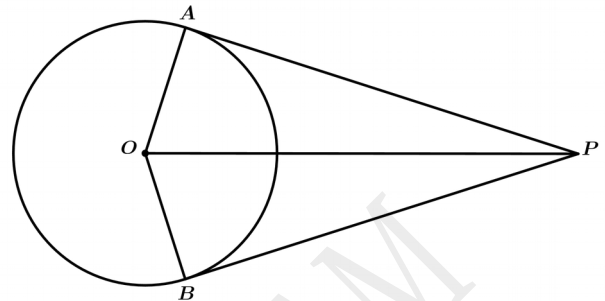


WANDOOR GANITHAM SSLC MATHEMATICS STUDY MATERIAL : 2023
TANGENTS

QUESTION – 1

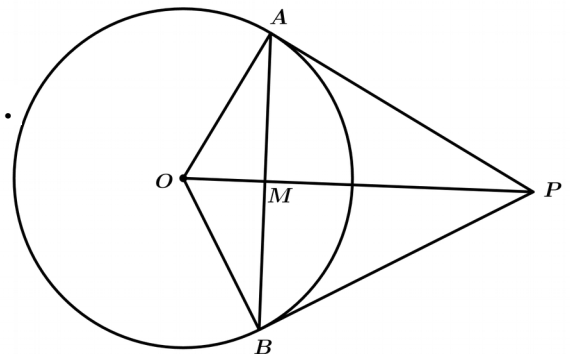
In the figure A and B are two points on a circle with centre O . The tangents through A and B meet at P .



- a) What are the measures of $\angle A$ and $\angle B$?
- b) Prove the following .
 - (i) Tangents have the same length .
 - (ii) OP is the bisector of $\angle APB$.
 - (iii) $\angle AOP = \angle BOP$
 - (iv) Quadrilateral OBPA is cyclic .

QUESTION – 2

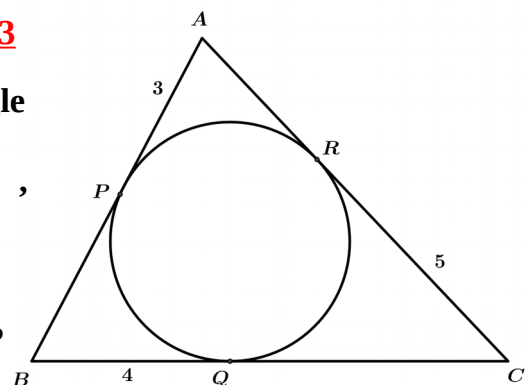
In the figure A and B are two points on a circle with centre O . The tangents through A and B meet at P .



- a) What is the measure of $\angle OAP$?
- b) Check whether the angles of the triangle AOP are equal to the angles of the triangle BOP or not .
- c) Prove that OP is the perpendicular bisector of the line AB .

QUESTION – 3

In the figure the circle touches the sides of the triangle at the points P , Q and R . PA = 3 centimetres , QB = 4 centimetres , RC = 5 centimetres .

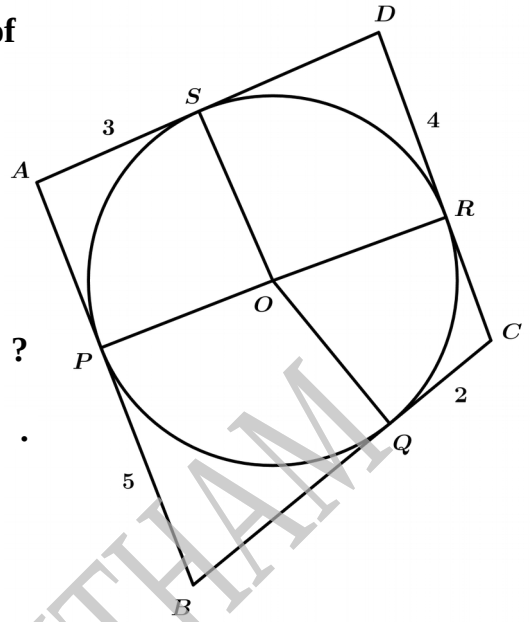


- a) What are the lengths of the lines RA and BC ?
- b) Calculate the perimeter of the triangle ABC .

QUESTION – 4

In the figure the circle centred at O touches the sides of the quadrilateral at the points P, Q, R and S .

$SA = 3$ centimetres, $PB = 5$ centimetres,
 $QC = 2$ centimetres, $RD = 4$ centimetres.



- What are the lengths of the line PA, CR and AD ?
- Calculate the perimeter of the quadrilateral $ABCD$.
- Find the sum of each pair of the opposite sides.

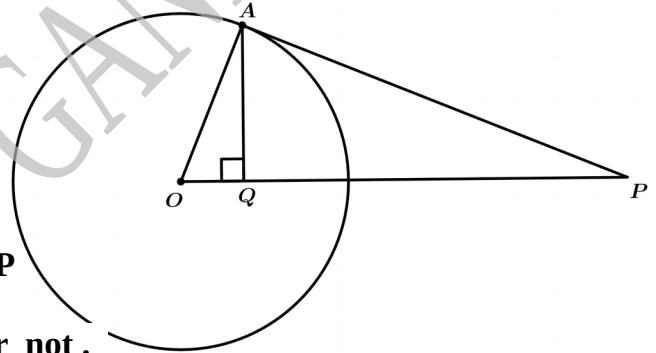
What is the special feature?

QUESTION – 5

In the figure O is the centre of the circle and

A is a point on it. PA is a tangent.

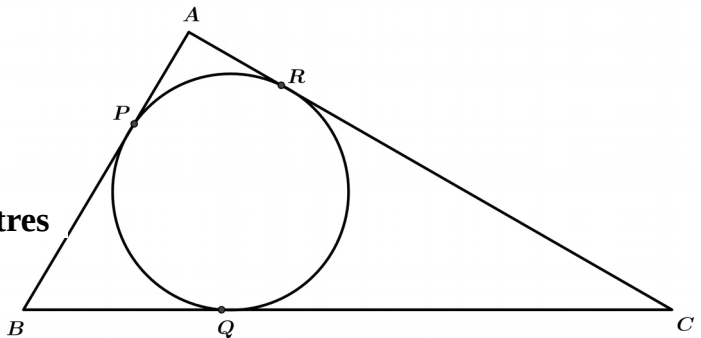
- What is the measure of $\angle OAP$?
- Check whether the angles of the triangle AOP are equal to the angles of the triangle AOQ or not.
- Prove that $OP \times OQ = OA^2$.



QUESTION – 6

In the figure the circle touches the sides of the triangle at the points P, Q and R .

$AB = 6$ centimetres, $BC = 12$ centimetres,
, $AC = 10$ centimetres.



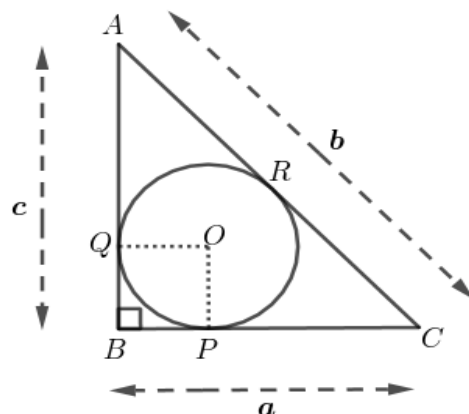
- If the length of PA is taken as x centimetres, what are the lengths of the lines RA and PB ?
- Calculate the lengths of the lines QB and RC .

QUESTION – 7

In the figure the circle centred at O touches the sides of the triangle at the points P, Q, R

$$\angle B = 90^\circ, BC = a, AC = b, AB = c$$

- What is the measure of $\angle OPB$?
- Check whether $BPOQ$ is a square or not .
- If the radius of the circle is taken as r , what are the lengths of the lines CP and AR ?
- Prove that diameter of the circle is $a + c - b$.



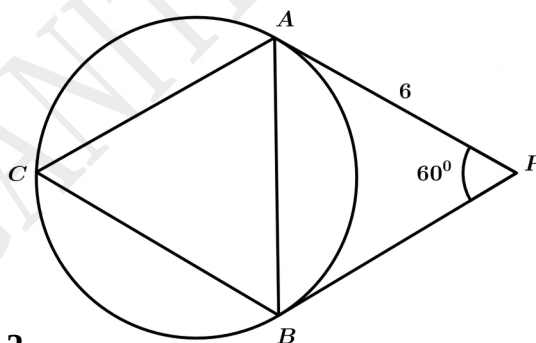
QUESTION – 8

In the figure , tangents at the points A and B

of the circle meet at P . $\angle APB = 60^\circ$,

$PA = 6$ centimetres , $CA = CB$.

- What is the length of PB ?
- What are the measures of $\angle ABP$ and $\angle ACB$?
- Prove that ABC is an equilateral triangle .
- Calculate the radius of the circle .



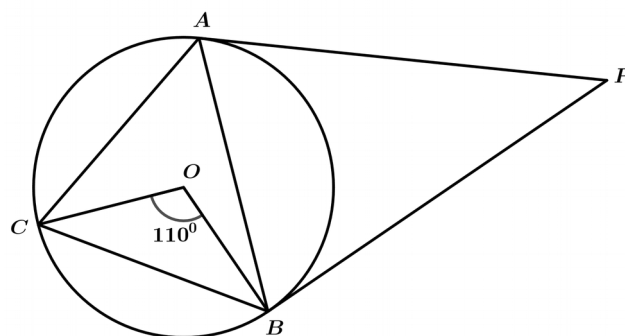
QUESTION – 9

In the figure O is the centre of the circle and tangents at the points A and B of the circle

meet at P . $BC = AC$, $\angle BOC = 110^\circ$.

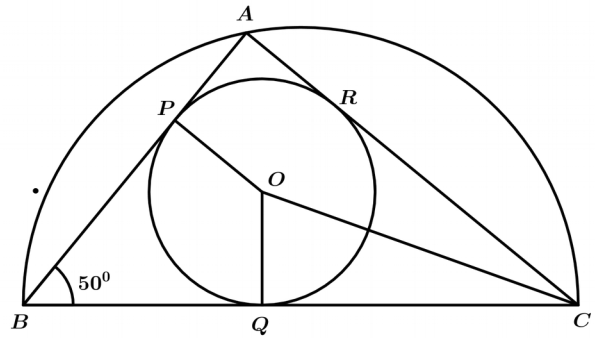
Find the measures of the following angles .

- $\angle CAB$
- $\angle OCA$
- $\angle ABP$
- $\angle APB$



QUESTION – 10

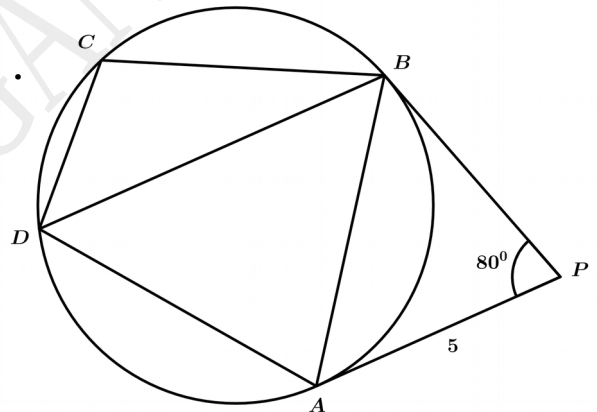
In the figure A is a point on the semicircle with diameter BC. A circle centred at O touches the sides of the triangle at P, Q and R. $\angle B = 50^\circ$. Find the measures of the following angles .



- a) $\angle BAC$
- b) $\angle OPB$
- c) $\angle POQ$
- d) $\angle POC$

QUESTION – 11

In the figure, A, B, C, D are the points on the circle. Tangents through the points A and B meet at P. $PA = 5$ centimetres, $\angle APB = 80^\circ$. The diagonal BD is parallel to the tangent PA.



- a) What is the length of PB ?

Find the measures of the following angles .

- b) $\angle PAB$
- c) $\angle ADB$
- d) $\angle ABD$
- e) $\angle BCD$

QUESTION – 12

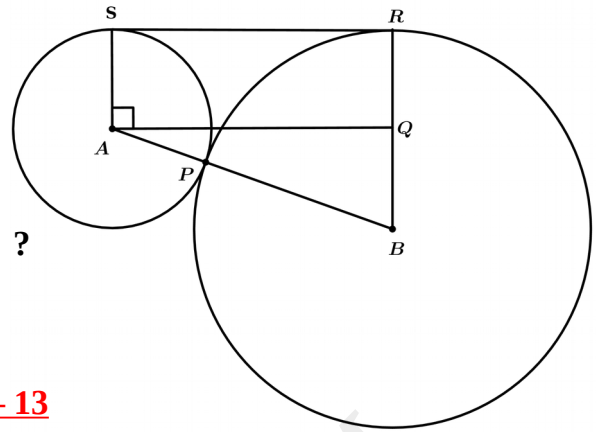
In the figure, two circles intersect at P. SR is the common tangent of the circles. Radius of the smaller circle is 4 centimetres and the radius of the larger circle is 8 centimetres. $\angle SAQ = 90^\circ$.

- a) What are the measures of $\angle ASR$ and $\angle SRQ$?

- b) Prove that AQRS is a rectangle .

- c) What are the length of the lines BQ and AB ?

- d) Calculate the length of the tangent SR .



QUESTION – 13

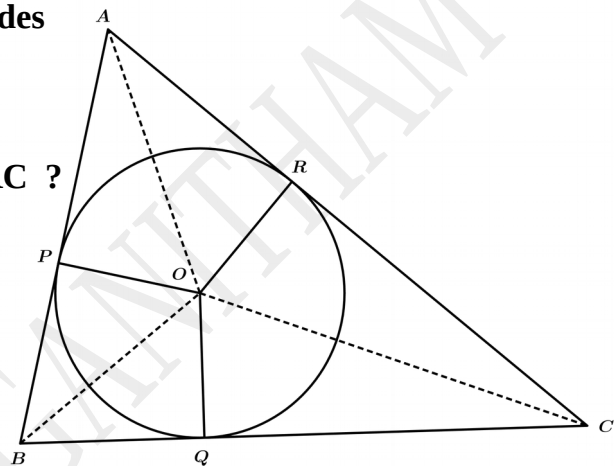
In the figure a circle centred at O touches the sides of the triangle at the points P, Q, R .

- a) What are the measures of $\angle OPB$ and $\angle ORC$?

- b) If the length of BC is 10 centimetres and the radius of the incircle of the triangle is 3 centimetres , what should be the area of the triangle BOC ?

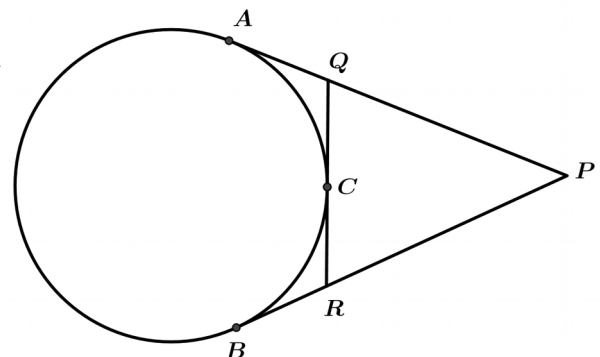
- c) Prove that the area of the triangle ABC is half the product of its perimeter and the radius of its incircle .

- d) What is the radius of the incircle of a right triangle with perpendicular sides 12 centimetres and 16 centimetres ?



QUESTION – 14

In the figure , tangents through the points A and B of the circle meet at P . Also a tangent at the point C of the circle cuts the tangents through A and B at Q and R .

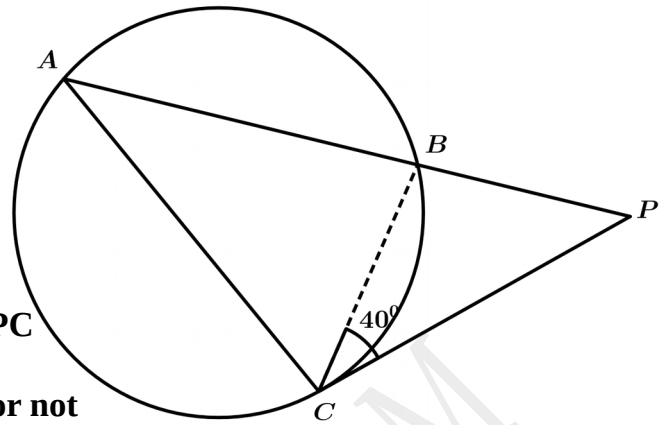


- a) If the length of QA is 2 centimetres , what is the length of QC ?

- b) Prove that the perimeter of the triangle PQR is twice the length of the tangent PA .

QUESTION – 15

In the figure , a chord AB is extended to meet the tangent through the point C at P .



- If $\angle BCP = 40^\circ$, what is the measure of $\angle CAB$?
- Check whether the angles of the triangle APC are equal to the angles of the triangle BPC or not
- Prove that $PA \times PB = PC^2$.
- If $AB = 6$ centimetres , $PB = 2$ centimetres , what is the area of the square with side PC ?

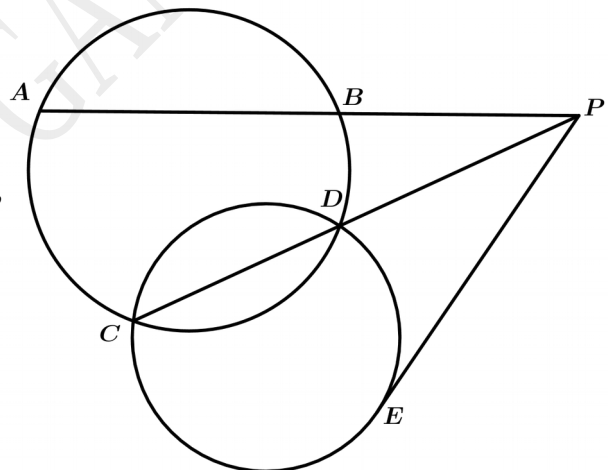
QUESTION – 16

In the figure two circles intersect at C and D .

PE is the tangent of the circle drawn below .

$PA = 12$ centimetres , $AB = 7$ centimetres ,

$PD = 6$ centimetres .



- What is the length of PB ?
- What is the value of $PC \times PD$?
- What is the length of CD ?
- Calculate the area of the square with side PE .

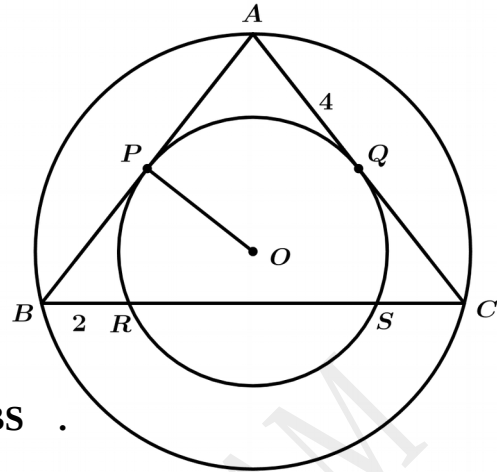
QUESTION – 17

The perpendicular sides of a right triangle are 6 centimetres and 8 centimetres .

- What is the length of its hypotenuse ?
- Calculate the radius of the circumcircle and radius of the incircle of the triangle .

QUESTION – 18

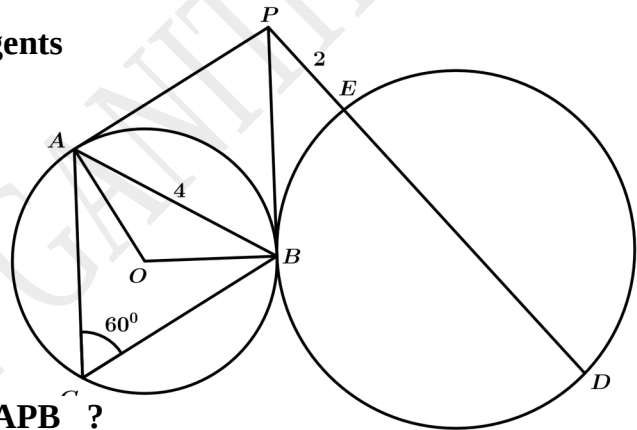
In the figure , O is the centre of both the circles .
 A, B, C are three points on the larger circle .
 Smaller circle touches the lines AB and AC at P
 and Q . BC cuts the smaller circle at R and S .
 $QA = 4$ centimetres , $RB = 2$ centimetres .



- What is the measure of $\angle APO$?
- Calculate the length of the lines PA , AB and BS .
- Calculate the perimeter of triangle ABC .

QUESTION – 19

In the figure , two circles meet at B . The tangents
 through the points A and B meet at P .
 PB is the common tangent of both the circles .
 O is the centre of the smaller circle .
 $AB = 4$ centimetres , $\angle C = 60^\circ$.



- What are the measures of $\angle AOB$ and $\angle APB$?
- Prove that APB is an equilateral triangle . .
- Calculate the length of DE .

QUESTION – 20

In the figure , circle centred with O touches the sides of
 the triangle . $\angle OAB = 40^\circ$

- What is the measure of $\angle OAC$?
- If $\angle OBC = x^\circ$ and $\angle OCA = y^\circ$,
 then $x + y = \text{---}$
- What is the measure of $\angle BOC$?

