# 11.3 CONSTRCUTION OF TANGENT TO A CIRCLE

**(a)To Draw the Tangent to a Circle at a Given Point on it, When the Centre of the Circle is Known :**

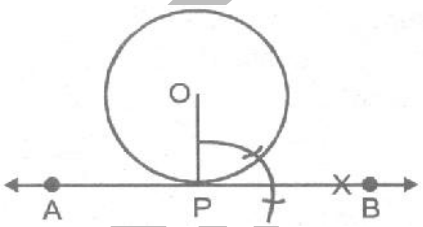
**Given :** A circle with centre O and a point P and it.

**Required :** To draw the tangent to the circle at P.

**Steps of Construction.**

(i) Join OP.

(ii) Draw a line AB perpendicular to OP at the point P. APB is the required tangent at P.




**Ex.5** Draw a circle of diameter 6 cm with centre O. Draw a diameter AOB. Through A or B draw tangent to the circle.

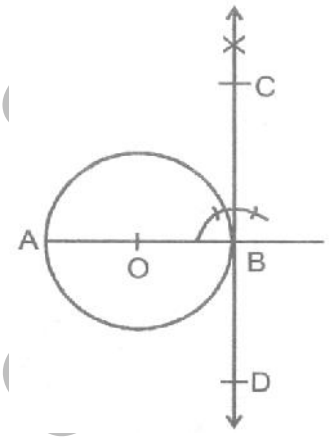
**Sol.** **Given :** A circle with centre O and a point P on it.
**Required :** To draw tangent to the circle at B or A.
**Steps of Construction.**

(i) With O as centre and radius equal to 3 cm ( 6 ÷ 2 ) draw a circle.

(ii) Draw a diameter AOB.

(iii) Draw CD ⊥ AB.

(iv) So. CD is the required tangent.




**(b) To Draw the Tangent to a Circle at a Given Point on it, When the Centre of the Circle is not Known :**

**Given :** A circle and a point P on it.

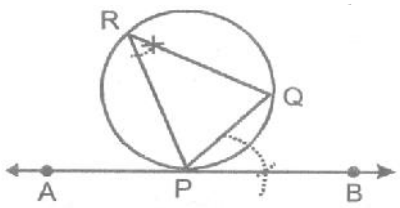
**Required :** To draw the tangent to the circle at P.

**Steps of Construction**

(i) Draw any chord PQ and Joint P and Q to a point R in major arc PQ (or minor arc PQ).

(ii) Draw $\angle QPB$ equal to $\angle PRQ$ and on opposite side of chord PQ.

The line BPA will be a tangent to the circle at P.




**Ex.6** Draw a circle of radius 4.5 cm. Take a point P on it. Construct a tangent at the point P without using the centre of the circle. Write the steps of construction.

**Sol.** Given : To draw a tangent to a circle at P.

**Steps of Construction**

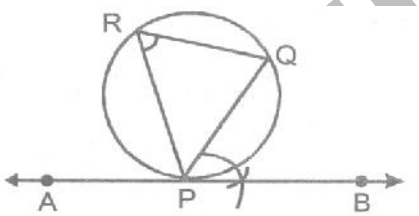
(i) Draw a circle of radius = 4.5 cm.

(ii) Draw a chord PQ, from the given point P on the circle.

(iii) Take a point R on the circle and joint PR and QR.

(iv) Draw $\angle QPB = \angle PRQ$ on the opposite side of the chord PQ.

(v) Produce BP to A. Thus, APB is the required tangent.




**(c) To Draw the Tangent to a Circle from a Point Outside it (External Point) When its Centre is known :**

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

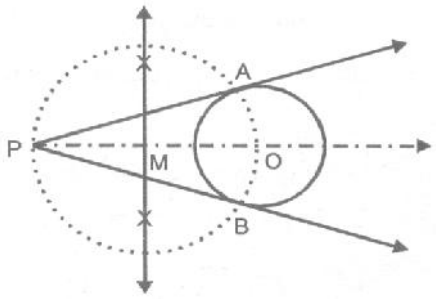
**Required :** To construct the tangents to the circle from P.

**Steps of Construction :**

(i) Join OP and bisect it. Let M be the mid point of OP.

(ii) Taking M as centre and MO as radius, draw a circle to intersect C (O, r) in two points, say A and B

(iii) Join PA and PB. These are the required tangents from P to C(O,r)




**Ex.7** Draw a circle of radius 2.5 cm. From a point P, 6 cm apart from the centre of a circle, draw two tangents to the circle.

**Sol.** **Given :** A point P is at a distance of 6 cm from the centre of a circle of radius 2.5 cm

**Required :** To draw two tangents to the circle from the given point P.

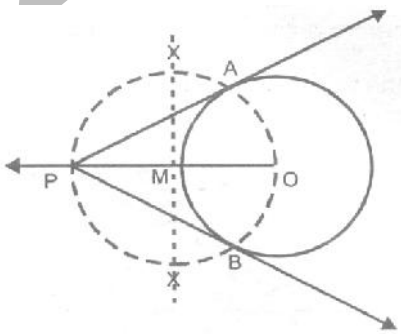
**Steps of Construction :**

(i) Draw a circle of radius 2.5 cm. Let it centre be O.

(ii) Join OP and bisect it. Let M be mid-point of OP.

(iii) Taking M as centre and MO as radius draw a circle to intersect C in two points, say A and B.

(iv) Join PA and PB. These are the required tangents from P to C.




**(d) To Draw Tangents to a Circle From a Point Outside it (When its Centre is not Known):**

**Given :** P is a point outside the circle.

**Required :** To draw tangents from a point P outside the circle.

**Steps of Construction :**

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

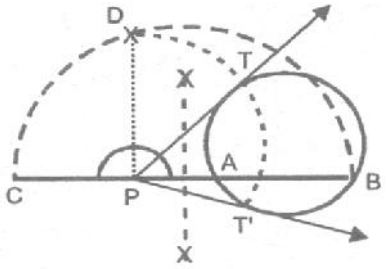
(ii) Produce AP to a point C, such that PA = PC.

(iii) With BC as a diameter, draw a semicircle.

(iv) Draw PD $\perp$ CB, intersecting the semicircle at D.

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

(iv) Join PT and PT'. Then, PT and PT' are the required tangents.




**Ex.8** Draw a circle of radius 3 cm. From a point P, outside the circle draw two tangents to the circle without using the centre of the circle.

**Given :** A point P is outside the circle of radius 3 cm.

**Required :** To draw two tangents to the circle from the point P, without the use of centre.

**Steps of constructing**

(i) Draw a circle of radius 3 cm.

(ii) Take a point P outside the circle and draw a secant PAB, intersecting the circle at A and B.

(iii) Produce AP to C such that AP = CP.

(iv) Draw a semicircle, wit CB as a diameter.

(v) Draw PD $\perp$ AB, intersecting the semi-circle AT D.

(vi) With PD as radius and P as centre draw two arcs to intersect the given circle at T and T'.

(vii) Joint PT and PT'. Which are the required tangents.