CIRCLE

BASIC INTRODUCTION OF CIRCLE

INTRODUCTION

In class IX, we have studied that a circle is a collection of all points in a plane which are at a constant distance from a fixed point. The fixed point is called the centre and the constant distance is known as the radius. We have also studied various terms related to a circle like chord, segment, sector, arc etc. Now, we shall study properties of a line touching a circle at one point.

Circle

A circle is the locus of a point which moves in such a way that it is always at the constant distance from a fixed point in the plane. **The fixed point** 'O' is called the centre of the circle. **The constant distance** 'OA' between the centre (O) and the moving point (A) is called the **Radius** of the circle.



Circumference

The distance round the circle is called the circumference of the circle.

- 2pr = circumference of the circle
- = Perimeter of the circle.
- = boundary of the circle
- r is the radius of the circle.

Chord

The chord of a circle is a line segment joining any two points on the circumference. AB is the chord of the circle with centre O. In fig. AB is the chord of the circle.

Diameter

A line segment passing through the centre of the circle and having its end points on the circle is called diameter. If r is the radius of the circle then the diameter of the circle is twice the radius i.e., d = 2rAOB is a diameter of the circle whose centre is O AOB = OA + OB = r + r = 2r.

Arc of a circle

If P and Q be any two points on the circle then the circle is divided into two pieces each of which is an arc. Now we denote the arc from P to Q in counter clock-wise direction by PQ and the arc from Q to P in clock-wise direction by QP.

Sector of a circle

The part of a circle bounded by two radii and arc is called sector. In fig, the part of the plane region enclosed by AB and its bounding radii OA and OB is a sector of the circle with centre O.









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segment of a circle

Let PQ be a chord of a circle with centre O and radius r, then PQ divides the region enclosed by the circle into two parts. Each part is called a segment of the circle. The part containing the minor arc is called the **minor segment** and the part containing the major arc is called the **major segment**.



INTERSECTION OF A CIRCLE AND A LINE

Consider a circle with centre O and radius r and a line PQ in a plane. We find that there are three different positions a line can take with respect to the circle as given below in fig.



- (a) The line PQ does not intersect the circle.In fig. (a) the line PQ and the circle have no common point. In this case PQ is called a non-intersecting line with respect to the circle.
- (b) The line PQ intersect the circle in more than one point. In fig. (b), there are two common points A and B between the line PQ and the circle and we call the line PQ as a secant of the circle.

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(c) The line intersect the circle in a single point i.e. the line intersect the circle in only one point. In fig. (c) you can verify that there is only one point 'A' which is common to the line PQ in the given circle. In this case the line is called a tangent to the circle.