CBSE Class 9 Mathematics

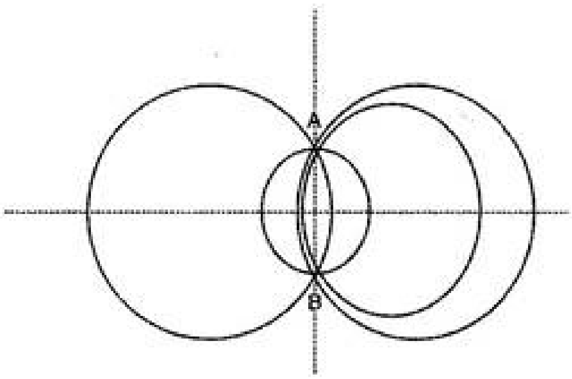
NCERT Solutions

CHAPTER 10

Circles(Ex. 10.3)

1. Draw different pairs of circles. How many points does each pair have in common? What is the maximum number of common points?

Ans. From the figure, we observe that when different pairs of circles are drawn, each pair have two common points (say A and B). Maximum number of common points are two in each pair of circles.



Suppose two circles C (O, r) and C (O', s) intersect each other in three points, say A, B and C.

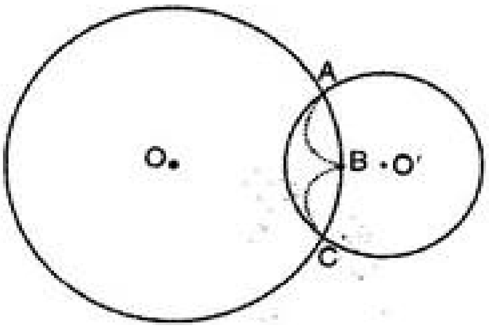
Then A, B and C are non-collinear points.

We know that:

There is one and only one circle passing through three non-collinear points.

Therefore, a unique circle passes through A, B and C.

$\Rightarrow$ O' coincides with O and $s = r$.



A contradiction to the fact that C (O', s) $\neq$ C (O, r)

$\therefore$ Our supposition is wrong.

Hence two different circles cannot intersect each other at more than two points.

2. Suppose you are given a circle. Give a construction to find its centre.

Ans. Steps of construction:

(a) Take any three points A, B and C on the circle.

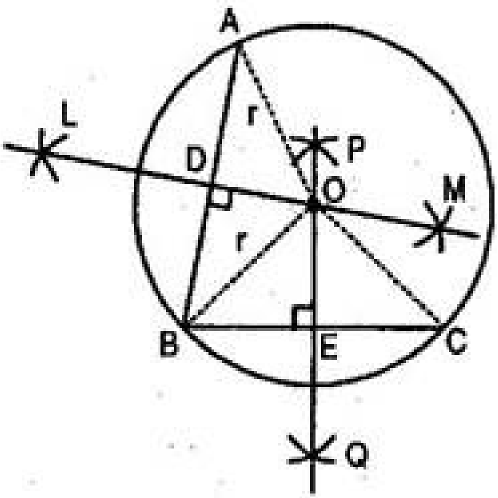
(b) Join AB and BC.

(c) Draw perpendicular bisector say LM of AB.

(d) Draw perpendicular bisector PQ of BC.

(e) Let LM and PQ intersect at the point O.

Then O is the centre of the circle.



Verification:

O lies on the perpendicular bisector of AB.

$\therefore$ OA = OB ....(i)

O lies on the perpendicular bisector of BC.

$\therefore$ OB = OC ....(ii)

From eq. (i) and (ii), we observe that

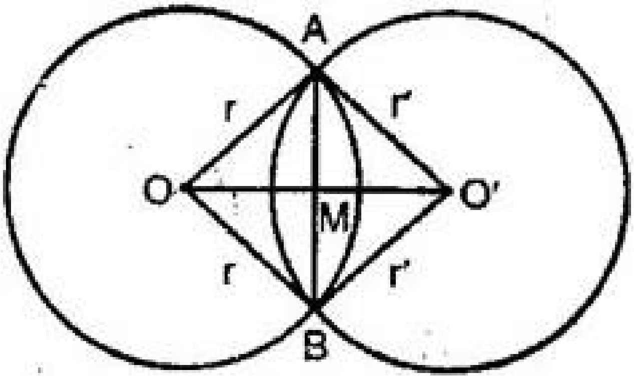
OA = OB = OC = r (say)

Three non-collinear points A, B and C are at equal distance (r) from the point O inside the circle.

Hence O is the centre of the circle.

3. If two circles intersect at two points, prove that their centres lie on the perpendicular bisector of the common chord.

Ans. Given: Let C (O, r) and C (O', r') be two circles intersecting at A and B. AB is the common chord.



To prove: OO' is the perpendicular bisector of the chord AB, i.e., AM = MB and $\angle$OMA = $\angle$OMB = 90°

Construction: Join OA, OB, O'A, O'B.

Proof: In triangles OAO' and OBO',

OA = OB [Each radius]

O'A = O'B [Each radius]

OO' = OO' [Common]

$\therefore$ ΔOAO' $\cong$ ΔOBO' [By SSS congruency]

$\Rightarrow$ $\angle$AOO' = $\angle$BOO' [By CPCT]

$\Rightarrow$ $\angle$AOM = $\angle$BOM (i)

Now in $\triangle$AOB, OA = OB

And $\angle$AOB = $\angle$OBA [Proved earlier]

Also $\angle$AOM = $\angle$BOM [From eq.(i)]

$\therefore$ Remaining $\angle$AMO = $\angle$BMO

Since $\angle$AMO + $\angle$BMO = 180° [Linear pair]

$\Rightarrow 2\angle$AMO = 180°

$\Rightarrow$ $\angle$AMO = $\angle$BMO = 90°

$\Rightarrow$ OM $\perp$ AB

$\Rightarrow$ OO’ $\perp$ AB

Since OM $\perp$ AB

$\therefore$ M is the mid-point of AB, i.e., AM = BM

Hence OO’ is the perpendicular bisector of AB.