# Circle

## Related Terms

1. A circle is a locus of a point which moves in such a way that its distance from a fixed point is always constant. The fixed point is called the centre of the circle.
2. The line segment joining any two points on a circle is called a chord of the circle.
3. A chord of a circle passing through its centre is called a diameter of the circle.
   It is the largest chord of a circle.
   Also, Diameter = 2 x Radius
4. A circle divides the plane region into three parts:
   Circumference: A point P lies on the circle if and only if its distance from the centre of the circle is equal to the radius of the circle.

   Interior of a circle: A point P lies inside a circle if and only if its distance from the centre of the circle is less than the radius of the circle.

   Exterior of a circle: A point P lies outside a circle if and only if its distance from the centre of the circle is greater than the radius of the circle.

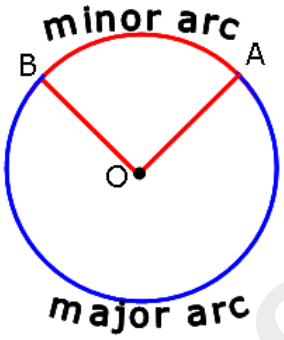
5. Circles having the same centre but with different radii are said to be concentric circles.
6. Two circles are said to be equal or congruent if they have equal radii.
7. A circle passing through all the vertices of a polygon is called circumscribed circle of the polygon and its centre is called circumcentre.
   The polygon is called inscribed polygon.
8. A circle touching all the sides of a polygon is called an inscribed circle of the polygon and its centre is called incentre.

# Arc, Segment and Sector

## Arc

An arc is a part of the circumference of a circle.

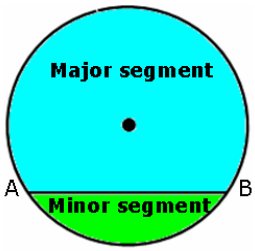
An arc less than one-half of the whole arc of a circle is called a **minor arc** of the circle, and an arc greater than one-half of the whole arc of a circle is called a **major arc** of the circle.




## Segment

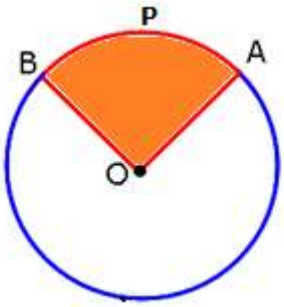
A chord of a circle divides it into two parts. Each part is called a **segment**.

The part containing the minor arc is called the **minor segment**, and the part containing the major arc is called the **major segment**.




## Sector

The region bounded by an arc and two radii, joining the centre to the end points of the arc, is called a sector.




The region bounded by an arc APB and radii OA and OB is a sector.

## Chord Properties

1. A straight line drawn from the centre of a circle to bisect a chord which is not a diameter is at right angles to chord.
2. Perpendicular drawn to a chord from the centre of a circle bisects the chord.
3. Equal chords of a circle are equidistant from centre.
4. Chords which are equidistant from the centre are equal in lengths.
5. There is one and only circle which passes through three given points not in a straight line.
6. The perpendicular bisector of a chord of a circle always passes through its centre.
7. Perpendicular bisectors of two chords of a circle intersect at its centre.

## Arc Properties

1. In equal circles, if two arcs subtend equal angles at the centre then they are equal.
2. In equal circles, if two arcs are equal then they subtend equal angles at the centre.
3. In equal circles, equal chords cut off equal arcs.
4. In equal circles, if two arcs are equal then their chords are equal.
5. Equal chords of the same circle subtend equal angles at the centre of the circle.
6. Equal angles at the centre make equal chords.
7. Equal arcs of the same circle subtend equal angles at any point on the remaining part of the circle.