MATHEMATICS

CLASS NOTES FOR CBSE

Chapter 10. Circles

01. ARC of a Circle

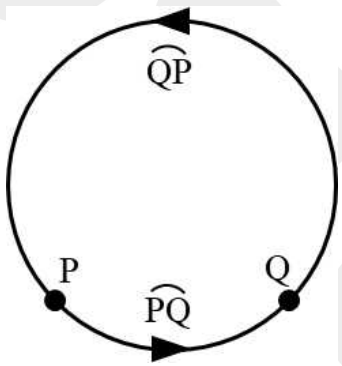
Definition

A continuous piece of a circle is called an arc of the circle.

Let P and Q be two points on a circle $C(O, r)$. Clearly, the circle is divided into two pieces each of which is an arc. We denote the arc from P to Q in counter clockwise direction by $\overset{\frown}{PQ}$ and the arc from Q to P in counter clockwise direction by $\overset{\frown}{QP}$. Note that the points P and Q lie on both $\overset{\frown}{PQ}$ and $\overset{\frown}{QP}$.

Length of an ARC

The length of an arc $\overset{\frown}{PQ}$ is the length of the fine thread which just covers the arc completely.



Figure

We denote the length of arc $\overset{\frown}{PQ}$ by $l(\overset{\frown}{PQ})$

It follows from the above discussion that for any two points P and Q on a circle either $l(\overset{\frown}{PQ}) < l(\overset{\frown}{QP})$ or $l(\overset{\frown}{PQ}) = l(\overset{\frown}{QP})$ or $l(\overset{\frown}{PQ}) > l(\overset{\frown}{QP})$.

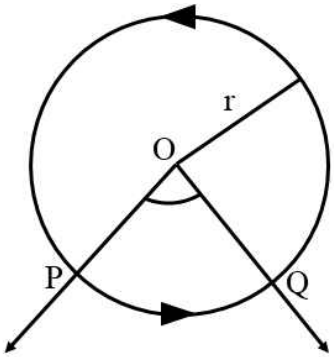
If $l(\overset{\frown}{PQ}) < l(\overset{\frown}{QP})$, then PQ is called the minor arc and $\overset{\frown}{QP}$ is known as the major arc.

Thus, arc PQ will be minor arc or a major arc according as $l(\overset{\frown}{PQ}) < l(\overset{\frown}{QP})$ or, $l(\overset{\frown}{PQ}) > l(\overset{\frown}{QP})$.

Central Angle

Let $C(O, r)$ be any circle. Then any angle whose vertex is O is called the central angle.

$\angle POQ$ is a central angle of the circle $C(O, r)$.



Figure

02. Chord and Segment of a Circle

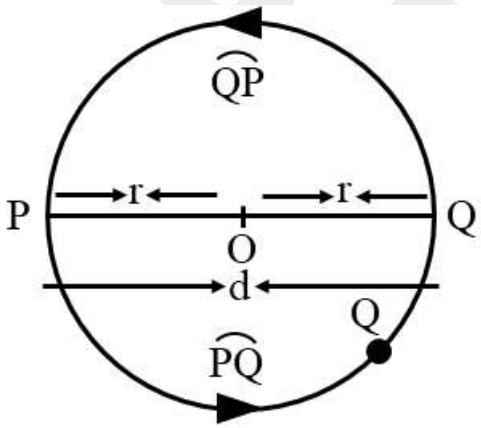
Chord

A line segment joining any two points on a circle is called a chord of the circle. It should be noted that a chord is not a part of the circle.

Diameter

A chord passing through the centre of a circle is known as its diameter.

Remark Clearly, if d is diameter of the circle $C(O, r)$, then $d = 2r$. Also, it is evident that all diameters of a circle are equal.



Figure

Semi-Circle

A diameter of a circle divides it into two equal parts which are arcs. Each of these two arcs is called a semi-circle.

In above Figure, $\overset{\frown}{PQ}$ and $\overset{\frown}{QP}$ are semi-circles. Clearly, $m(\overset{\frown}{PQ}) = 180°$. Clearly, an arc whose length is less than the arc of a semi-circle is called a *minor arc*, otherwise it is called a *major arc*.

Thus, an arc $\overset{\frown}{PQ}$ is a minor arc if $m(\overset{\frown}{PQ}) < 180°$ and a major arc if $m(\overset{\frown}{PQ}) > 180°$