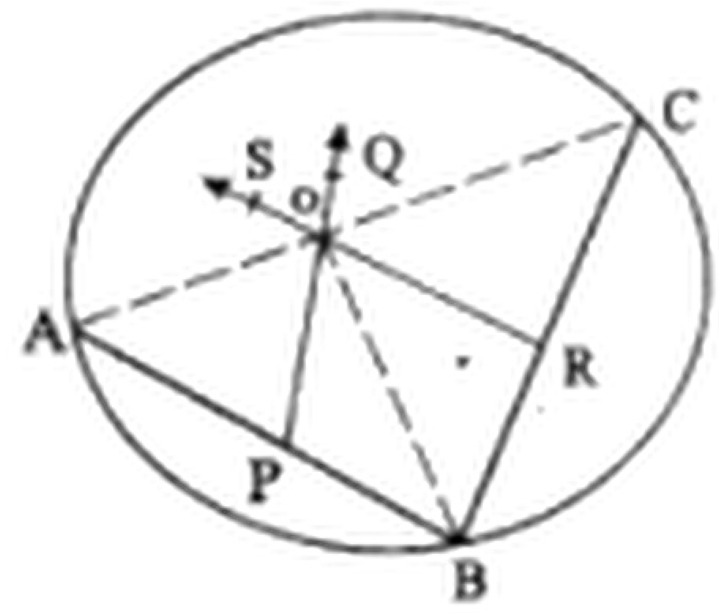
EXERCISE 12.1

Q1. Prove that the center of a circle is on the right bisectors of each of its chords.



Solution:

Given:

A, B, C are three non-Collinear points.

Required:

To find the Centre of the circle passing through A, B, C

Construction:

(i) Join B to A, C

(ii) Take PQ right bisector of AB and RS right bisector of BC. They intersect at 0.

(iii) Join O to A, B, C. O is the Centre of the circle.

Proof:

Statements	Reasons
In $\overline{OA} \cong \overline{OB}$ (i)	O is on right bisector of AB
$\overline{OB} \cong \overline{OC}$ (ii)	O is on right bisector of BC
$\overline{OA} \cong \overline{OB} \cong \overline{OC}$ (iii)	From (i), (ii)
Hence O is equidistant from A, B, C.	

Therefore, O is the required Centre of the circle.	

Q2. Where will be the Centre of a circle passing through three non-collinear points?

Solution

Given

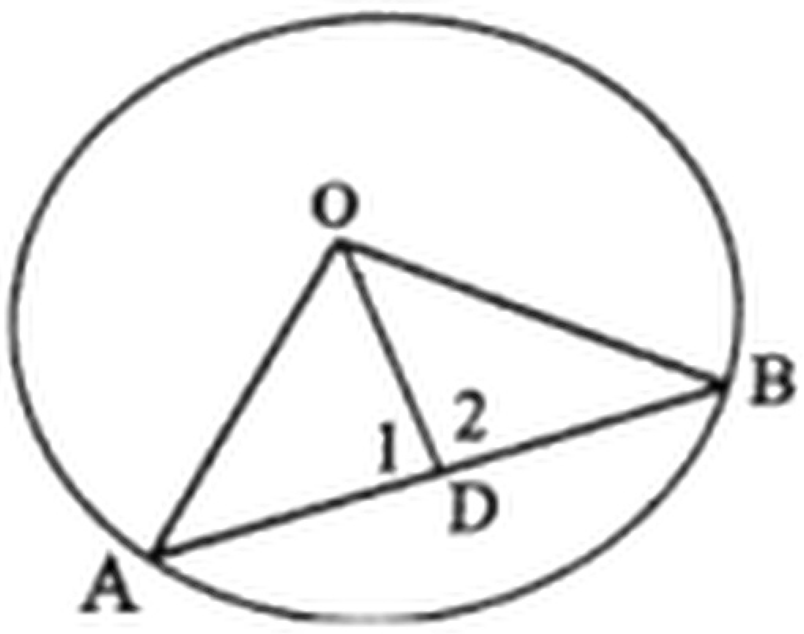
O is the Centre of a circle. AB is any chord of the circle.

To prove

O is right bisector of AB.

Construction

Take midpoint D of AB and join D to O.



Proof

Statements	Reasons
In ΔAOD ↔ ΔB0D	
$(\overline{OA}) \cong (\overline{OB})$	Radii of same circle
$(\overline{OD}) \cong (\overline{OD})$	Common
$(\overline{AD}) \cong (\overline{BD})$	Construction

$\Delta AOD \cong \Delta BOD$	S.S.S. S.S.S.
But $m\angle 1 = m\angle 2 = 180°$	Supplementary angles
$m\angle 1 + m\angle 2 = 180°$	From (i)
$2m\angle 1 = 180°$	
$m\angle 1 = 90°$	
DO is right bisector of AB.	
i.e. O is on the right bisector of AB.	

Q3. Three villages P, Q and R are not on the same line. The people of these villages want to make a Children Park at such a place which is equidistant from these three villages. After fixing the place of Children Park, prove that the park is equidistant from three villages.

Solution:

Given

P, Q, R, are three villages on the same straight line

To prove:

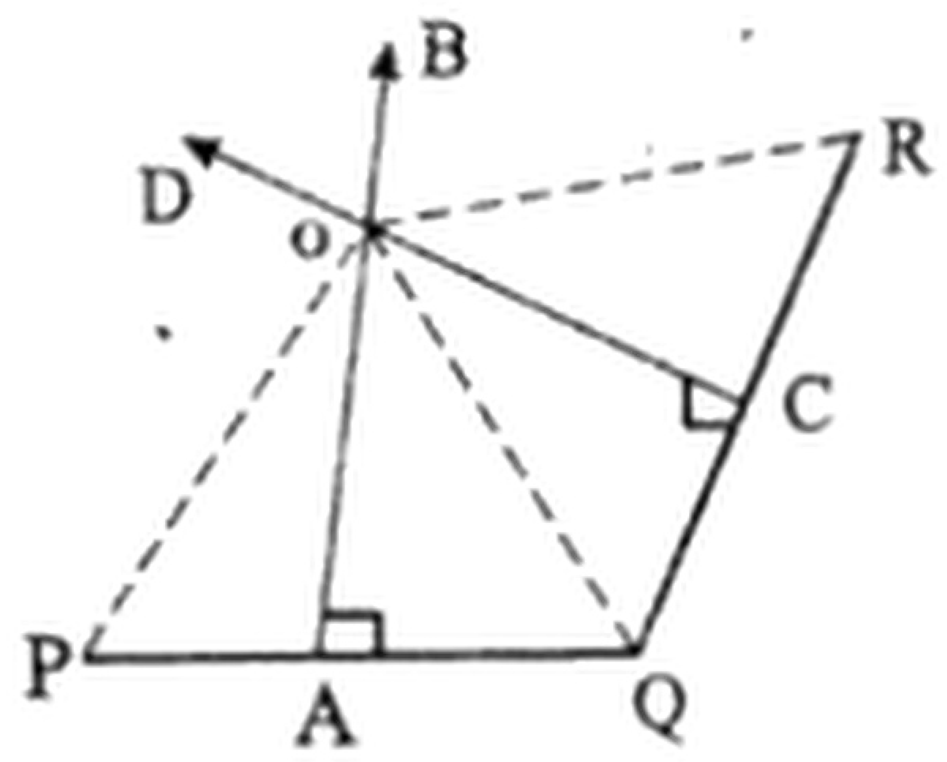
To find the point equidistant from P, Q, R.

Construction

(i) Join Q to P and R.

(ii) Take AB right bisector of PQ and CD right bisector of QR. AB and CD intersect at O.

(iii) Join O to P, Q, R. O is the place of children park



Proof

Statements	Reasons
$\overline{OP} = \overline{QR} = \overline{OR}$ (i)	O is on the right bisector PQ.
$\overline{OQ} = \overline{OR}$ (ii)	O is on the right bisector QR.
$\therefore \overline{OP} = \overline{OQ} = \overline{OR}$	From (i) and (ii)
Hence O is equidistant from P, Q, R	