4 GEOMETRY

INTRODUCTION

4.1 Circles are geometric shapes you can see all around you. The significance of the concept of a circle can be well understood from the fact that the wheel is one of the ground-breaking inventions in the history of mankind

4.2 **Parts of Circle :**

A circle, you can describe, is the set of all points in a plane at a constant distance from a fixed point. The fixed point is the centre of the circle; the constant distance corresponds to a radius of the circle. A line that cuts the circle in two parts is called a secant of the circle. A line segment whose end points lie on the circle is called a chord of the circle..

Exercise 4.1

Fill in the blanks :

(i) Twice of the radius is called _______ of the circle. **[Ans. diameter]**

(ii) Longest chord passes through the _______ of the circle. **[Ans. centre]**

(iii) Distance from the centre to any point on the circumference of the circle is called _______. **[Ans. radius]**

(iv) A part of a circle between any two points is called a/an _______ of the circle. **[Ans. arc]**

(v) A circle divides the plane into _______ parts. **[Ans. three parts]**

Write True or False. Give reasons for your answers.

(i) Line segment joining any two points on the circle is called radius of the circle. **[Ans. False]**

(ii) Point of concurrency of the diameter is the centre of the circle. **[Ans. True]**

(iii) The boundary of the circle is called its circumference. **[Ans. True]**

(iv) A circle has infinite number of equal chords. **[Ans. True]**

(v) Sector is the region between the chord and its corresponding arc. **[Ans. False]** point of the ... and the circle is circumcircle.

4.4 Properties of Chords of a Circle :

In this chapter, already we come across lines, angles, triangles and quadrilaterals. Recently we have seen a new member circle. Using all the properties of these, we get some standard results one by one. Now, we are going to discuss some properties based on chords of the circle.

4.4.1 Perpendicular from the Centre to a Chord :

Theorem 2 :
The perpendicular from the centre of a circle to a chord bisects the chord.

Converse of Theorem 2 :
The line joining the centre of the circle and the midpoint of a chord is perpendicular to the chord.

4.4.2 Angle Subtended by Chord at the Centre :

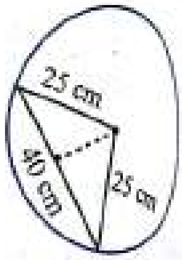
Instead of a single chord we consider two equal chords. Now we are going to discuss another property.

Theorem 3 : Equal chords of a circle subtend equal angles at the centre
The line joining the centre of the circle and the midpoint of a chord is perpendicular to the chord.

Exercise 4.2

1. The radius of the circle is 25cm and the length of one of its chord is 40cm. Find the distance of the chord from the centre.

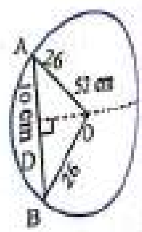
Sol. Distance of the chord from the centre



$$= \sqrt{(25\text{cm})^2 - (20\text{ cm})^2}$$
$$= \sqrt{(625 - 400)}\text{cm}$$
$$= \sqrt{225} = 15 \text{ cm}$$

2. The diameter of the circle is 52cm and the length of one of its chord is 20cm. Find the distance of the chord from the centre.

Sol. The distance of the chord from the centre O



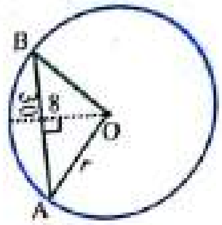
$$OD = \sqrt{26^2 - 10^2}$$
$$= \sqrt{676 - 100}$$
$$= \sqrt{576} = 24 \text{ cm}$$

3. The chord of length 30 cm is drawn at the distance of 8cm from the centre of the circle. Find the radius of the circle.

Sol.

$$\text{Radius of the circle} = \sqrt{8^2+15^2} = \sqrt{64+225}$$

$$= \sqrt{289} = 17 \text{ cm}$$



4. Find the length of the chord AC where AB and CD are the two diameters perpendicular to each other of a circle with radius $4\sqrt{2}$ cm and also find $\angle OAC$ and $\angle OCA$.

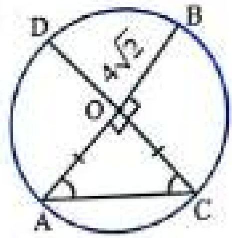
Sol. ΔOAC is an isoceles triangle with one angle $90°$

$$\therefore \angle OAC + \angle OCA = 180° - 90°$$

$$2\angle OAC = 90° \quad (\because \angle OAC = \angle OCA)$$

$$\angle OAC = 45°$$

$$\therefore \angle OCA = 45°$$



$$\text{Length of the chord} = \sqrt{(4\sqrt{2})^2+(4\sqrt{2})^2}$$

$$= \sqrt{16\times2+16\times2}$$

$$= \sqrt{64} = 8 \text{ cm}$$

5. A chord is 12cm away from the centre of the circle of radius 15cm. Find the length of the chord.

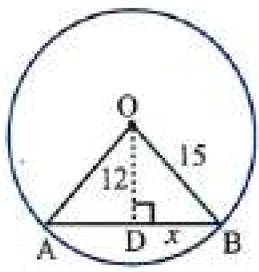
Sol.

$$BD = \sqrt{15^2-12^2}$$

$$= \sqrt{225-144}$$

$$= \sqrt{81}$$

$$= 9 \text{ cm}$$



$\therefore$ length of the chord AB $= 9 + 9 = 18$ cm

6. In a circle, AB and CD are two parallel chords with centre O and radius 10 cm such that AB = 16 cm and CD = 12 cm determine the distance between the two chords?

Sol. The distance between the two chord FE

$$= OE + OF$$

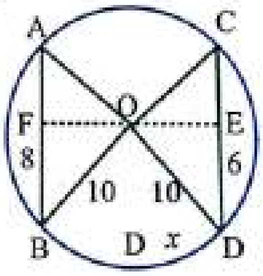
$$OE = \sqrt{10^2-6^2} = \sqrt{100-36} = \sqrt{64} = 8 \text{ cm}$$

$$OF = \sqrt{10^2-8^2}$$

$$= \sqrt{100-64}$$

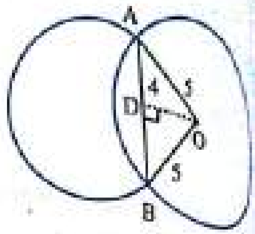
$$= \sqrt{36} = 6 \text{ cm}$$

$$\therefore FE = 8 \text{ cm} + 6 \text{ cm} = 14 \text{ cm}$$



$\therefore$ Distance between the chords is 14 cm

7. Two circles of radii 5 cm and 3 cm intersect at two points and the distance between their centres is 4 cm. Find the length of the common chord.



Sol.

$$OD = DP = \frac{4\text{cm}}{2} = 2 \text{ cm}$$

$$\begin{aligned} AD &= BD = \sqrt{5^2 - 4^2} \\ &= \sqrt{25 - 16} \\ &= \sqrt{9} \\ &= 3 \text{ cm} \end{aligned}$$

$\therefore$ The length of the common chord $AB = AD + BD = (3 + 3)$ cm $= 6$ cm

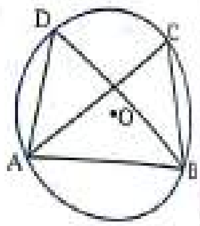
4.4.3 Angle Subtended by an Arc of a Circle :

Now we are going to verify the relationship between the angle subtended by an arc at the centre and the angle subtended on the circumference.

4.4.4 Angle at the Centre and the Circumference :

Theorem 5 :
The angle subtended by an arc of the circle at the centre is double the angle subtended by it at any point on the remaining part of the circle.

4.4.5 Angles at the Circumference to the same Segment :
Consider the circle with centre O and chord AB. C and D are the points on the circumference of the circle in the same segment. Join the radius OA and OB.



$$\frac{1}{2}\angle AOB = \angle ACB \text{ (by theorem 5)}$$

$$\text{and } \frac{1}{2}\angle AOB = \angle ADB \text{ (by theorem 5)}$$

$$\angle ACB = \angle ADB$$

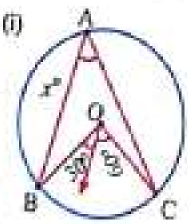
This conclusion leads to the new result.

Theorem 6 : Angles in the same segment of a circle are equal

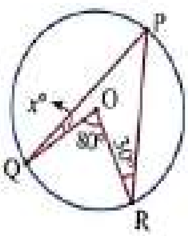
Exercise 4.3

1. Find the value of $x°$ in the following:

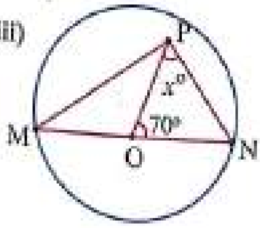
(i)



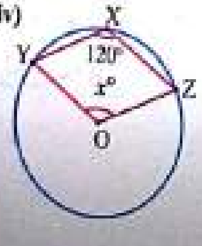
(ii)



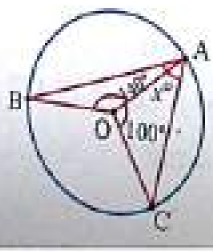
(iii)



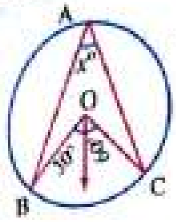
(iv)



(v)

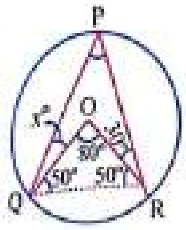


Sol. (i)



$x° = \frac{1}{2}\angle BOC = \frac{1}{2} \times (30° + 60°) = \frac{1}{2} \times 90° = 45°$

(ii)

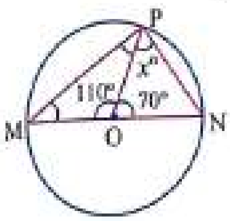


$\angle QPR = \frac{1}{2}\angle QOR = \frac{1}{2} \times 80° = 40°$

In ΔQPR

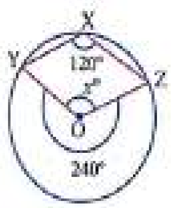
$$\begin{aligned}
\angle R + \angle P + \angle Q &= 180° \\
80° + 40° + \angle Q &= 180°; \\
\angle Q &= 180° - 120° = 60° \\
\angle Q &= x° + 50° = 60° \\
x° &= 60° - 50° = 10°
\end{aligned}$$

(iii)



$$\begin{aligned}
\angle MPN &= 90° \text{ (Angle subtended by the diameter is 90°)} \\
\angle OMP + \angle OPM &= 180° - 110° = 70° \\
\angle MPO &= \frac{70}{2} = 35° \\
\text{But } \angle MPN &= 90° \\
\therefore x &= \angle OPN = 90° - 35° = 55°
\end{aligned}$$

(iv)



Central angle is twice that of angle subtended on the circumference

$$\begin{aligned}
\angle YOZ &= 120° \times 2 = 240° \\
\therefore x + \angle YOZ &= 360° \\
x° &= 360° - 240° = 120°
\end{aligned}$$

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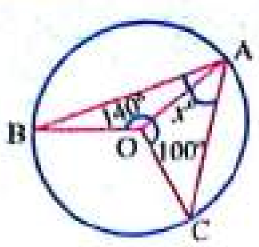
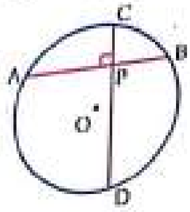
(v)



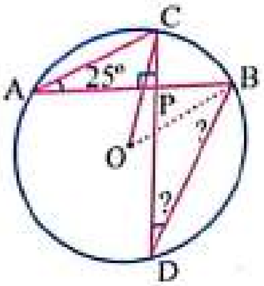
$\angle BOC = 360^o - 240^o = 120^o$

$\therefore \angle BAC = x^o = \frac{120^o}{2} = 60^o$

2. In the given figure, $\angle CAB = 25^o$, find $\angle BDC$, $\angle DBA$ and $\angle COB$



Sol.



(i) $\angle CAB = 25^o$

$\therefore \angle BDC = 25^o$

(ii) $\angle DBA = \angle DCA = 180 - (90 + 25^o)$

$= 180^o - 115^o$

$= 65$

(ii) $\angle COB = 2\angle CAB = 2 \times 25^o = 50^o$

4.5 Cyclic Quadrilaterals :

Now we see a special quadrilateral with its properties called "Cyclic Quadrilateral". A quadrilateral is called cyclic quadrilateral if all its four vertices lie on the circumference of the circle. Now we are going to learn the special property of cyclic quadrilateral.

Theorem 7 :

Opposite angles of a cyclic quadrilateral are supplementary.

Let us see the converse of theorem 7, which is very useful in solving problems.

Converse of Theorem 7 :

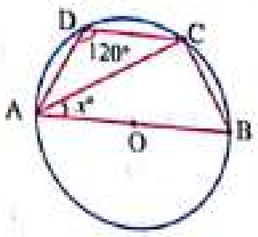
If a pair of opposite angles of a quadrilateral is supplementary, then the quadrilateral is cyclic

Exterior Angle of a Cyclic Quadrilateral :

Theorem 8 : If one side of a cyclic quadrilateral is produced then the exterior angle is equal to the interior opposite angle..

Exercise 4.4

Find the value of x in the given figure.



In the cyclic quadrilateral ABCD

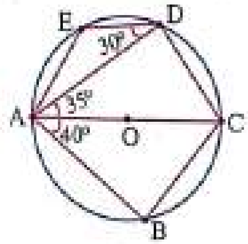
$$\angle ABC = 180° - 120° = 60°$$

$$\angle BCA = 90°$$

$$\therefore x = \angle BAC = 180° - (90° + 60°) = 30°$$

In the given figure, AC is the diameter of the circle with centre O. If $\angle ADE = 30°$; $\angle DAC = 35°$ and $\angle CAB = 40°$.

Find (i) $\angle ACD$ (ii) $\angle ACB$ (iii) $\angle DAE$



(i)
$$\angle ACD = 180° - (90° + 35°) = 180° - 125° = 55°$$

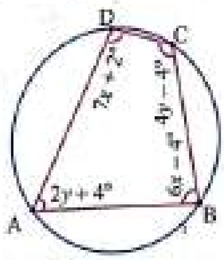
(ii)
$$\angle ACB = 180° - (90° + 40°) = 180° - 130° = 50°$$

(iii)
$$\angle ADC = 90°$$

$$\angle CAE = 180° - 120° = 60°$$

$$\therefore \angle DAE = 60° - 35° = 25°$$

Find all the angles of the given cyclic quadrilateral ABCD in the figure.



In the cyclic quadrilateral $\angle A + \angle C = 180°$

$$2y + \cancel{4} + 4y - \cancel{4} = 180°$$

$$6y = 180°$$

$$y = \frac{180°}{6} = 30°$$

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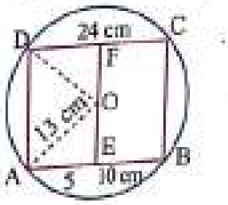
$$\angle B + \angle D = 6x - 4 + 7x + 2$$
$$13x - 2 = 180^\circ$$
$$13x = 180 + 2 = 182^\circ$$
$$x = \frac{182}{13} = 14^\circ$$
$$\therefore \angle A = 2(30) + 4^\circ = 64^\circ$$
$$\angle B = 6(14) - 4^\circ = 84 - 4 = 80^\circ$$
$$\angle C = 4(30) - 4 = 120 - 4 = 116^\circ$$
$$\angle D = 7(14) + 2 = 98 + 2 = 100^\circ$$

4. **AB and CD are two parallel sides of a cyclic quadrilateral ABCD such that AB = 10cm, CD = 24cm and the radius of the circle is 13cm. Find the shortest distance between the two sides AB and CD.**

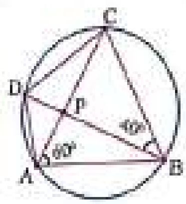
Sol. In this figure,

$$OE = \sqrt{13^3 - 5^2} = \sqrt{169 - 25} = \sqrt{144} = 12 \text{ cm}$$
$$OF = \sqrt{13^2 - 12^2} = \sqrt{169 - 144} = \sqrt{25} = 5 \text{ cm}$$

The shortest distance between = 12 + 5 = 17 cm



5. **In the given figure, ABCD is a cyclic quadrilateral where diagonals intersect at P such that $\angle DBC = 40^\circ$ and $\angle BAC = 60^\circ$ find (i) $\angle CAD$ (ii) $\angle BCD$**



Sol.

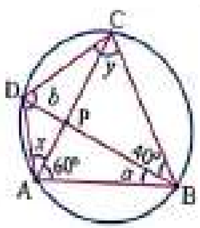
$$\angle DBC = 40^\circ$$
$$\angle BAC = 60^\circ$$

(i) $\angle CAD = \angle CBD = 40^\circ$

($\because$ angles in the same segment are equal)

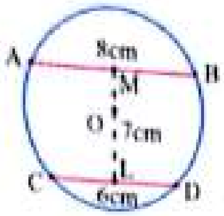
(ii) $\angle BCD + \angle BAD = 180^\circ$

($\because$ In cyclic quadrilateral opposite angles are supplementary)



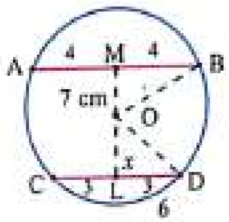
$$\angle BCD + (\angle BAD + \angle CAD) = 180^\circ$$
$$\angle BCD + (60^\circ + 40^\circ) = 180^\circ$$
$$\angle BCD = 180^\circ - 100^\circ = 80^\circ$$

In the given figure, AB and CD are the parallel chords of a circle with centre O. Such that AB = 8cm and CD = 6cm. If OM ⊥ AB and OL ⊥ CD distance between LM is 7cm. Find the radius of the circle?



Sol. In the figure

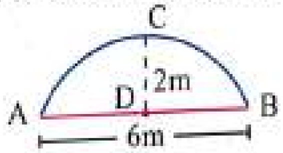
$$LM = 7 \text{ cm}$$
$$\text{Let } OM = (7-x) \text{ cm}$$
$$MB = \frac{8}{2} = 4 \text{ cm}$$
$$OB = \sqrt{4^2 + (7-x)^2}$$
$$OD = \sqrt{3^2 + x^2}$$
$$OB = OD \ (\because \text{radius})$$
$$\sqrt{16 + (7-x)^2} = \sqrt{3^2 + x^2}$$



Squaring both sides

$$16 + (7-x)^2 = 9 + x^2$$
$$16 + 49 - 14x + \cancel{x^2} = 9 + \cancel{x^2}$$
$$14x = 65 - 9$$
$$14x = 56 \ ; \ x = \frac{54}{14} = 4$$
$$\therefore \text{Radius } OD = \sqrt{3^2 + 4^2} = \sqrt{9+16} = \sqrt{25} = 5 \text{ cm}$$

3. The arch of a bridge has dimensions as shown, where the arch measure 2m at its highest point and its width is 6m. What is the radius of the circle that contains the arch?



Sol.

$$\text{If } CD = 2 \text{ cm and R is the radius, i.e. } OC = OA = OB = R$$
$$\therefore OD = OC - DC = R - 2 \text{ cm}$$
$$\text{since } AB = 6 \text{ cm}$$
$$\Rightarrow \quad AD = DB = \frac{6}{2} = 3 \text{ cm}$$

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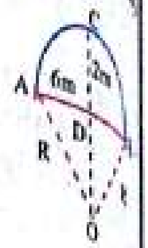
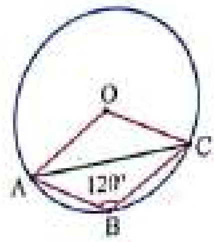
In ΔOBD, (By Pythogoras theorem)

$$OB^2 = OD^2 + BD^2$$
$$R^2 = (R-2)^2 + 3^2$$
$$\Rightarrow \cancel{R^2} = R - 4R + 4 + 9$$
$$\Rightarrow = \cancel{R^2} - 4R + 13$$
$$4R = 13$$
$$\Rightarrow R = \frac{13}{4} = 3.25 \text{ cm}$$

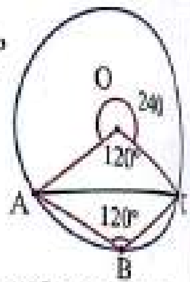


8. In figure $\angle ABC = 120°$, where A,B and C are points on the circle with centre O. Find $\angle OAC$?

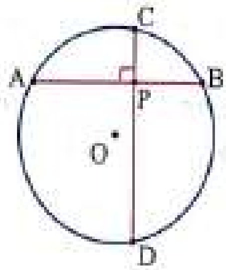


Sol.

$$\text{reflex } \angle AOC = 2 \times \angle ABC = 2 \times 120° = 240°$$
$$\therefore \angle AOC = 360° - 240° = 120°$$
$$\text{Hence } \angle OAC + \angle OCA = 180° - 120° = 60°$$
$$\Rightarrow 2\angle AOC = 60°$$
$$\Rightarrow \angle OAC = \frac{60°}{2} = 30° \quad [\because \angle OAC = \angle OCA]$$



9. A school wants to conduct tree plantation programme. For this a teacher allotted a circle of radius 6m ground to nineth standard students for planting sapplings. Four students plant trees at the points A,B,C and D as shown in figure. Here AB = 8m, CD = 10m and AB $\perp$ CD. If another student places a flower pot at the point P, the intersection of AB and CD, then find the distance from the centre to P.



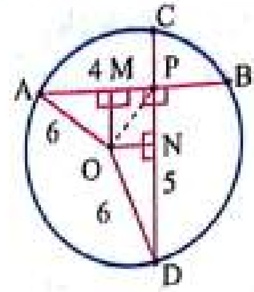
Sol. In the figure

$$OA = OD = 6 \text{ cm} \quad (\because \text{radius} = 6 \text{ cm})$$
$$AB = 8 \text{ cm (Chord)}$$
$$CD = 10 \text{ cm (Chord)}$$
$$OM = \sqrt{6^2 - 4^2} \quad (\because \text{OM bisects the chord and } \perp^r \text{ to the chord})$$
$$= \sqrt{36-16} = \sqrt{20} \text{ cm}$$

$$ON = \sqrt{6^2 - 5^2} = \sqrt{36-25} = \sqrt{11} \text{ cm}$$

ONPM is a rectangle with all the angles 90° and with length $\sqrt{20}$ cm, breadth $\sqrt{11}$ cm.

We need to find OP which is the diagonal of the rectangle ONPM.

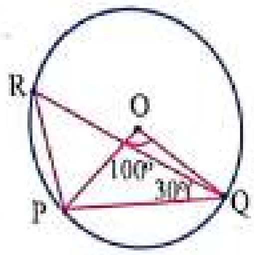


$$\therefore OP = \sqrt{ON^2 + NP^2} = \sqrt{\sqrt{11}^2 + \sqrt{20}^2}$$

($\because$ OM = NP, opposite sides of the rectangle)

$$= \sqrt{11+20} = \sqrt{31} = 5.56 \text{ cm} = 5.6 \text{ cm}$$

In the given figure, $\angle POQ = 100^\circ$ and $\angle PQR = 30^\circ$, then find $\angle RPO$.



In the figure $\angle POQ = 100^\circ$

$\angle PQR = 30^\circ$

$\angle PQR = \frac{1}{2}\angle POQ = \frac{1}{2} \times 100 = 50^\circ$ ... (1)

In ΔOPQ,

$\angle OPQ = \angle OQP = \angle POQ = 180^\circ$

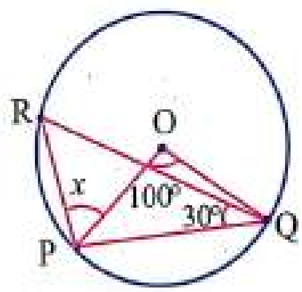
$2\angle OPQ + 100 = 180^\circ$

$2\angle OPQ = 180^\circ$

$2\angle OPQ = 80^\circ$ $(180^\circ - 80^\circ = 100)$

$\therefore \angle OPQ = 40^\circ$

In ΔPRQ,



$\angle R + \angle P + \angle Q = 180^\circ$

$50^\circ + (40 + x) + 30^\circ = 180^\circ$

$(40 + x)^\circ = 180^\circ - 80 = 100^\circ$

$x^\circ = 100^\circ - 40^\circ = 60^\circ$

$\therefore \angle RPO = x = 60^\circ$

4.6 **Constructions**

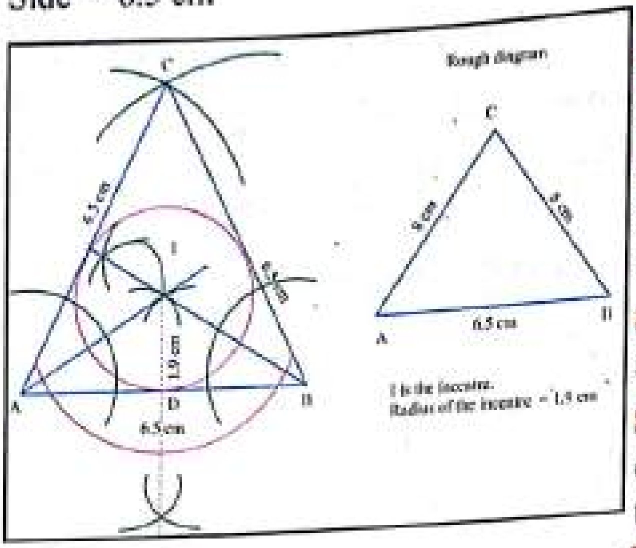
In the first term we have learnt to locate circumcentre and ortho centre of a triangle. Now we are ready to locate in centre and centroid of a triangle. For this we use (i) the construction of perpendicular bisector of a line segment (ii) the construction of angle bisector of a given angle.

4.6.1 **Construction of the Incircle of a Triangle Incentre** ... formed by) the intersection

Exercise 4.5

1. Draw an equilateral triangle of side 6.5 cm and locate its incentre. Also draw the incircle.

Sol. Side = 6.5 cm



Construction :

Step 1 : Draw ΔABC with $AB = BC = CA = 6.5$ cm

Step 2 : Construct angle bisectors of any two angles (A and B) and let them meet at I. I is the incentre of ΔABC.

Step 3 : Draw perpendicular from I to any one of the side (AB) to meet AB at D.

Step 4 : With I as centre, ID as radius draw the circle. This circle touches all the sides of triangle internally.

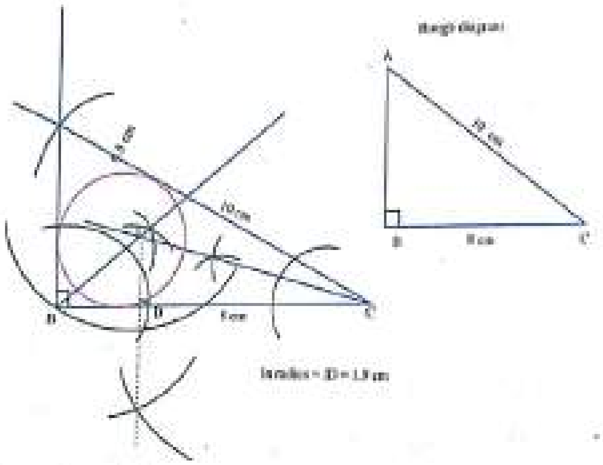
Step 5 : Measure in radius.

In radius = 1.9 cm.

2. Draw a right triangle whose hypotenuse is 10 cm and one of the legs is 8 cm. Locate its incentre and also draw the incircle.

Sol. hypotenuse = 10 cm

One of the legs = 8 cm



Construction :

Step 1 : Draw ΔABC with BC = 8 cm. AC = 10 cm with right angle at B.

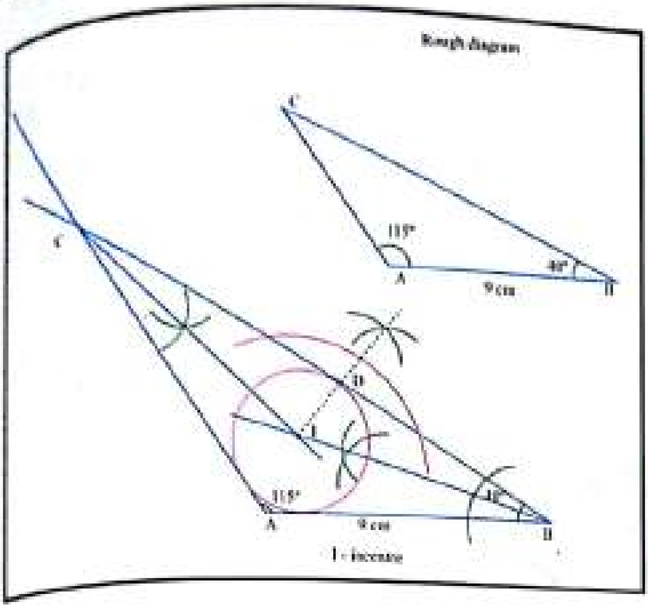
Step 2 : Construct angle bisectors of any two angles (B and C) and let them meet at I. I is the incentre.

Step 3 : Draw perpendicular from I to any side of the triangle to meet BC at D.

Step 4 : With I as centre, ID as radius draw the incircle, which touches all the three sides of the triangle internally. In radius = 1.9 cm.

Draw ΔABC given AB = 9 cm, $\angle CAB = 115°$ and $\Delta ABC = 40°$. Locate its incentre and also draw the incircle. (Note: You can check from the above examples that the incentre of any triangle is always in its interior).

Sol.



Construction :

Step 1 : Draw ΔABC with AB = 9 cm. $\angle A = 115°, \angle B = 40°$.

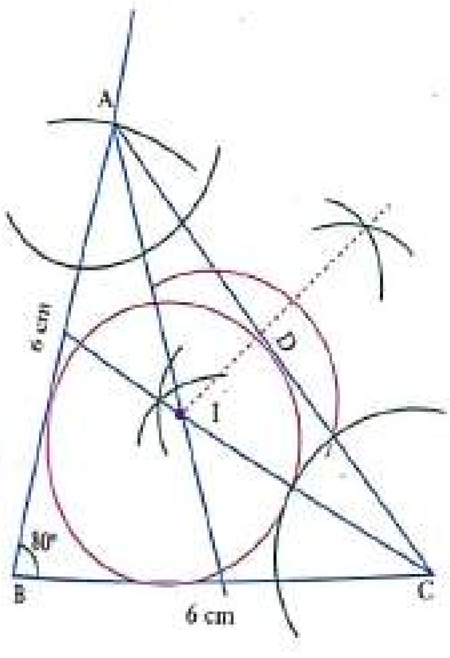
Step 2 : Construct angle bisectors of any two angles (B and C). Let them meet at I. I is the incentre of ΔABC.

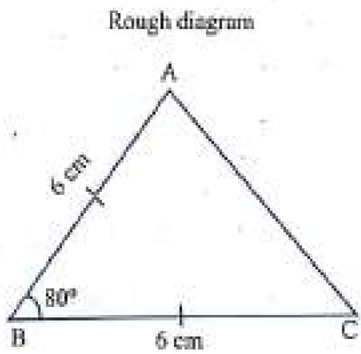
Step 3 : Draw perpendicular from I to any side (BC) to meet BC at D.

Step 4 : Draw incircle, with I as centre and ID a radius. Measures the in radius.

Construct ΔABC in which AB = BC = 6cm and B = 80°. Locate its in centre and draw the incircle.

Sol. In ΔABC, AB = BC = 6 cm, $\angle B = 80°$.





I - in centre

Construction :

Step 1 : Draw ΔABC with BC = 6 cm. AB = 6 cm, AB = 6 cm, and $\angle B = 80°$.

Step 2 : Construct the incentre I and ID is the in radius, as in the previous sums.

Step 3 : Draw incircle with I as centre and ID as radius. It touches all the three sides internally.

Step 4 : Measure in radius. In radius = 1.7 cm

Exercise 4.6

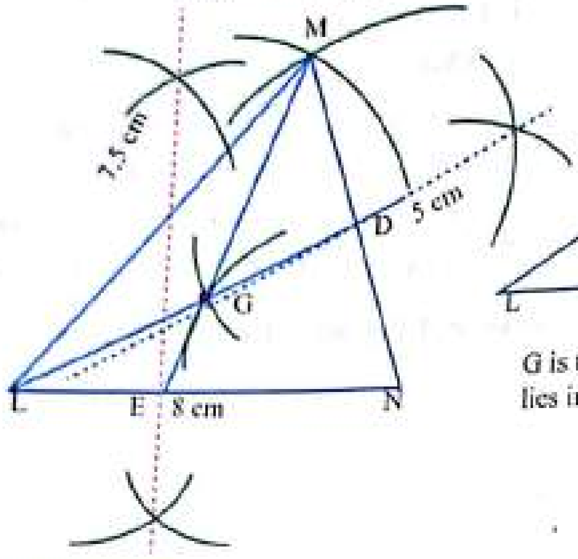
1. Construct the ΔLMN such that LM = 7.5cm, MN = 5cm and LN = 8cm. L... its centroid.

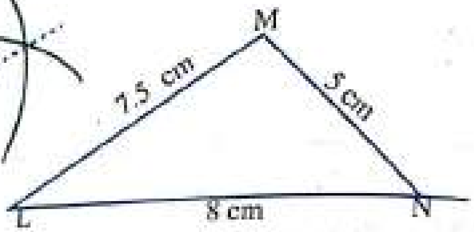
Sol. In ΔLMN

LM = 7.5 cm.

MN = 5 cm.

LN = 8 cm





G is the centroid and it lies inside the triangle

Construction :

Step 1 : Draw ΔLMN with LNM = 8 cm, MN = 5 cm, LM = 7.5 cm

Step 2 : Construct perpendicular bisectors for any two sides (LN and MN) to f... the mid points of LM and MN.

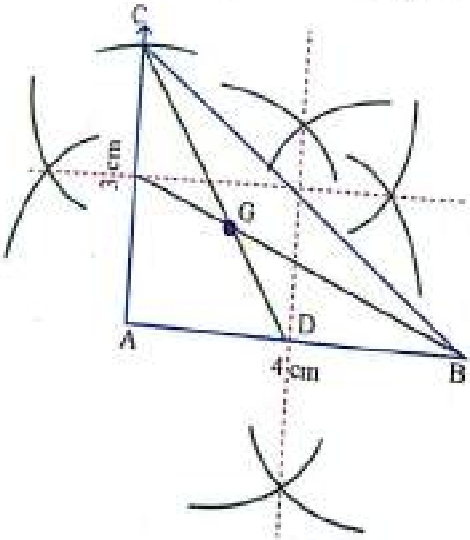
Step 3 : Draw the medians LD, ME. Let them meet at G.

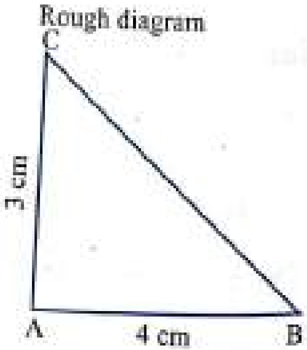
Step 4 : G is the centroid of the triangle LMN.

2. Draw and locate the centroid of the triangle ABC where right angle at A, AB = 4cm and AC = 3cm.

Sol. In ΔABC,

AB = 4 cm, AC = 3 cm, ∠A = 90°





Construction :

Step 1 : Draw ΔABC with $AB = 4$ cm, $AC = 3$ cm, $\angle A = 90^\circ$

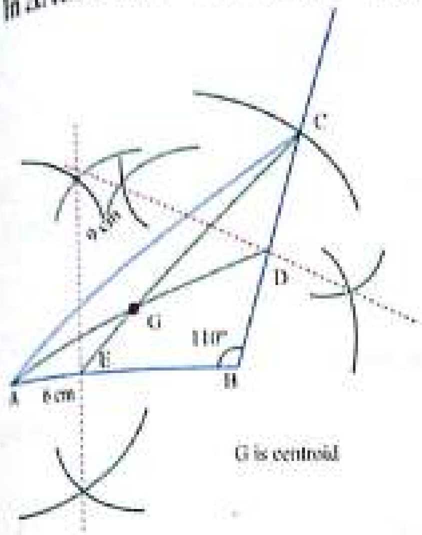
Step 2 : Draw perpendicular bisectors of any two sides (AB and AC) to find the mid points of AB and AC.

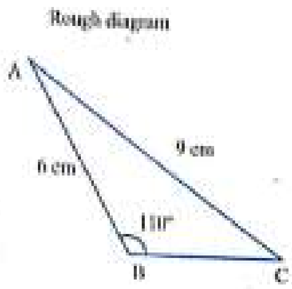
Step 3 : Draw the medians CD and BE. Let them meet at G.

Step 4 : G is the centroid of the given triangle.

Draw the ΔABC, where $AB = 6$cm, $B = 110^\circ$ and $AC = 9$cm and construct the centroid.

In ΔABC, $AB = 6$ cm, $\angle B = 110^\circ$, $AC = 9$ cm





Construction :

Step 1 : Draw ΔABC with $AB = 6$ cm, $\angle B = 110^\circ$, $AC = 9$ cm

Step 2 : Draw perpendicular bisectors of any two sides (BC and AB) to find the mid points of BC and AB.

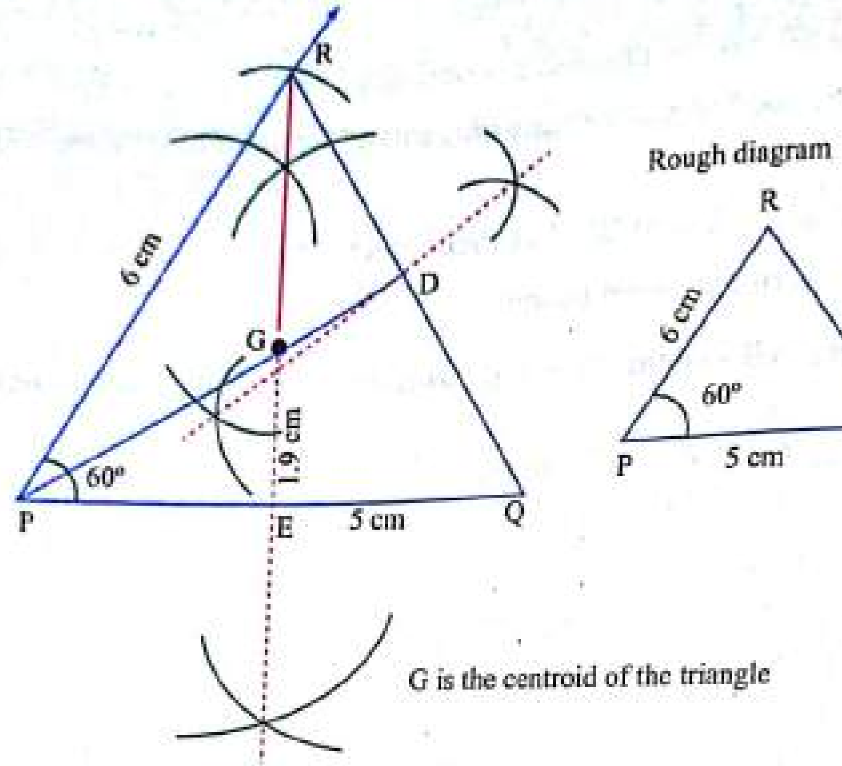
Step 3 : Construct medians AD and CE. Let them meet at G.

Step 4 : G is the centroid of the given ΔABC.

Construct the ΔPQR such that $PQ = 5$cm, $PR = 6$cm and $\angle QPR = 60^\circ$ and locate its centroid.

Sol. In ΔPQR,

$$PQ = 5 \text{ cm},$$
$$PR = 6 \text{ cm}$$
$$\angle QPR = 60^\circ$$



Construction :

Step 1 : Draw ΔPQR with the given measurement

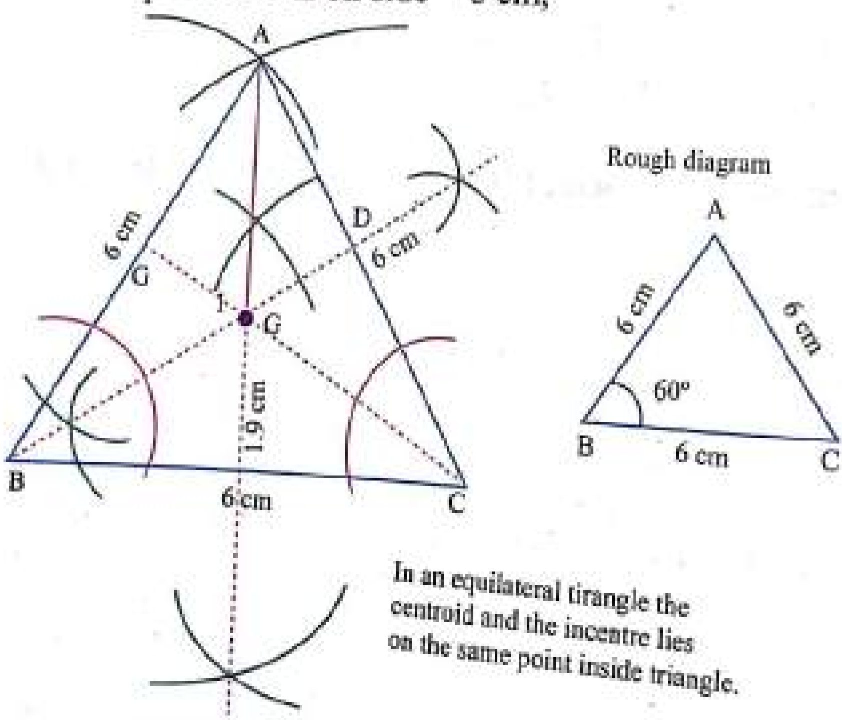
Step 2 : Draw perpendicular bisectors of any two sides (PQ and QR) to find the mi points of PQ and QR.

Step 3 : Draw medians PD and RE. Let them meet at G.

Step 4 : G is the centroid of the given ΔPQR.

5. Construct an equilateral triangle of side 6cm and locate its centroid and also i incentre. What do you observe from this?

Sol. In an equilateral Δ on side = 6 cm,



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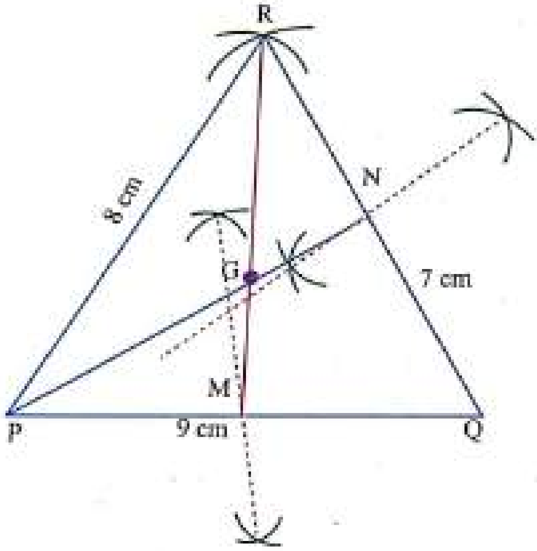
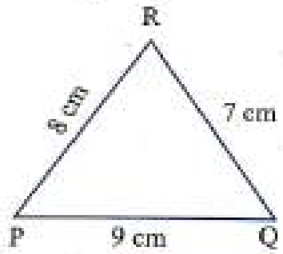
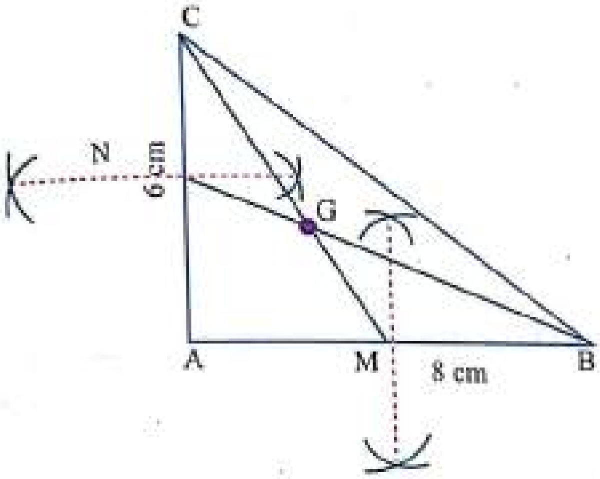
1. **Construct the centroid of ΔPQR such that $PQ = 9$ cm, $PQ = 7$cm, $RP = 8$ cm.**

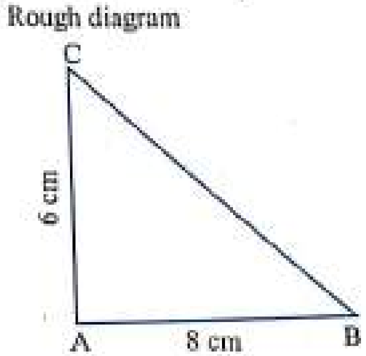
Sol. In ΔPQR, $PQ = 5$ cm, $PR = 6$ cm, $\angle QPR = 60^o$





Draw and locate the centroid of the triangle ABC where right angle at A, AB = 8 cm and AC = 6 cm.





Construction :

Step 1 : Draw ΔABC with the given measurements AB = 8 cm, $\angle A = 90°$ and AC = 6 cm and construct the perpendicular bisector of any two sides (AB and AC) to find the mid points M and N of AB and BC respectively.

Step 2 : Draw the medians (C and BN and let them meet at G. The point G is the centroid of the given ΔABC.