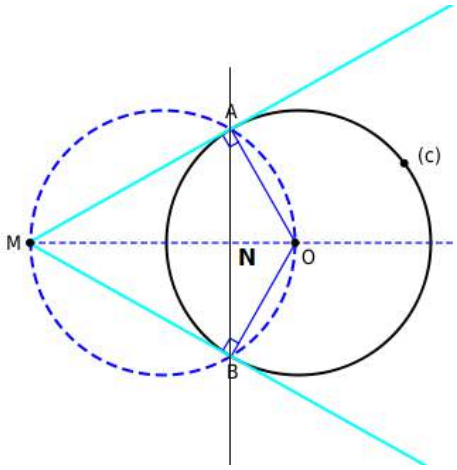
Circle: Constructions

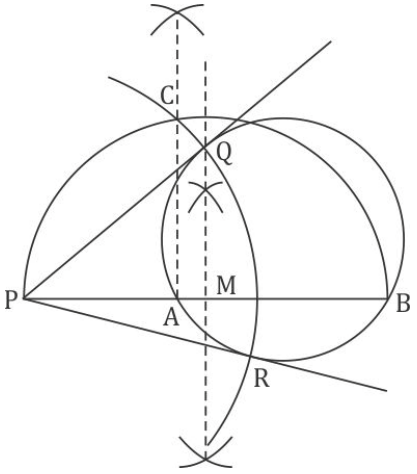
Important Concepts

1. Construction of a tangent from a point on the circle
   Steps of construction:
   1. Take a point *R* on the circle.
   2. Join *OR* and Construct $\angle ORQ = 90^{o}$.
   3. Produce *QR* to *P* to get *PRQ* as required tangent.

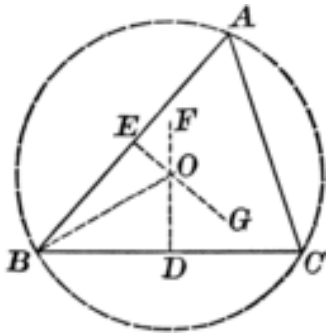
2. Construction of a tangent from a point outside the circle
   1. Take a point M outside the circle.
   2. Join the centre O with the point M.
   3. Draw perpendicular bisector of line OM, which intersect OM at N.
   4. Taking N as a centre and NM as a radius draw a circle which intersects the given circle at two points A and B. Join MA and MB to get the required tangents.



3. Construction of tangents to a given circle from an exterior point when the centre of the circle is not known.
   1. Draw any secant PAB to the circle.
   2. Draw the perpendicular bisector of PB. Let M be the midpoint of PB.
   3. Taking M as centre and MP as radius, draw a semi circle.
   4. At A, draw a perpendicular to PB. Let this perpendicular meet the semicircle at C.
   5. Taking P as centre and CP as radius, draw an arc to meet the given circle at two points, say Q and R.
   6. Join PQ and PR. Then PQ and PR are the required tangents from P to the given circle.

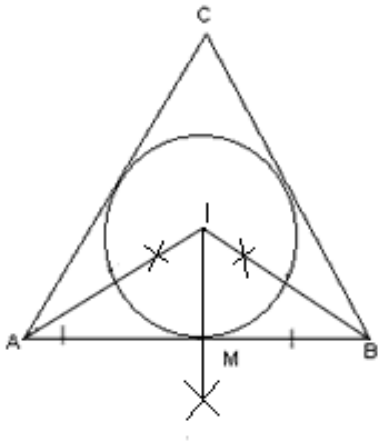


4. To construct the circumscribing circle of a triangle



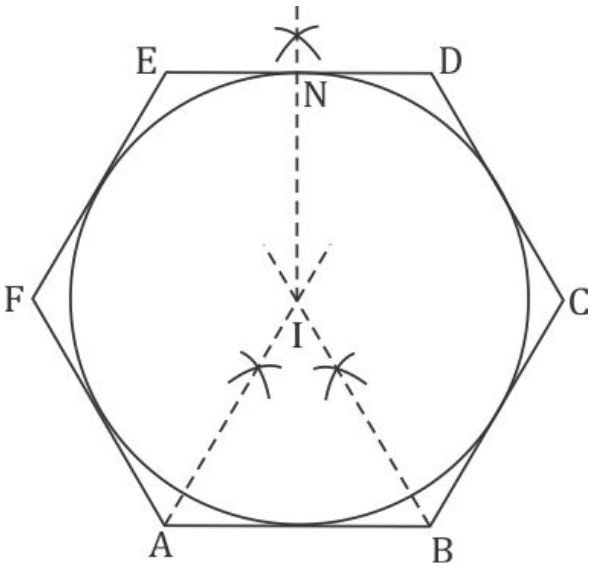
1. Consider a triangle ABC.
2. Draw perpendicular bisectors of any two sides say AB and BC and let them intersect at O.
3. Taking O as a centre and OB as radius draw the circle, this circle must pass through A, B and C.

5. To construct a in-circle in a triangle



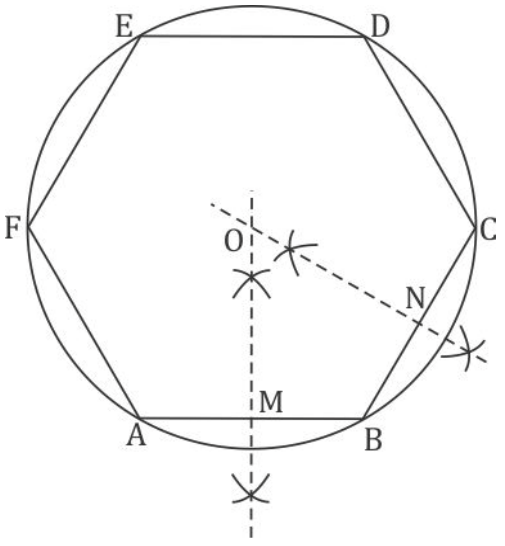
1. Consider a triangle ABC.
2. Draw angle bisector of angle A and B, which intersect at a point I.
3. Draw a perpendicular from I on AB, which intersect AB at M.
4. Taking I as a centre and IM as radius draw the circle. This gives the required in circle.

6. To construct a circle in a given regular hexagon:



1. Construct a regular hexagon of side = 4 cm.
2. Draw bisectors of $\angle A \text{ and } \angle B$. Let these bisectors meet at the point I.
3. From I draw IN perpendicular to ED
4. Draw a circle, with I as centre and IN as radius.
   This is the required circle inside the regular hexagon.

7. To construct a circle about a given regular hexagon.



1. Construct a regular hexagon with side = 3 cm
2. Draw the perpendicular bisectors of the sides
   AB and BC. Let these bisectors meet at the point O.
3. Draw a circle, with O as centre and radius OA.
   This is the required circle about the regular hexagon.