Class 10 Mathematics – Chapter: Circles

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1. Introduction

A circle is a set of points in a plane that are at a fixed distance (radius) from a fixed point (center).

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2. Important Terms

- Center (O): Fixed point in the circle.
- Radius (r): Distance from center to any point on the circle.
- Diameter (d): Distance through the center; d=2rd = 2rd=2r.

- Chord: A line segment with endpoints on the circle.
- Arc: A part of the circumference.
- Sector: Region bounded by two radii and an arc.
- Segment: Region bounded by a chord and an arc.

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3. Properties of Circles

- Equal chords are equidistant from the center.
- The perpendicular from the center to a chord bisects the chord.

- Diameter is the longest chord.
- Radius is perpendicular to the tangent at the point of contact.

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4. Angle Properties

- Angle subtended by a diameter at the circumference is a right angle.
- Angles subtended by the same chord at the circumference are equal.
- Angle in a semicircle is 90°.

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5. Equation of a Circle (Cartesian form)

If the center is at (h,k)(h, k)(h,k) and radius is rrr, equation is:

(x−h)2+(y−k)2=r2(x - h)^2 + (y - k)^2 = r^2(x−h)2+(y−k)2=r2

For a circle with center at origin (0,0)(0,0)(0,0), it is:

x2+y2=r2x^2 + y^2 = r^2x2+y2=r2

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6. Important Formulas

- Circumference = 2πr2\pi r2πr
- Area = πr2\pi r^2πr2

7. Important Exam Tips

- Remember key properties and definitions.
- Practice angle property proofs.
- Understand the standard form of circle equations.
- Draw diagrams to visualize problems.