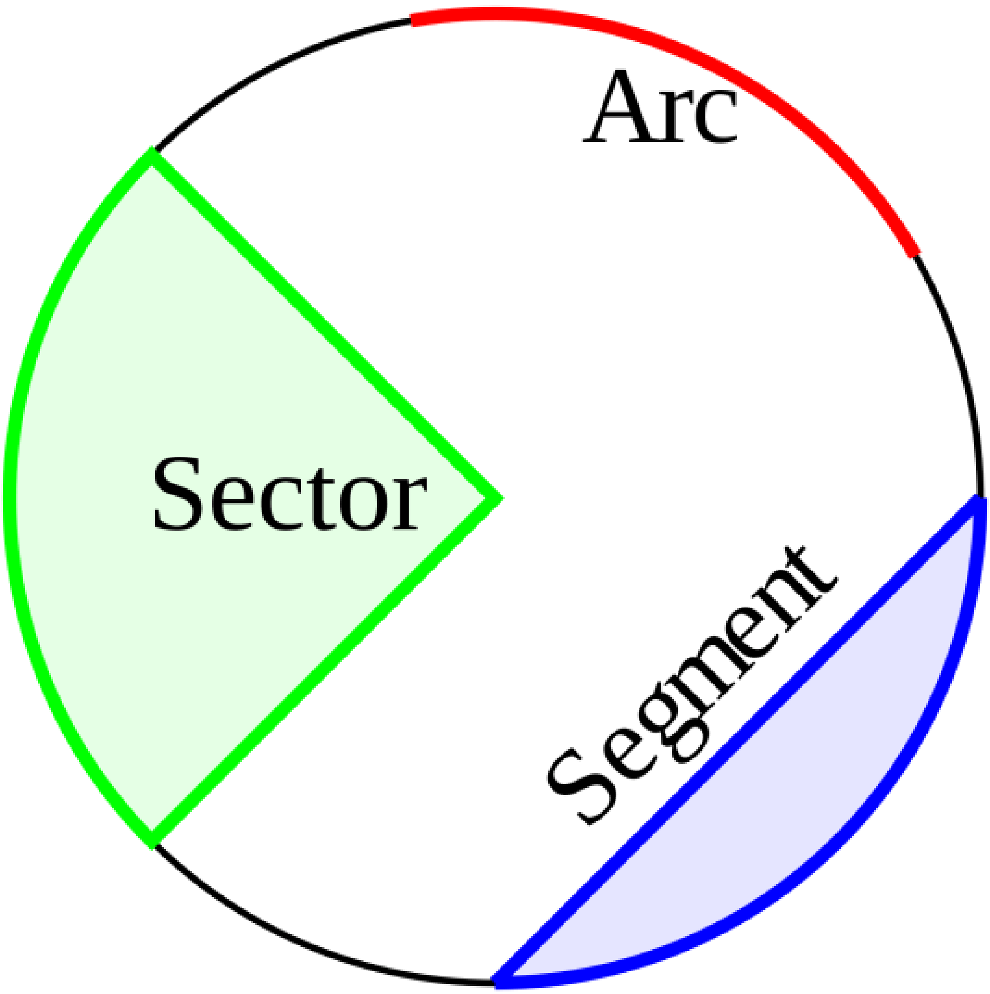
NCERT Class 9 Solutions: Circles (Chapter 10) Exercise 10.2


Arc
Sector
Segment

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 centres.

Solution:

- A circle is a collection of points that are equal distance from a fixed point.
- This fixed point is called the center of the circle and this equal distance is called as radius of circle
- And, the shape of a circle depends on its radius.
- It can be observed that if we try to superimpose two circle of equal radius, then both circles will cover each other. Thus, two circles are congruent if they have equal radius.
- Now, let ' s consider two congruent circles having centers at O and O ' and two chords PQ and MN of equal lengths.

In $\triangle POQ$ and $\triangle \mathrm{NO}'M$

- $PQ = MN$ (Chords of same length)
- $OP = O'N$ (Radius of congruent circle)
- $OQ = O'M$ (Radius of congruence rule)
- $\triangle POQ \cong \triangle \mathrm{NO}'M$ (Side-side-side congruence rule)
- $\angle POQ = \angle \mathrm{NO}'M$ (By Corresponding Parts of Congruent Triangles)
- So, equal chords of congruent circles subtend equal angles at their centres.

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

Solution:

Consider two congruent circles (circles of same radius) with centres as O and O′. Note that radius of congruent circles are equal.

In $\triangle POQ$ and $\triangle NO'M$,

- $\angle POQ = \mathrm{NO}'M$ (Given)
- $OP = O'N$ (Radius of congruent circles)
- $OQ = O'M$ (Radius of congruent circles)
- $\triangle POQ \cong \triangle \mathrm{NO}'M$ (side-angle-side congruence rule)
- $PQ = NM$ (corresponding parts of congruent triangles)
- So, if chords of congruent circles subtend equal angles at their centres, then the chords are equal.