Circle: Exercise 10.2

Q.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.

Sol. Given: let AB and CD be the two equal chords of a circle with center at O.



To prove: $\angle AOB = \angle COD$ **Proof:** Firstly, in $\triangle AOB$ and $\triangle COD$, AO = CO (Since, radii of the same circle) BO = DO (Since, radii of the same circle) and AB = CD (Equal chords-given) So, from SSS criterion of congruence, Therefore, $\triangle AOB \cong \triangle COD$ \Rightarrow Thus, $\angle AOB = \angle COD$ (Congruent parts of congruence triangles) Hence Proved.

Q.2 Prove that if chords of congruent circles subtend equal angles at their centres, then the chords are equal.

Sol. Given: Let AB and CD be the two chords such that angles subtended by these chords at the centre of the circle are equal. ($\angle AOB = \angle COD$)



To prove: AB = CD **Proof:** Firstly, in $\triangle AOB$ and $\triangle COD$, AO = CO (Since, radii of the same circle) BO = DO (Since, radii of the same circle) and $\angle AOB = \angle COD$ (given) So, from SAS criterion of congruence, Therefore, $\triangle AOB \cong \triangle COD$ \Rightarrow Thus, AB = CD (Congruent parts of congruence triangles) Hence Proved.