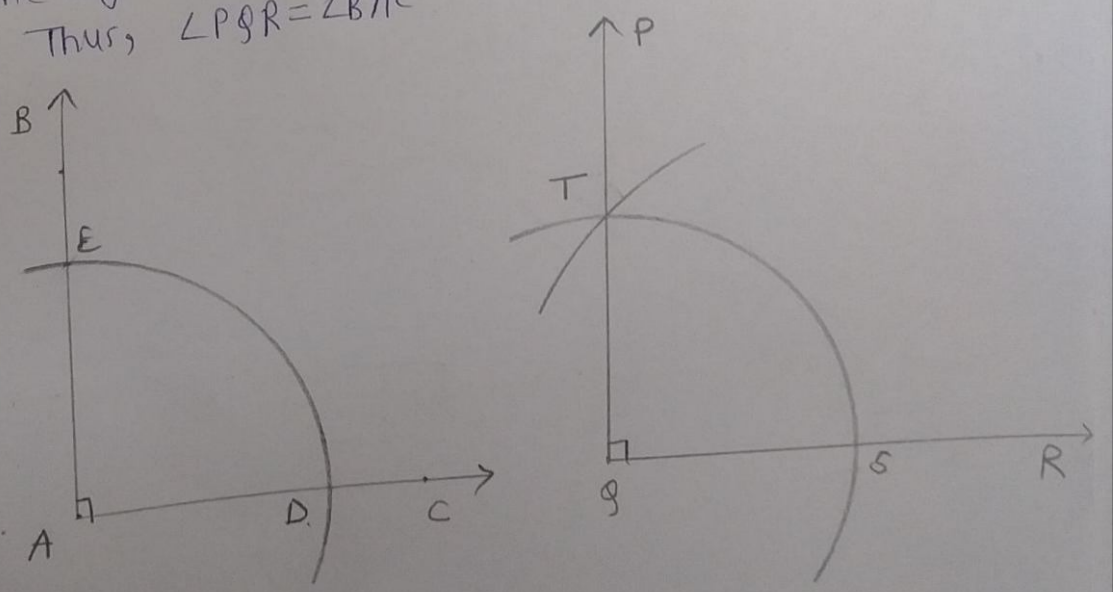
1) Draw an angle and label it as ∠BAC. Construct another angle, equal to ∠BAC.

→ Let us follow following steps:

- Initially we will draw any ∠BAC as shown in fig.
- Now, we have to construct the same angle ∠PQR equal to ∠BAC.
- Now, first we will draw a line segment QR as shown in fig.
- We will draw an arc by taking point A as center & of any radius which intersects AB in point E & AC in point D as shown in fig.
- Take same radius & take point Q as a center & draw an arc which intersects PQ in point T & QR in point S as shown in fig.
- Now, we will take point S as center & radius equal to distance DE & we will draw an arc which intersects QP in point T as shown in fig.

Thus, the angle PQR formed is equal to ∠BAC.

Thus, ∠PQR = ∠BAC

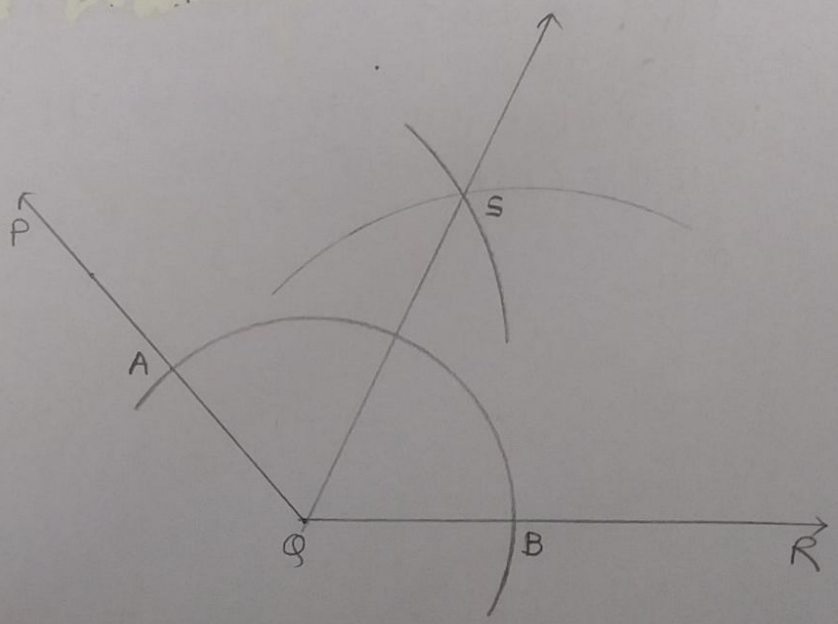


2.) Draw an obtuse angle. Bisect it. Measure each of the angle so formed.

→ Let us follow the following steps:

- Draw an obtuse angle suppose $\angle PQR = 130°$.
- Now, we will draw an arc by taking Q as center and of any radius which intersects PQ in point A & QR in point B as shown in fig.
- Now, we will draw an arc by taking point A centre & radius more than half of distance AB as shown.
- Similarly, we will draw again an arc by taking point B as center & same radius which cuts the previous arc in point S as shown in fig.
- Now, we will joint QS.

Thus, $\angle PQS = \angle SQR$

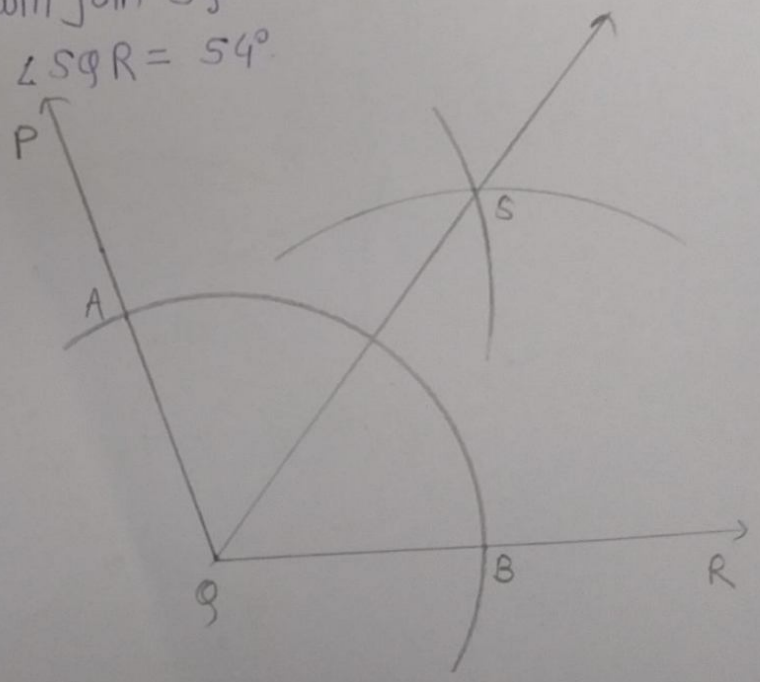


3. Using your protractor, draw an angle of 108°. With this given angle as given, draw an angle of 54°.

→ Let us follow the following steps:

- first we will draw an angle. $\angle PQR = 108°$.
- By taking point Q as center & of any radius we will draw an arc which cuts PQ in point A & QR in point B as shown in fig. below.
- Again, we will take point A as centre & radius equal to more than half of AB we will draw an arc as shown in fig.
- Similarly, we will draw an arc which cuts previous arc in point 'S' by taking B as center & of same radius as shown in fig.
- Now, we will join SQ.

Thus, Here, $\angle SQR = 54°$

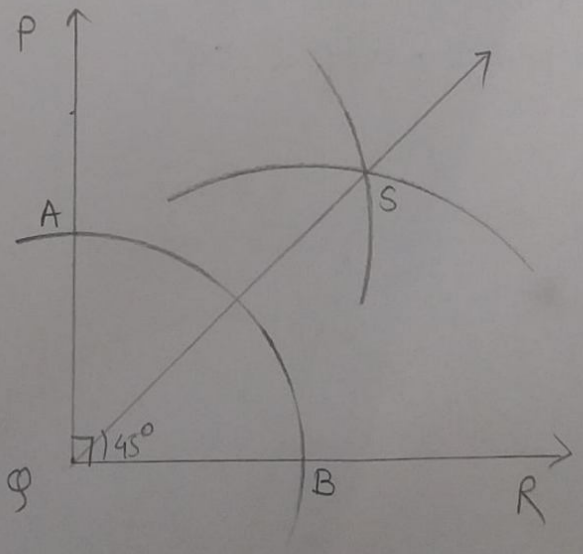


4) Using the protractor, draw a right angle. Bisect it to get an angle of measure 45°.

→ Let us follow the following steps:

- First draw an angle $\angle PQR = 90°$.
- Take point Q as center & draw an arc which intersects PQ in point A and QR in point B as shown in fig. below
- Now, take point A as center & radius equal to more than half of AB and draw an arc as shown.
- Simillarly, take point B as center & same radius & draw an arc which cuts the previous arc in point S as shown in fig. below.
- Now, join QS as shown.

Thus, here $\angle SQR = 45°$

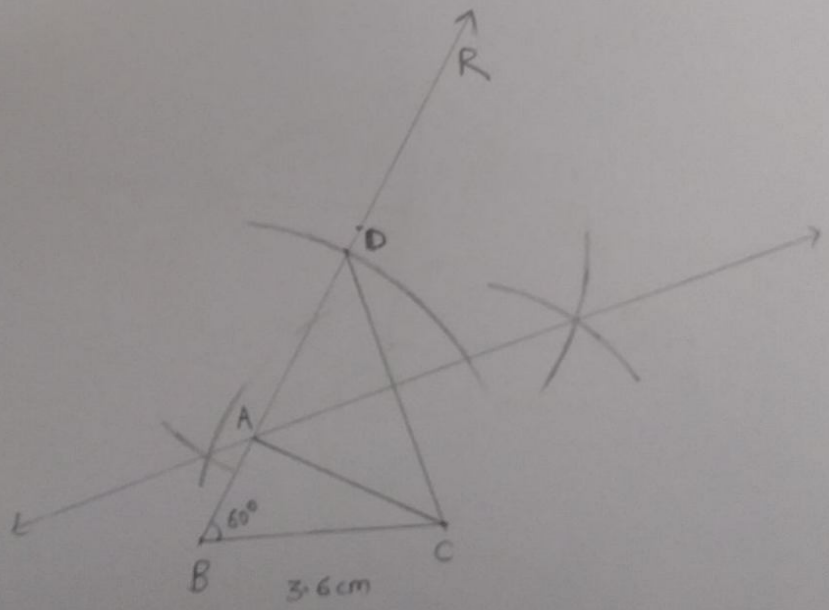


Exercise 17.3

1.) Construct a ΔABC in which $BC = 3.6$ cm, $AB + AC = 4.8$ cm and $\angle B = 60°$.

→ Let us follow the following steps:

- First draw a line segment $BC = 3.6$ cm.
- At point B, draw an angle $\angle RBC = 60°$.
- Now, take radius equal to 4.8 cm & center as point B on BR and draw an arc which intersects BR at point D as shown in fig.
- Now, join the points D and C.
- Now, we will draw a perpendicular bisector of DC i.e. which intersects DB in point A as shown in fig.
- Now, will join AC and hence the required ΔABC is formed finally.

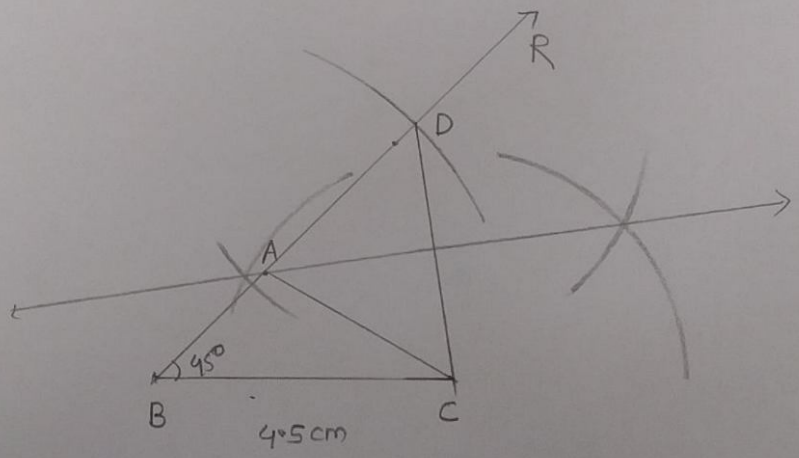


2) Construct a ΔABC in which $AB + AC = 5.6$ cm, $BC = 4.5$ cm and $\angle B = 45°$.

→ Let us follow the following steps for construction:

- Draw a line segment. $BC = 4.5$ cm
- At point B, draw an angle $\angle RBC = 45°$.
- Take point B as center & radius equal to 5.6 cm and draw an arc which intersects RB at point D' as shown.
- Now, join the points D and C.
- Now, draw a perpendicular bisector of DC which may intersects BD at point A as shown.
- Now, we will join AC.

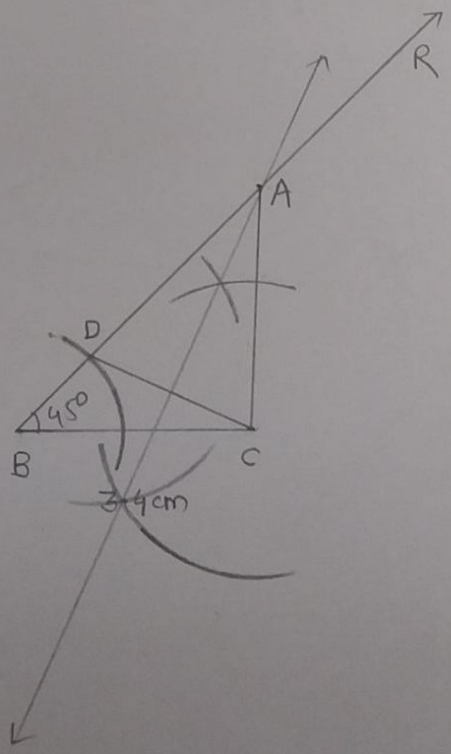
And hence, the required triangle ΔABC is formed finally.



3.) Construct a ΔABC in which $BC = 3.4$ cm, $AB - AC = 1.5$ cm & $\angle B = 45°$.

→ Let us follow the following steps of construction:

- first draw a line segment $BC = 3.4$ cm.
- Now, draw an angle $\angle RBC = 45°$.
- Take radius equal to 1.5cm & point B as center & draw an arc along RB which intersects RB at point D as shown in fig.
- Now, join the points D and C as shown.
- Now, draw a perpendicular bisector of line segment DC which intersects RB at point A as shown.
  And join the line segment AC.
- Now, finally the required triangle ΔABC is formed here.



4.) Using rulers & compasses only, construct a ΔABC, given base $BC = 7cm$, $\angle ABC = 60°$ and $AB + AC = 12cm$.

→ Let us follow the following steps of construction:

- First draw a line segment $BC = 7cm$
- By taking point B as center & of any radius draw an arc which cuts BC at point N as shown below.
- Now, by taking same radius & point N as center draw an arc which cuts previous arc in point M as shown in fig.
- Now, join the line segment BM & produce BM upto any point suppose 'P'.
- Now cut $BR = 12cm$ from BP as shown. and join the points R & C.
- Now, draw a perpendicular bisector of RC which intersects BR in point A suppose.
- Now, finally join the line segment AC and hence finally the required ΔABC is formed here as shown in fig. below.