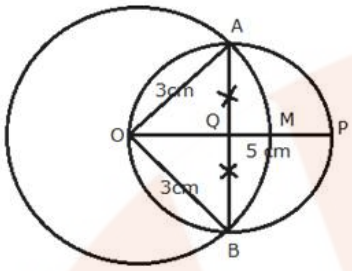
Book Name: Selina Concise

EXERCISE

Solution 1:

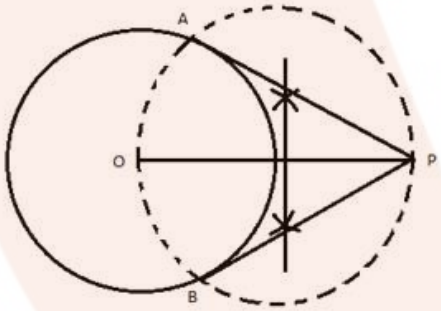


Steps Of Construction:

i) Draw a circle with centre O and radius 3 cm.
ii) From O, take a point P such that OP = 5 cm
iii) Draw a bisector of OP which intersects OP at M.
iv) With centre M, and radius OM, draw a circle which intersects the given circle at A and B.
v) Join AP and BP.

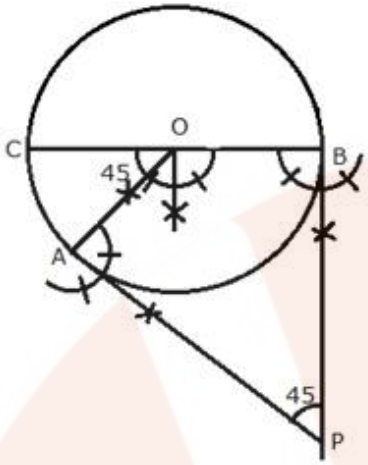
AP and BP are the required tangents.
On measuring AP = BP = 4 cm

Solution 2:



i. Draw a circle of diameter 9 cm, taking O as the centre.
ii. Mark a point P outside the circle, such that PO = 7.5 cm.
iii. Taking OP as the diameter, draw a circle such that it cuts the earlier circle at A and B.
iv. Join PA and PB.

Solution 3:



Steps of Construction:

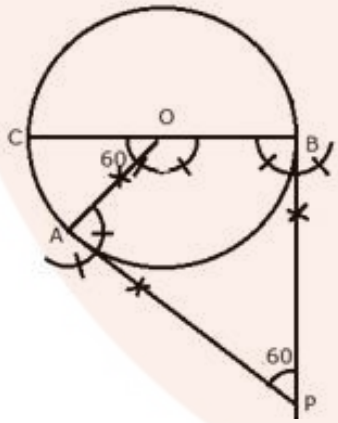
i) Draw a circle with centre O and radius BC = 5 cm

ii) Draw arcs making an angle of 180º - 45º = 135º at O such that $\angle$AOB = 135º

iii) AT A and B, draw two rays making an angle of 90º at each point which meet each other at point P, outside the circle.

iv) AP and BP are the required tangents which make an angle of 45º with each other at P.

Solution 4:



Steps of Construction:

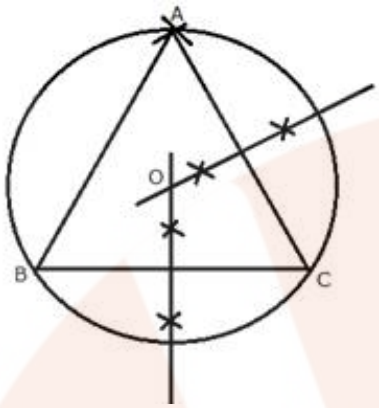
i) Draw a circle with centre O and radius BC = 4.5 cm

ii) Draw arcs making an angle of 180º - 60º = 120º at O such that $\angle$AOB = 120º

iii) AT A and B, draw two rays making an angle of 90º at each point which meet each other at point P, outside the circle.

iv) AP and BP are the required tangents which make an angle of 60º with each other at P.

Solution 5:



Steps of construction:

i) Draw a line segment BC = 4.5 cm

ii) With centers B and C, draw two arcs of radius 4.5 cm which intersect each other at A.

iii) Join AC and AB.

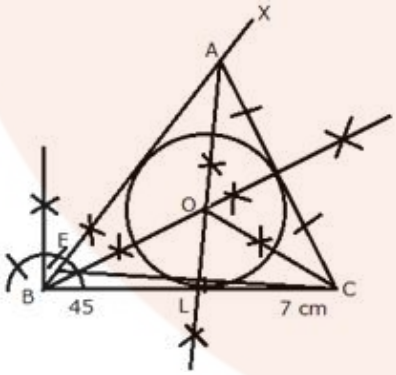
iv) Draw perpendicular bisectors of AC and BC intersecting each other at O.

v) With centre O, and radius OA or OB or OC draw a circle which will pass through A, B and C.

This is the required circumcircle of triangle ABC.

On measuring the radius OA = 2.6 cm

Solution 6:



Steps of Construction:

i) Construction of triangle:

a) Draw a line segment BC = 7 cm

b) At B, draw a ray BX making an angle of 45^{o} and cut off BE = AB − AC = 1cm

c) Join EC and draw the perpendicular bisector of EC intersecting BX at A.

d) Join AC.

ΔABC is the required triangle.

ii) Construction of incircle:

e) Draw angle bisectors of ∠ABC and ∠ACB intersecting each other at O.

f) From O, draw perpendiculars OL to BC.

g) O as centre and OL as radius draw circle which touches the sides of the ΔABC. This is the required in-circle of ΔABC.

On measuring, radius OL = 1.8 cm

Solution 7:

Steps of Construction:

i) Draw a line segment BC = 5 cm

ii) With centers B and C, draw two arcs of 5 cm radius each which intersect each other at A.

iii) Join AB and AC.

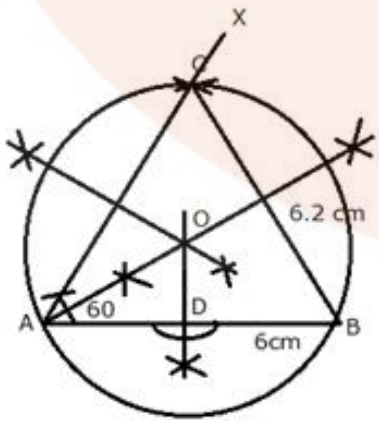
iv) Draw angle bisectors of ∠B and ∠C intersecting each other at O.

v) From O, draw OL ⊥ BC.

vi) Now with centre O and radius OL, draw a circle which will touch the sides of ΔABC

On measuring, OL = 1.4 cm

Solution 8:



Steps of construction:

i) Draw a line segment AB = 6 cm

ii) At A, draw a ray making an angle of 60^o with BC.

iii) With B as centre and radius = 6.2 cm draw an arc which intersects AX ray at C.

iv) Join BC.

ΔABC is the required triangle.

v) Draw the perpendicular bisectors of AB and AC intersecting each other at O.

vi) With centre O, and radius as OA or OB or OC, draw a circle which will pass through A, B and C.

vii) From O, draw OD ⊥ AB.

Proof: In right ΔOAD and ΔOBD

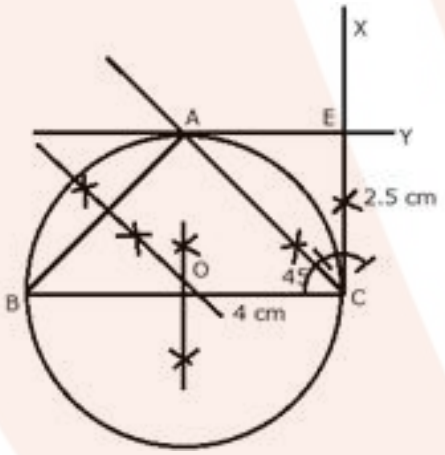
OA = OB (radii of same circle)

Side OD = OD (common)

$\therefore \triangle OAD \cong \triangle OBD$ (RHS)

$\Rightarrow AD = BD$ (CPCT)

Solution 9:



Steps of Construction:

i) Draw a line segment BC = 4 cm.

ii) At C, draw a perpendicular line CX and from it, cut off CE = 2.5 cm.

iii) From E, draw another perpendicular line EY.

iv) From C, draw a ray making an angle of 45^o with CB, which intersects EY at A.

v) Join AB.

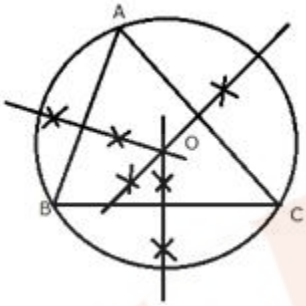
vi) ΔABC is the required triangle.

vii) Draw perpendicular bisectors of sides AB and BC intersecting each other at O.

viii) With centre O, and radius OB, draw a circle which will pass through A, B and C.

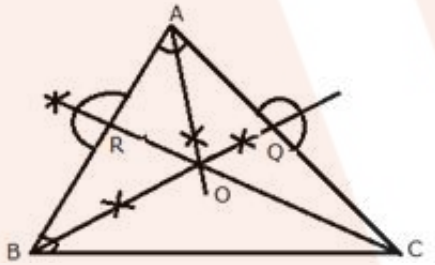
Measuring the radius OB = OC = OA = 2 cm

Solution 10:



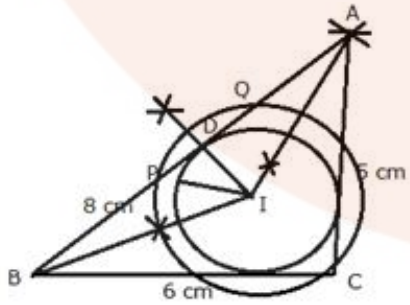
i) O is called the circumcentre of circumcircle of ΔABC.
ii) OA, OB and OC are the radii of the circumcircle.
iii) Yes, the perpendicular bisector of BC will pass through O.

Solution 11:



i) O is called the incentre of the incircle of ΔABC.
ii) OR and OQ are the radii of the incircle and OR = OQ.
iii) OC is the bisector of angle C
$\therefore \angle ACO = \angle BCO$

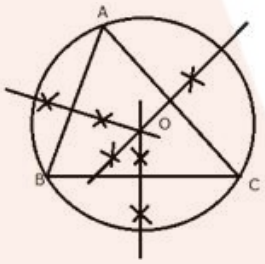
Solution 12:



Steps of Construction:
i) Draw a line segment BC = 6 cm.
ii) With centre B and radius 8 cm draw an arc.

iii) With centre C and radius 5 cm draw another arc which intersects the first arc at A.
iv) Join AB and AC.
ΔABC is the required triangle.
v) Draw the angle bisectors of $\angle B$ and $\angle A$ intersecting each other at I. Then I is the incentre of the triangle ABC
vi) Through I, draw $ID \perp AB$
vii) Now from D, cut off $DP = DQ = \frac{2}{2} = 1$ cm
viii) With centre I, and radius IP or IQ, draw a circle which will intersect each side of triangle ABC cutting chords of 2 cm each.

Solution 13:



Steps of construction:

i) Draw a line segment BC = 6 cm
ii) With centers B and C, draw two arcs of radius 6 cm which intersect each other at A.
iii) Join AC and AB.
iv) Draw perpendicular bisectors of AC, AB and BC intersecting each other at O.
v) With centre O, and radius OA or OB or OC draw a circle which will pass through A, B and C.

This is the required circumcircle of triangle ABC.

Solution 14:

Steps of Construction:

i) Draw a line segment BC = 5.6 cm

ii) With centers B and C, draw two arcs of 5.6 cm radius each which intersect each other at A.

iii) Join AB and AC.

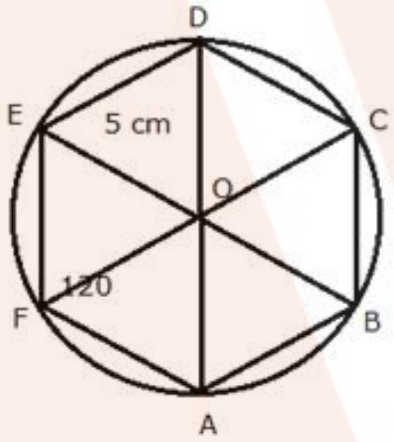
iv) Draw angle bisectors of ∠B and ∠C intersecting each other at O.

v) From O, draw $OL \perp BC$.

vi) Now with centre O and radius OL, draw a circle which will touch the sides of ΔABC.

This is the required circle.

Solution 15:



Steps of Construction:

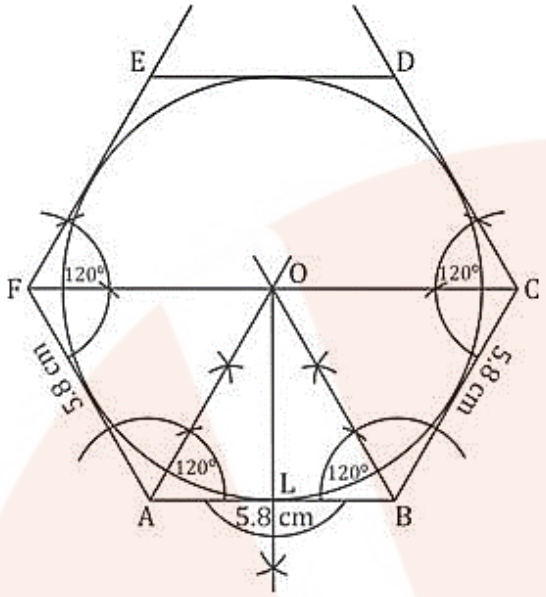
i) Draw a regular hexagon ABCDEF with each side equal to 5 cm and each interior angle 120º.

ii) Join its diagonals AD, BE and CF intersecting each other at O.

iii) With centre as O and radius OA, draw a circle which will pass through the vertices A, B, C, D, E and F.

This is the required circumcircle.

Solution 16:



Steps of Construction:

i) Draw a line segment AB = 5.8 cm

ii) At A and B, draw rays making an angle of 120° each and cut off AF = BC = 5.8 cm

iii) Again F and C, draw rays making an angle of 120° each and cut off FE = CD = 5.8 cm.

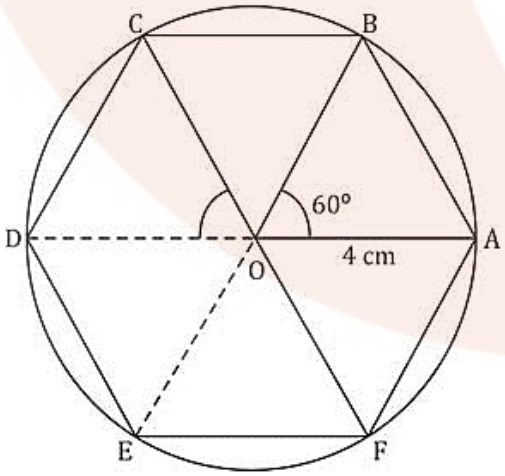
iv) Join DE. Then ABCDEF is the regular hexagon.

v) Draw the bisectors of ∠A and ∠B intersecting each other at O.

vi) From O, draw OL ⊥ AB

vii) With centre O and radius OL, draw a circle which touches the sides of the hexagon. This is the required in circle of the hexagon.

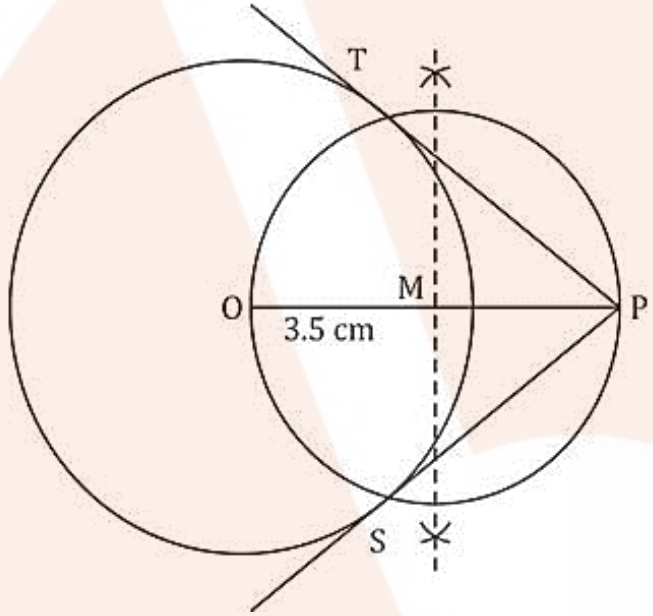
Solution 17:



Steps of Construction:

(i) Draw a circle of radius 4 cm with centre O
(ii) Since the interior angle of regular hexagon is 60^o, draw radii OA and OB such that $\angle AOB = 60^\circ$.
(iii) Cut off arcs BC, CD, EF and each equal to arc AB on given circle
(iv) Join AB, BC, CD, DE, EF, FA to get required regular hexagon ABCDEF in a given circle.
The circle is the required circum circle, circumscribing the hexagon.

Solution 18:



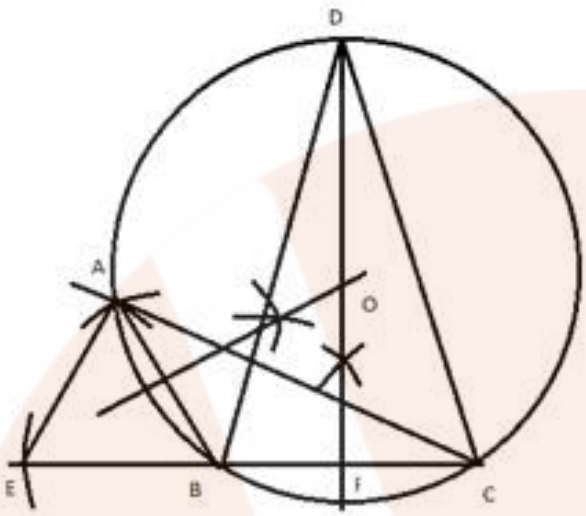
Steps of Construction:

i) Draw a line segment OP = 6 cm
ii) With centre O and radius 3.5 cm, draw a circle
iii) Draw the midpoint of OP
iv) With centre M and diameter OP, draw a circle which intersect the circle at T and S
v) Join PT and PS.

PT and PS are the required tangents. On measuring the length of PT = PS = 4.8 cm

Solution 19:

i.



a. Draw a line BC = 5.4 cm.
b. Draw AB = 6 cm, such that m∠ABC = 120°.
c. Construct the perpendicular bisectors of AB and BC, such that they intersect at O.
d. Draw a circle with O as the radius.

ii.

e. Extend the perpendicular bisector of BC, such that it intersects the circle at D.
f. Join BD and CD.
g. Here BD = DC.