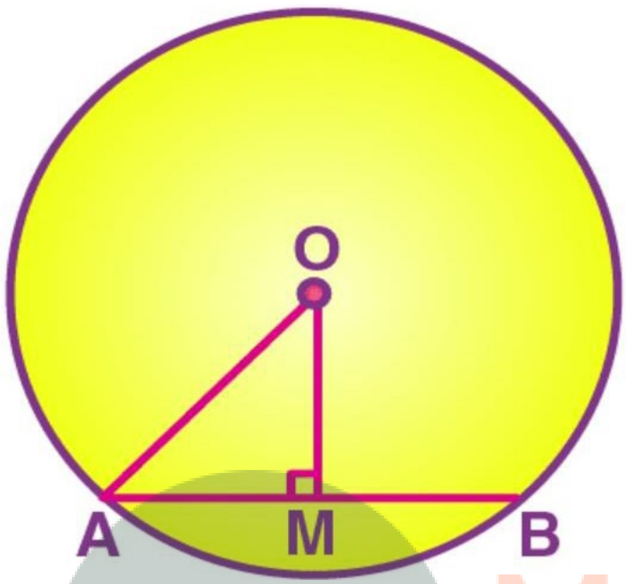
EXERCISE 17D

1. The radius of a circle is 13 cm and the length of one of its chords is 24 cm. Find the distance of the chord from the centres.
Solution:

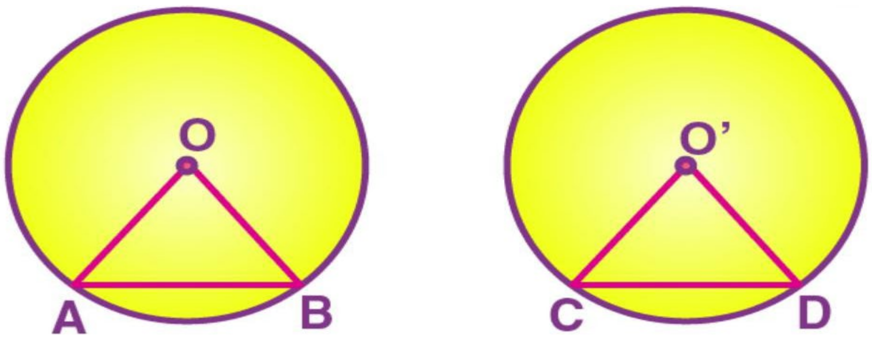


To find – OM
Given – AB = 24 cm
As OM ⊥ AB
OM bisects AB
AM = 12 cm

In right △ OMA,
$OA^2 = OM^2 + AM^2$
$OM^2 = OA^2 - AM^2$
Substituting the values
$OM^2 = 13^2 - 12^2$
$OM^2 = 25$
OM = 5 cm

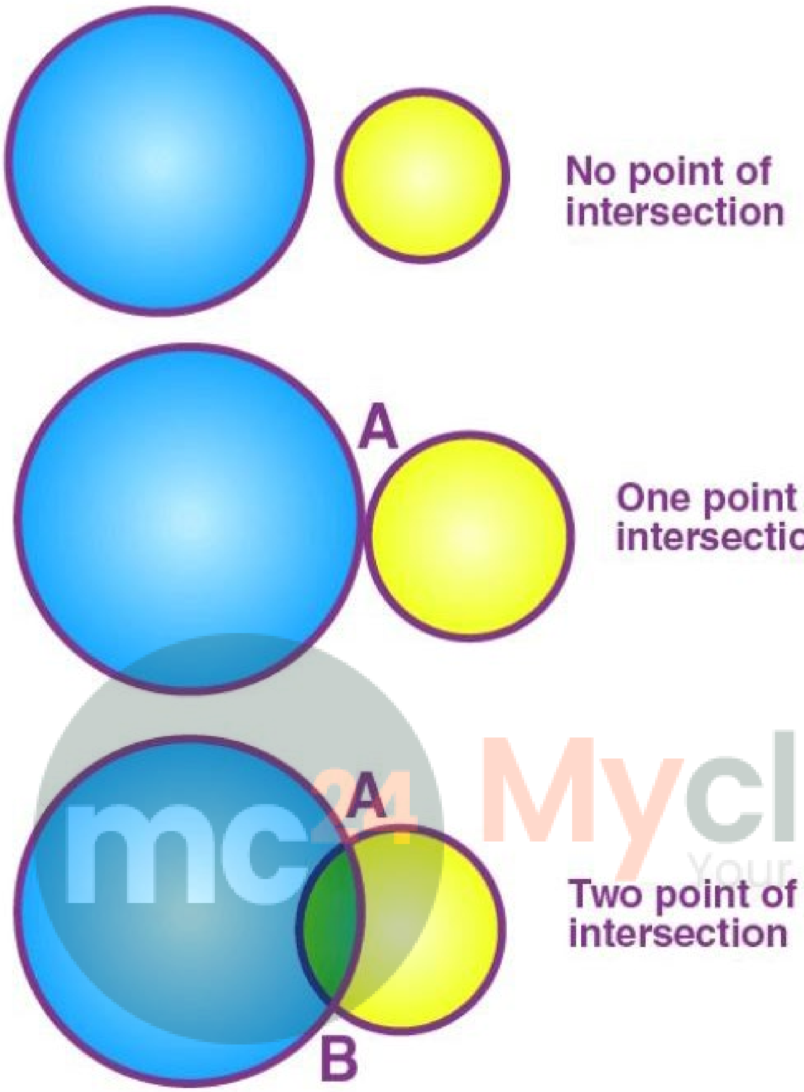
Therefore, the distance of the chord from the centre is 5 cm.

2. Prove that equal chords of congruent circles subtend equal angles at their centre.
Solution:



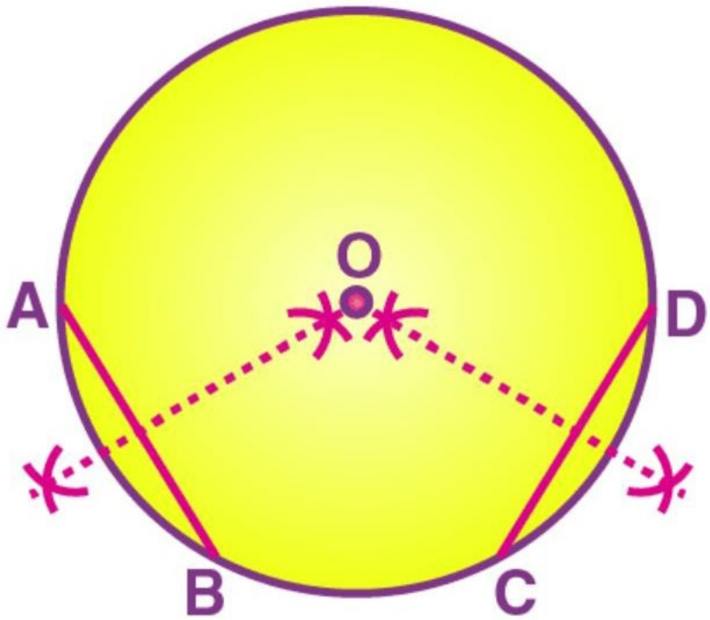
Given – AB and CD are two equal chords of congruent circles with centres O and O' respectively.
To prove -
∠ AOB = ∠ CO'D
Proof – In △ OAB and △ O'CD
OA = O'C (radii of congruent circles)
OB = O'D (radii of congruent circles)
AB = CD (Given)
△ OAB ≅ △ O'CD [By SSS congruence criterion]
∠ AOB = ∠ CO'D [c.p.c.t]

3. Draw two circles of different radii. How many points these circles can have in common? What is the maximum number of common points?
Solution:



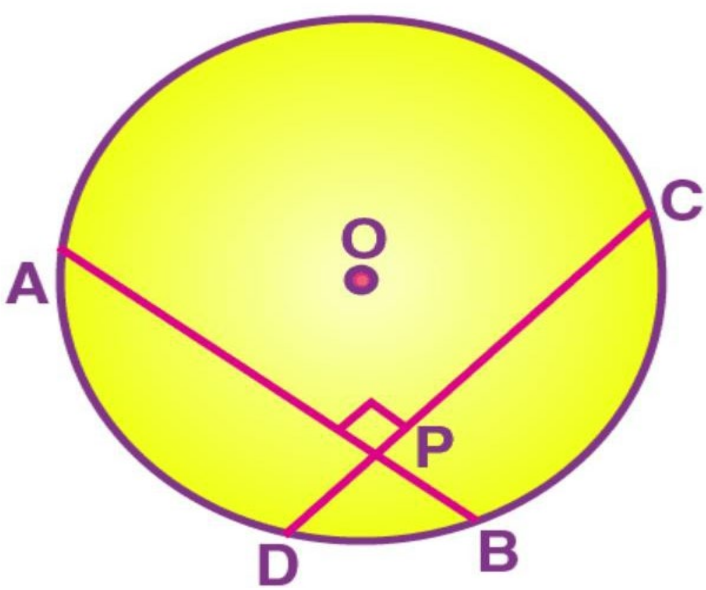
The circle can have 0, 1 or 2 points in common.
The maximum number of common points is 2.

4. Suppose you are given a circle. Describe a method by which you can find the centre of this circle.
Solution:

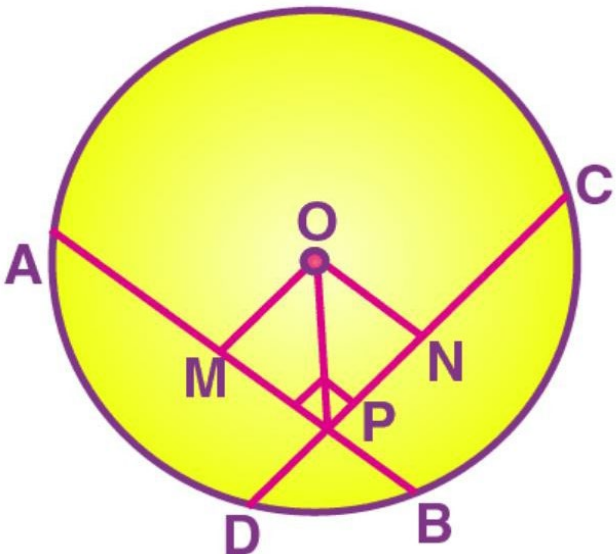


In order to draw the centre of a given circle:
1. Construct the circle.
2. Taking any two different chords AB and CD of this circle, construct perpendicular bisectors of these chords.
3. Now let the perpendicular bisectors meet at point O.
Hence, O is the centre of the given circle.

5. Given two equal chords AB and CD of a circle, with centre O, intersecting each other at point P. Prove that:
(i) AP = CP
(ii) BP = DP



Solution:



In △ OMP and △ ONP,
OP = OP (common side)
∠ OMP = ∠ ONP [Both are right angles]
OM = OM [side both the chords are equal, so the distance of the chords from the centre are also equal]
△ OMP ≅ △ ONP [RHS congruence criterion]
MP = PN [cpct] …… (a)

(i) AB = CD [given]
AM = CN [Perpendicular drawn from the centre to the chord bisects the chord]
AM + MP = CN + NP [from (a)]
AP = CP …… (b)

(ii) AB = CD
AP + BP = CP + DP
BP = DP [from (b)]
Therefore, proved.