Circle

Previous knowledge

<table>
<tr><td>

1. A *circle* is a collection of points that are at the equal distance from a specific point (fixed point) on the plane.
2. The fixed point is called the *Centre* and the constant distance is called the *radius* of the circle.
   Point O is centre of the circle and OD is radius.
3. A line segment joining two points on the circle is called the *chord* of the circle.
   Seg PQ is chord of a circle.
4. A chord passing through centre of the circle is called a *diameter* of the circle.
   Seg AB is diameter of the circle
   Diameter is the longest chord of the circle
5. A continuous part of a circle is called an *arc* of the circle.
6. Minor and Major Arcs : An arc less than one-half of the whole arc of the circle is called the *minor arc*
   In the fig 1 arc DB, arc AXD

7. An arc greater than the one-half of the whole arc of the circle is called the *major arc*.
   In the fig. arc PXB, PDQ etc.
8. Semicircular arcs : half part of the circle is called semicircular arc.
   In the fig 1 arc AXB, arc APB etc.
   Measure of semicircular arc is 180^0

9. An angle subtended at the centre of the circle by any two points on the circle is called *central angle*. In fig 2
   $\angle APB$ is the central angle for the arc AB

10. Measure of the minor arc = measure of the central angle subtended by the end points of the arc.
    Measure of arc AB $= m\angle APB = 60^0$
11. Measure of major arc = 360 – measure of corresponding minor arc
    Measure of arc ACB $= 360 – m(\text{minor arc AB})$
    $= 360 – 60 = 300^0$

</td><td>
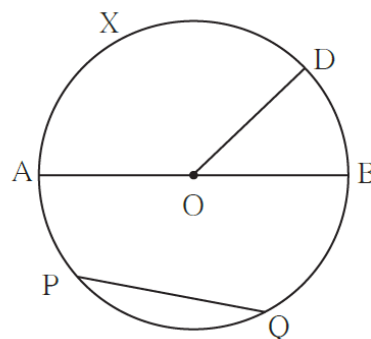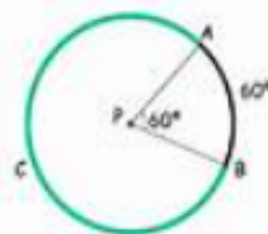

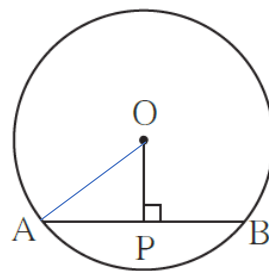
Fig 1

Fig 2

</td></tr>
</table>

|	

Properties of chords of a circle-
    i.   The perpendicular drawn from the centre of the circle is perpendicular to the chord bisects the chord.
    ii. A line segment joining the centre of the circle to the midpoint of the chord is perpendicular to the chord.	

Radius of a circle with centre O is 10 cm. Find the length of the chord if the chord is at a distance of 6 cm from the centre. **Solution:** Distance of the chord from the centre of the circle is the length of perpendicular drawn from the centre of the circle to the chord. AB is the chord of the circle with centre O. seg OP ⊥ chord AB. Radius of the circle = l(OB) = 10 cm. l(OP) = 6 cm. ΔOPB is a right angled triangle. According to Pythagoras theorem, $[l(OP)]^2 + [l(PB)]^2 = [l(OB)]^2$ $6^2 + [l(PB)]^2 = 10^2$ $[l(PB)]^2 = 10^2 - 6^2 = 100\text{-}36 = 64$ l(PB) = 8cm Length of chord from the centre is 8 cm	
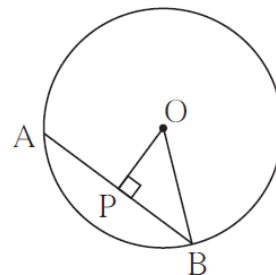
Congruent arcs
If the measures of two arcs of circle are same then two arcs are congruent.
  m∠AOB = m∠COD
m(arc AXB) = m(arc CYD)
  then arc AXB = arc CYD
The chords corresponding to congruent arcs are congruent.
Chord AB = chord CD
In a circle if two chords are congruent then their corresponding minor arcs and major arcs are congruent	
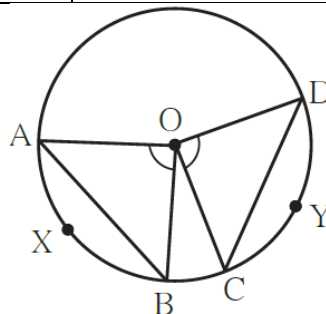
In the fig if m∠AOB = 50^0 then m(arc AXB) = m(arcCYD) = 50^0	