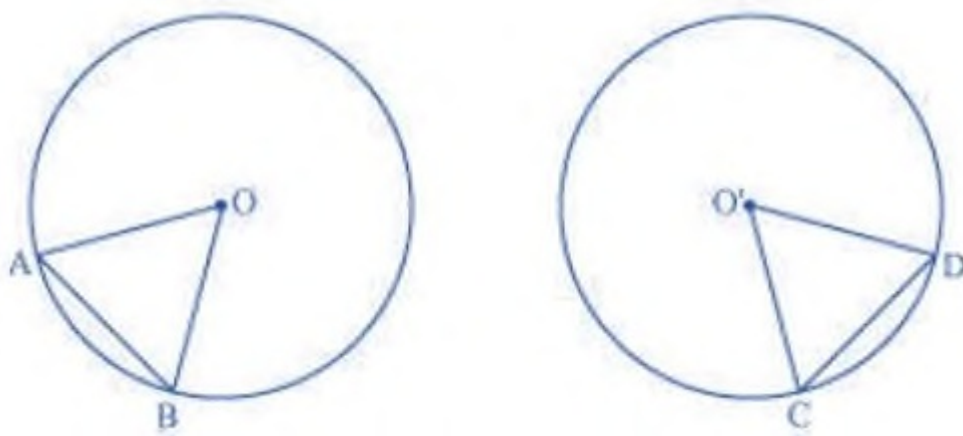


Exercise 10.2

Question: 1 Recall that two circles are congruent if they have the same radii. Prove that equal chords of congruent circles subtend equal angles at their centers.

Solution: A circle is a collection of points which are equidistant from a fixed point. This fixed point is called as the centre of the circle and this equal distance is called as radius of the circle.

And thus, the shape of a circle depends on its radius. Therefore, it can be observed that if we try to superimpose two circles of equal radius, then both circles will cover each other



In $\triangle AOB$ and $\triangle CO'D$

$AB = CD$ (Chords of same length)

$OA = O'C$ (Radii of congruent circles)

$OB = O'D$ (Radii of congruent circles)

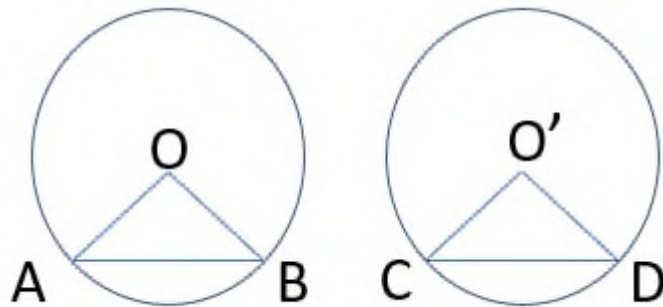
$\triangle AOB \cong \triangle CO'D$ (SSS congruence rule)

$\angle AOB = \angle CO'D$ (By CPCT)

Hence, equal chords of congruent circles subtend equal angles at their centers.

Question: 2 Prove that if chords of congruent circles subtend equal angles at their centers, then the chords are equal.

Solution: Let us consider two congruent circles (circles of same radius) with centers as O and O



In $\triangle AOB$ and $\triangle CO'D$,

$\angle AOB = \angle CO'D$ (Given)

$OA = O'C$ (Radii of congruent circles)

$OB = O'D$ (Radii of congruent circles)

$\triangle AOB \cong \triangle CO'D$ (SAS congruence rule)

$AB = CD$ (By CPCT)

Hence, if chords of congruent circles subtend equal angles at their centers, then the chords are equal.