Loci

Important Concepts and Theorems

1. If a point moves in such a way that it satisfies some given geometric conditions at each instant during its motion, then the path traced out by the moving point is called its locus.

2. A point which does not satisfy the given geometrical condition (or conditions) cannot lie on the locus

3. Locus of a point equidistant from a fixed point is a circle with fixed point as centre.

4. The locus of a point, equidistant from two given points, is the perpendicular bisector of the line segment joining the two points.

5. Every point lying on the perpendicular bisector of the line segment joining two given points is equidistant from the given points.

6. The locus of a point equidistant from two intersecting lines is the pair of lines bisecting the angles formed by the given lines.

7. Every point on the bisector of an angle is equidistant from the arms of the angle.

Locus in some standard cases

1. The locus of a point which is at a given distance from a given straight line, consists of a pair of straight lines parallel to the given line and at a given distance from it.

2. The locus of the centre of a wheel, which moves on a straight horizontal road, is a straight line parallel to the road and at a distance equal to the radius of the wheel.

3. The locus of a point, which is inside a circle and is equidistant from two points on the circle, is the diameter of the circle which is perpendicular to the chord of the circle joining the given points.

4. The locus of the mid points of all parallel chords of a circle is the diameter of the circle which is perpendicular to the given parallel chords.

5. The locus of a point (in a plane), which is at a given distance r from a fixed point (in the plane), is a circle with the fixed point as its centre and radius r.

6. The locus of a point which is equidistant from two given concentric circles of radii r_1 and r_2 is the circle of radius $\frac{r_1 + r_2}{2}$ with the given circles.

7. The locus of a point which is equidistant from a given circle consists of a pair of circles concentric with the given circle.

8. If A, B are fixed points, then the locus of a point P such $\angle APB = 90^\circ$ is the circle with AB as diameter.

9. The locus of the midpoints of all equal chords of a circle is the circle concentric with the given circle and of radius equal to the distance of equal chords from the centre of the given circle.

10. The locus of centres of circles touching a given line PQ at a given point T on it is the straight line perpendicular to PQ at T.