CHAPTER 10
CIRCLES

NOTES

➢ **Circle:** The closed plane figure consisting of all those points of the plane which are at a constant distance from a fixed point is called a circle.

The fixed point is called the centre and the constant distance, the radius of the circle.

➢ **Terms related to a circle**

- **Chord:** The line segment joining any two points of a circle is called a chord.

- **Diameter:** A chord of a circle passing through the centre of the circle is called a diameter.

- **Circumference:** The perimeter of a circle is called the circumference of the circle.

- **Arc:** It is a part of a circle between two distinct points of the circle.

    The two points divide the circle into two parts usually unequal, the larger part is called major arc and the smaller part minor arc.

➢ **Theorems**

1. Equal chords of a circle subtend equal angles at the centre.

2. If the angles subtended by the chords of a circle at the centre are equal, then the chords are of equal length.

3. The perpendicular from the centre of a circle to a chord bisects the chord.

4. The line drawn through the centre of a circle to bisect a chord is perpendicular to the chord.

5. One and only one circle can be drawn passing through three given non-collinear points.

> Note:
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> An infinite number of circles can be drawn through a point.
>
> An infinite number of circles can also be drawn passing through any two points in a plane.

6. Chords of equal lengths are equidistant from the centre.

7. Chords equidistant from the centre of a circle are equal in length.

8. The angle subtended by an arc of a circle at the centre is double the angle subtended by it at any point on the remaining part of the circle.

    Corollary: Angle in a semi-circle is a right angle.

9. Angles in the same segment of a circle are equal.

10. If a line segment joining two points subtends equal angles at two other points lying on the same side of the line containing the line segment, the four points are concyclic.

    An angle in a segment of a circle is the angle subtended at any point on the corresponding arc of the segment by the corresponding chord.

11. Opposite angles of a cyclic quadrilateral are supplementary.

12. If the opposite angles of a quadrilateral are supplementary, then the quadrilateral is cyclic.

    A quadrilateral is cyclic if all its vertices lie on a circle.

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