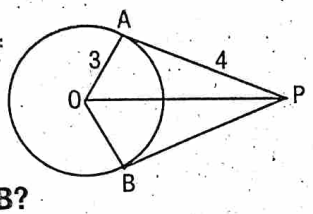
1. In the figure PA, PB are tangents, O is the centre of the circle. If the radius of the circle is 3 cm and PA = 4 cm.



(a) What is the length of PB?

(b) Find the length of OP. (2)

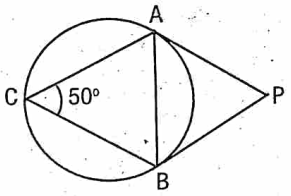
(a) PB = PA = 4 cm

(b) In right triangle OAP, $OP^2 = OA^2 + AP^2$

$= 3^2 + 4^2 = 9 + 16 = 25$

$OP = \sqrt{25} = 5$ cm

2. In the figure PA and PB are tangents. ∠C = 50°.



(a) Write the angle measures of triangle PAB.

(b) What is the measure of ∠P, if ∠C = ∠P? (3)

(a) ∠PAB = ∠ACB = 50°

∠PBA = ∠ACB = 50°

∠APB = 180 − (50 + 50) = 80°

(b) ∠C = ∠PAB = ∠PBA

When ∠PAB and ∠PBA are equal to ∠P, these angles should be 60° each.

∴ ∠P = 60°

3. The inradius of a triangle is 2.5 cm and two of its angles are 60°, 50°. Draw the triangle. (4)

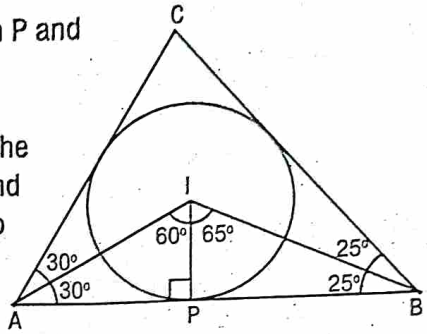
Draw a circle with centre I and radius 2.5 cm.

Mark a point P on the circle.

Draw a line through P and perpendicular to IP.

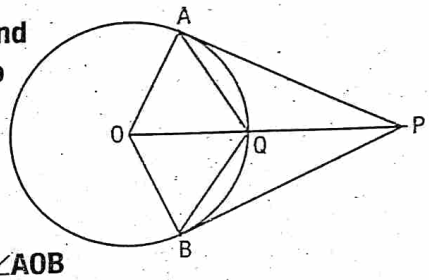
Measure and draw ∠PIA = 60° to get the point A. Measure and draw ∠PIB = 65° to get the point B.

Measure and draw ∠IAC = 30° and ∠IBC = 25° to get the point C.



4. In the figure, PA and PB are tangents to the circle with centre O.

If OP = 2OB



(a) Find the measures of ∠AOB and ∠BQA.

(b) Prove that triangle QPB is isosceles.

(c) If QB = 5 cm, what is the circumradius of quadrilateral OAPB? (5)

(a) OB = OQ

OP = 2OB ∴ OP = 2OQ

That means OQ = PQ ..... (1)

In ΔOAP, ∠OAP = 90°

If OA = x, OP = 2x

$AP = \sqrt{(2x)^2 - x^2} = \sqrt{4x^2 - x^2} = \sqrt{3x^2} = \sqrt{3}x$

Ratio of the sides of ΔOAP $= x : \sqrt{3}x : 2x$

$= 1 : \sqrt{3} : 2$

In a triangle with sides in the ratio $1:\sqrt{3}:2$, the angles are 30°, 60° and 90°.

$\therefore \angle OPA = 30°, \angle AOP = 60°$

$\angle BOP = \angle AOP = 60°$

$\therefore \angle AOB = 60 + 60 = 120°$

Central angle of the major arc AB $= 360 - 120 = 240°$

$\angle BQA = 240 \div 2 = 120°$

b. $\angle AOB + \angle P = 180°$

$\angle P = 180 - 120 = 60°$

$\angle QPB = 60 \div 2 = 30°$

Since $\angle BQA = 120°$, $\angle BQO = 60°$

In ΔOBQ, $\angle BOQ = 60°$, $\angle BQO = 60°$

$\therefore \angle OBQ = 60°$

Since $\angle OBP = 90°$, $\angle QBP = 90 - 60 = 30°$

Since two angles of ΔQPB are equal it is isosceles.

c. Since three angles of ΔOQB are equal, its sides are also equal.

$\therefore OQ = 5$ cm

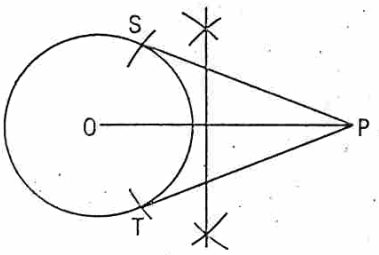
Also PQ = 5 cm (reason (1))

Diameter of the circumcircle of the quadrilateral OAPB $= OQ + PQ = 5 + 5 = 10$ cm

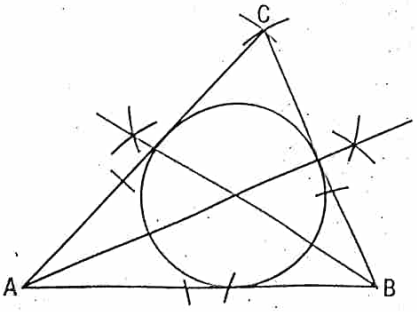
Circum radius $= 10 \div 2 = 5$ cm

SSLC Model Examination - 2019

5. Draw a circle of radius 3 centimetres. Mark a point 7 centimetres away from its centre. Draw the tangents to the circle from that point. (4)

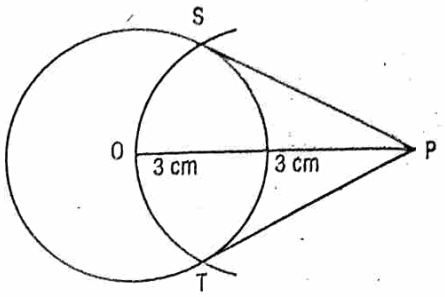


6. Draw a triangle of sides 5 centimetres, 6 centimetres and 7 centimetres. Draw its incircle. (5)

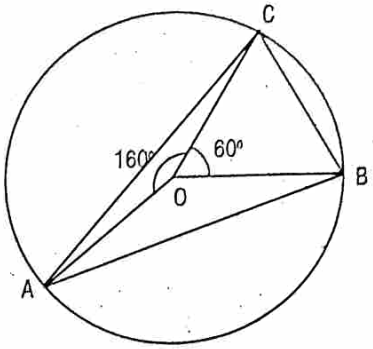


SSLC Examination - 2019

7. Draw a circle of radius 3 centimetres. Mark a point P at a distance 6 centimetres from the centre of the circle. Draw tangents from P to the circle. (3)



8. In triangle ABC, $\angle A = 30°$, $\angle B = 80°$, circumradius of the triangle is 4 centimetres. Draw the triangle. Measure and write the length of its smallest side. (4)

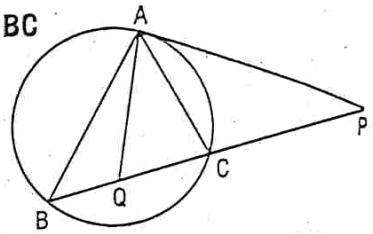


$\angle A = 30°$

$\angle B = 80°$

BC = 4 cm

9. In the figure chord BC is extended to P. Tangent from P to the circle is PA. AQ is the bisector of $\angle BAC$.



(a) Write one pair of equal angles from the figure.

(b) If $\angle PAC = x$ and $\angle PCA = y$, prove that $\angle BAC = y - x$.

(c) Prove that $\angle PAQ = \frac{y+x}{2}$. (4)

(a) $\angle ABC = \angle PAC$

(b) If $\angle PAC = x$, $\angle ABC = x$

$\angle PCA = y$

$\therefore \angle BCA = 180 - y$ (Linear pair)

Since the sum of the angles of a triangle is 180°,

$\angle ABC + \angle BCA + \angle BAC = 180°$

$\angle BAC = 180 - \angle ABC - \angle BCA = 180 - x - (180 - y)$

$= 180 - x - 180 + y$

$= y - x$

(c) $\angle PAQ = \angle PAC + \angle CAQ$

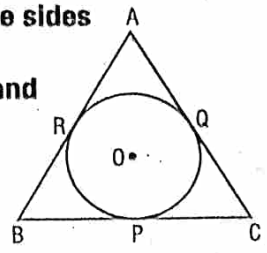
$= x + \frac{y-x}{2}$ ($\angle CAQ$ is half of $\angle BAC$)

$= x + \frac{y}{2} - \frac{x}{2}$

$= \frac{2x}{2} + \frac{y}{2} - \frac{x}{2} = \frac{2x-x+y}{2}$

$= \frac{x+y}{2}$

10. Circle with centre O touches the sides of the triangle at P, Q and R, AB = AC, AQ = 4 centimetres and CQ = 6 centimetre.



(a) What is the length of CP?

(b) Find the perimeter and the area of the triangle.

(c) What is the radius of the circle? (5)

(a) CP = 6 cm (Lengths of tangents CP and CQ are equal.)

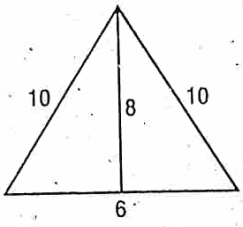
(b) AC = 4 + 6 = 10 cm

AB = 10 cm (AB = AC)

BC = 6 + 6 = 12 cm

Perimeter of ΔABC

= 10 + 10 + 12 = 32 cm



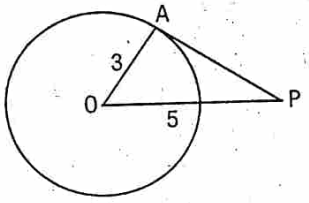
$s = \frac{32}{2} = 16$

Area $= \frac{1}{2} \times 12 \times 8 = 48$ sq.cm.

(c) Radius of the circle $= \frac{A}{s} = \frac{48}{16} = 3$ cm

Second Terminal Evaluation 2017

11. In the figure OA is a radius and PA is the tangent to the circle at A. If OP = 5 cm, OA = 3 cm then



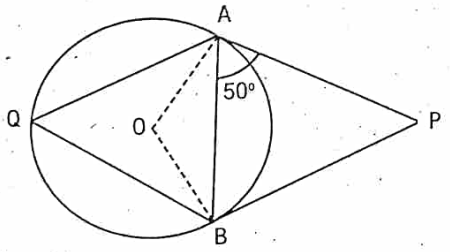
a. What is the measure of ∠OAP?

b. Calculate the length of the tangent PA. (2)

a. ∠OAP = 90°

b. $PA = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$ cm

12. In the figure PA, PB are two tangents to the circle with centre O. If ∠PAB = 50°, write the measures of ∠AQB, ∠AOB, ∠APB. (3)



∠AQB = 50° (In a circle the angle which a chord makes with the tangent at its ends on any side are equal to the angle which it makes on the part of the circle on the other side.)

∠AOB = double of ∠AQB = 100°

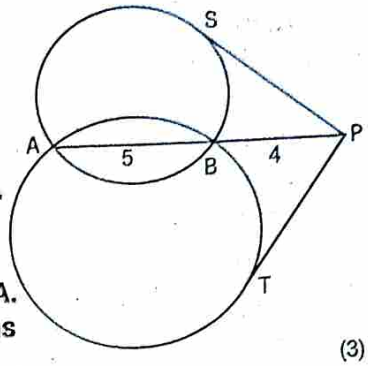
Since the tangents PA and PB are equal,

ΔAPB is an isosceles triangle.

∠ABP = 50°

∠APB = 180 − (50 + 50) = 180 − 100 = 80°

13. In the figure PT, PS are tangents to the large circle and small circle respectively. The circles cut each other at points A and B. If PB = 4 cm, AB = 5 cm.



a. Find the length of PA.

b. Calculate the lengths of PS and PT. (3)

a. PA = PB + AB = 4 + 5 = 9 cm

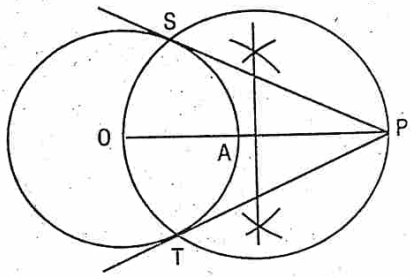
b. PA × PB = PS², 4 × 9 = PS², PS² = 36

PS = $\sqrt{36}$ = 6 cm

PA × PB = PT²

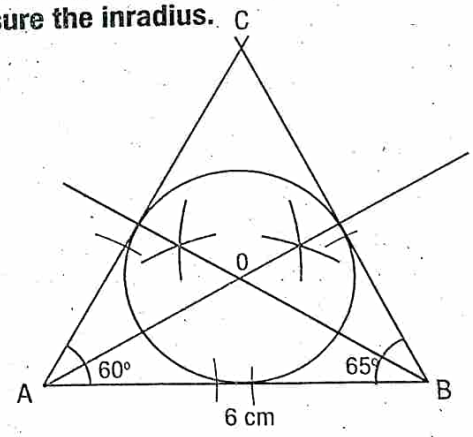
PT² = 4 × 9 = 36, PT = $\sqrt{36}$ = 6 cm

14. Draw a circle of radius 3 cm. Mark a point 7 cm away from its centre. Draw tangents from that point to the circle and measure lengths of the tangents. (4)



OA = 3 cm
OP = 7 cm
PS = 6.3 cm
PT = 6.3 cm

15. In triangle ABC, AB = 6 cm, ∠A = 60°, ∠B = 65°. Draw triangle ABC and construct its incircle and measure the inradius. (5)



Inradius = 1.8 cm