Maths Class 10 Notes for Constructions

**INTRODUCTION** : Construction is very important chapter of geometry. One of the aims of the studying construction is to acquire the skill of drawing figures accurately.

In the previous classes you have learn how to construct angles of 30°, 45°, 60°, 90° and 120°. You have also learn how to construct some geometrical figures like triangles, quadrilateral and circles, etc with the help of ruler and compass.

In this chapter, you will learn how to divide a line segment in a given ration (both internally and externally). You will also learn how to draw a triangle similar to a given triangle with some given scale and to draw tangents from an interior point to a circle.

**DIVISION OF A LINE SEGMENT**

In order to divide a line segment internally in a given ratio m : n, where both m and n are positive integers, we follow the following steps :

**Given** : A line segment AB and a ratio m:n.

**Required** : To divide line segment AB in the ratio m: n.

**Steps of construction** :

(i) Draw a line segment AB of given length by using a ruler

(ii) Draw any ray AX making a suitable acute angle with AB.

(iii) Along AX draw (m + n) arcs intersecting the rays AX at A_1, A_2,…….,A_m, A_{m+1},……A_{m+n} such that AA_1 = A_1A_2 = = A_{m+n-1}A_{m+n}
(iv) Join \( B_{A_m+n} \)

(v) Through the point \( A_m \) draw a line parallel to \( A_{m+n} B \) by making \( \angle AA_mP = \angle AA_{m+n}B \). Suppose this line meets \( AB \) at point \( P \). The point \( P \) so obtained is the required point which divides \( AB \) internally in the ratio \( m: n \).

TO DRAW TANGENTS TO A CIRCLE FROM A POINT OUTSIDE IT, WHEN CENTRE OF THE CIRCLE IS KNOWN:

**Given**: A circle with centre \( O \) and a point \( P \) outside it.

**Required**: To construct the tangents to the circle from point \( P \).

![Diagram of circle with tangents](image)

**Steps of construction**:

1. Join \( OP \) and bisect it. Let \( M \) be the mid-point of \( OP \).

2. Taking \( M \) as centre and \( MO \) as radius, draw a circle to intersect the given circle in two points, say \( A \) and \( B \).

3. Draw rays \( PA \) and \( PB \).

Ray \( PA \) and \( PB \) are the required tangents from \( P \) to given circle.

**To draw tangents to a circle from a point outside it (when centre of the circle is not known)**

**Given**: A circle and a point \( P \) outside it.

**Required**: To draw tangents from point \( P \) to the circle.
Steps of construction:

(i) Draw a secant PAB to intersect the circle at two points A and B.

(ii) Produce AP to a point C, such that PA = PC.

(iii) With BC as a diameter, draw a semi-circle.

(iv) Draw PD \perp CB, intersecting the semi-circle drawn in step (iii) at D.

(v) Taking PD as radius and P as centre, draw arcs to intersect the given circle at T and T’.

(vi) Draw rays PT and VT’. Rays PT and PT’ are the required tangents.