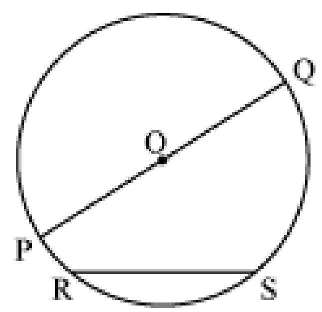
The Circle

- **Circle:** Circle is a simple closed curve.



1. The fixed point O is the centre of the circle.

2. The fixed distance OP = OQ is the **radius** of the circle.

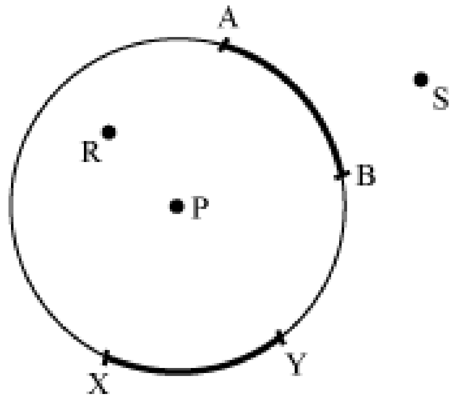
3. The distance around the circle is its **circumference**.

4. A line joining any two points on a circle is known as **chord**. In the given figure, RS and PQ are the chords.

5. The chord passing through the centre of a circle is called **diameter**. The diameter of a circle divides it into two semicircles.

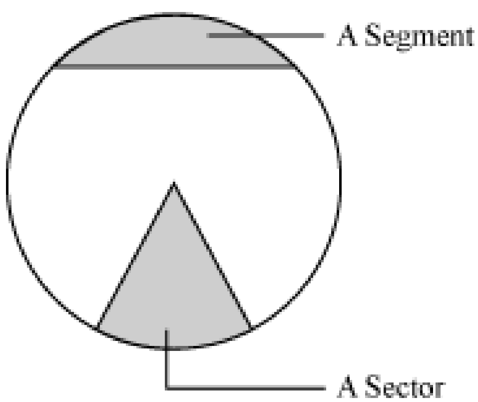
6. The diameter of a circle is the longest chord of the circle and it is twice the radius.

7. The portions on a circle are known as arcs. In the figure, XY and AB are arcs.

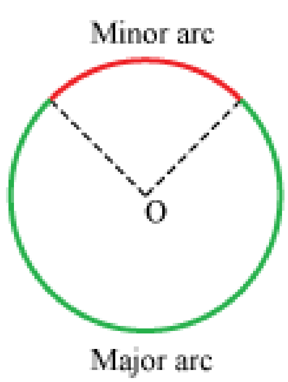


8. The region in the interior of a circle enclosed by a chord and an arc is known as **segment.**

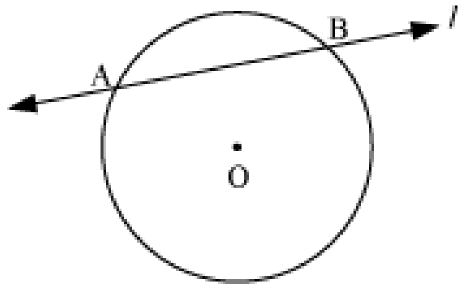
9. The region in the interior of a circle enclosed by an arc on one side and a pair of radii on the other side is called **sector.**



- An arc less than one-half of the entire arc of a circle is called the **minor arc** of the circle, while an arc greater than one-half of the entire arc of a circle is called the **major arc** of the circle.

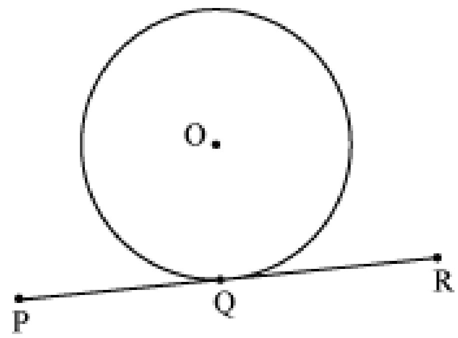


- A line that meets a circle at two points is called the secant of the circle.



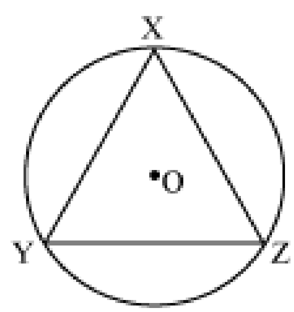
In the figure, a line *l* is the **secant** to the circle.

- A line that meets a circle at one and only one point is called a tangent to the circle. The point where the tangent touches the circle is called the point of contact.



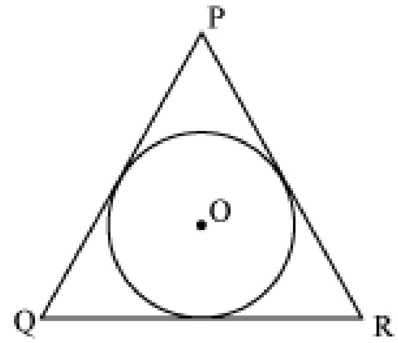
In the above figure, line PR is the tangent to the circle.

- A circle which passes through all the three vertices of a triangle is called the **circumcircle** of the triangle.



In the above figure, circumcircle of ΔXYZ is drawn.

- A circle (drawn inside a triangle) which touches all the three sides of the triangle is called the **incircle** of the triangle.



In the above figure, incircle of ΔPQR is drawn.

- **Construction of circumcircle of given triangle:**

Example:

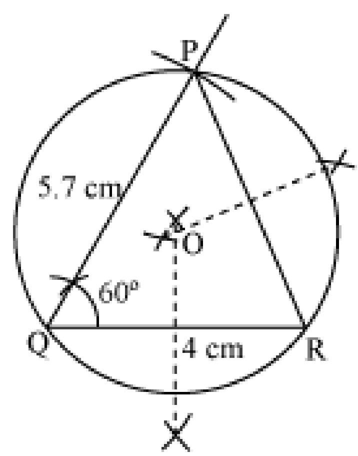
Construct the circumcircle of ΔPQR such that ∠Q = 60°, QR = 4 cm, and QP = 5.7 cm.

Solution:

Step 1: Draw a triangle PQR with ∠Q = 60°, QR = 4 cm, and QP = 5.7 cm

Step 2: Draw perpendicular bisector of any two sides, say QR and PR. Let these perpendicular bisectors meet at point O.

Step 3: With O as centre and radius equal to OP, draw a circle.



The circle so drawn passes through the points P, Q, and R, and is the required circumcircle of ΔPQR.

- **Construction of incircle of given triangle:**

Example:

Construct incircle of a right ΔPQR, right angled at Q, such that QR = 4 cm and PR = 6 cm.

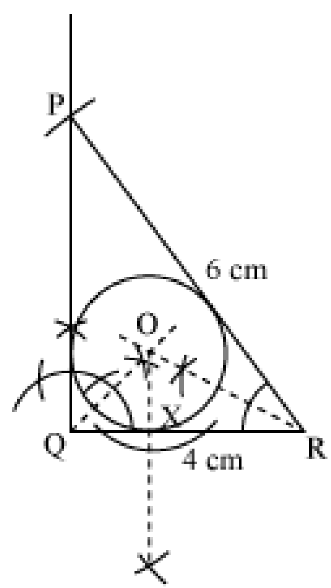
Solution:

Step 1: Draw a ΔPQR right-angled at Q with QR = 4 cm and PR = 6 cm.

Step 2: Draw bisectors of ∠Q and ∠R. Let these bisectors meet at the point O.

Step 3: From O, draw OX perpendicular to the side QR.

Step 4: With O as centre and radius equal to OX, draw a circle.



The circle so drawn touches all the sides of ΔPQR and is the required incircle of ΔPQR.