Total lecture = 2

Lecture-I

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 a 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 $\angle ABP = 90^\circ$ 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.

Teach how to draw:-

i) 60°, 120°, 90°, 45°, 30°.

ii) Angle bisector

iii) Perpendicular bisector.

Lecture-II

Circle : Construction

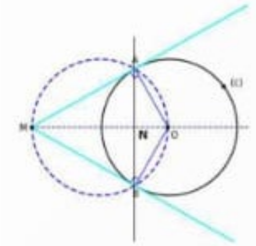
Important Concepts :

1. Construction of a tangent from a point on the circle

   Steps of construction:

   1. Taka a point R on the circle
   2. Join OR and Construct $\angle ORQ = 90^o$,
   3. Produce QR to P to get PRQ as required tangent.

2. Construction of a tangent from a point outside the circle

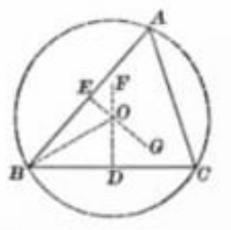


   1. Take a point M outside the circle.
   2. Join the centre O with the point M.
   3. Draw perpendicular bisector of line OM, which intersect OM at N.
   4. Taking N as a centre and NM as a radius draw a circle which intersects the given circle at two points A and B. Join MA and MB to get the required tangents.

3. Construction of tangents to a given circle from an exterior point when the centre of the circle is not known.

   1. Draw any secant PAB to the circle.
   2. Draw the perpendicular bisector of PB. Let M be the midpoint of PB.
   3. Taking M as centre and MP as radius draw a semi circle.
   4. At A, draw a perpendicular to PB. Let this perpendicular meet the semicircle at C.
   5. Taking P as centre and CP as radius, draw an arc to meet the given circle at two points, say Q and R.
   6. Join PQ and PR. Then PQ and PR are the required tangents from P to the given circle.

4. To construct the circumscribing circle of a triangle.

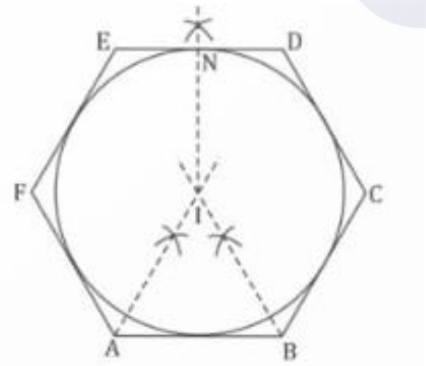


1. Consider a triangle ABC.
2. Draw perpendicular bisectors of any two sides say AB and BC and let them intersect at O.
3. Taking O as a centre and OB as radius draw the circle, this circle must pass through A, B and C.

5. To construct a in-circle in a triangle

1. Consider a triangle ABC.
2. Draw angle bisector of angle A and B, which intersect at a point I
3. Draw a perpendicular from I and AB which intersect AB at M.
4. Taking I as a centre and IM as radius draw the circle. This gives the required in circle.

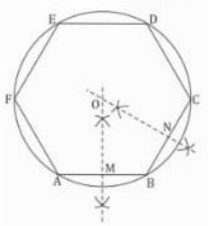
6. To construct a circle in a given regular hexagon :



1. Construct a regular hexagon of side = 4 cm.
2. Draw bisectors of ∠A and ∠B. Let these bisectors meet at the point I.
3. From I draw IN perpendicular to ED.
4. Draw a circle, with I as centre and IN as radius.

This is the required circle inside the regular hexagon.

7. To construct a circle about a given regular hexagon.



1. Construct a regular hexagon with side = 3 cm.
2. Draw the perpendicular bisectors of the sides AB and BC. Let these bisectors meet at the point O.
3. Draw a circle, with O as centre and radius OA. This is the required circle about the regular hexagon.