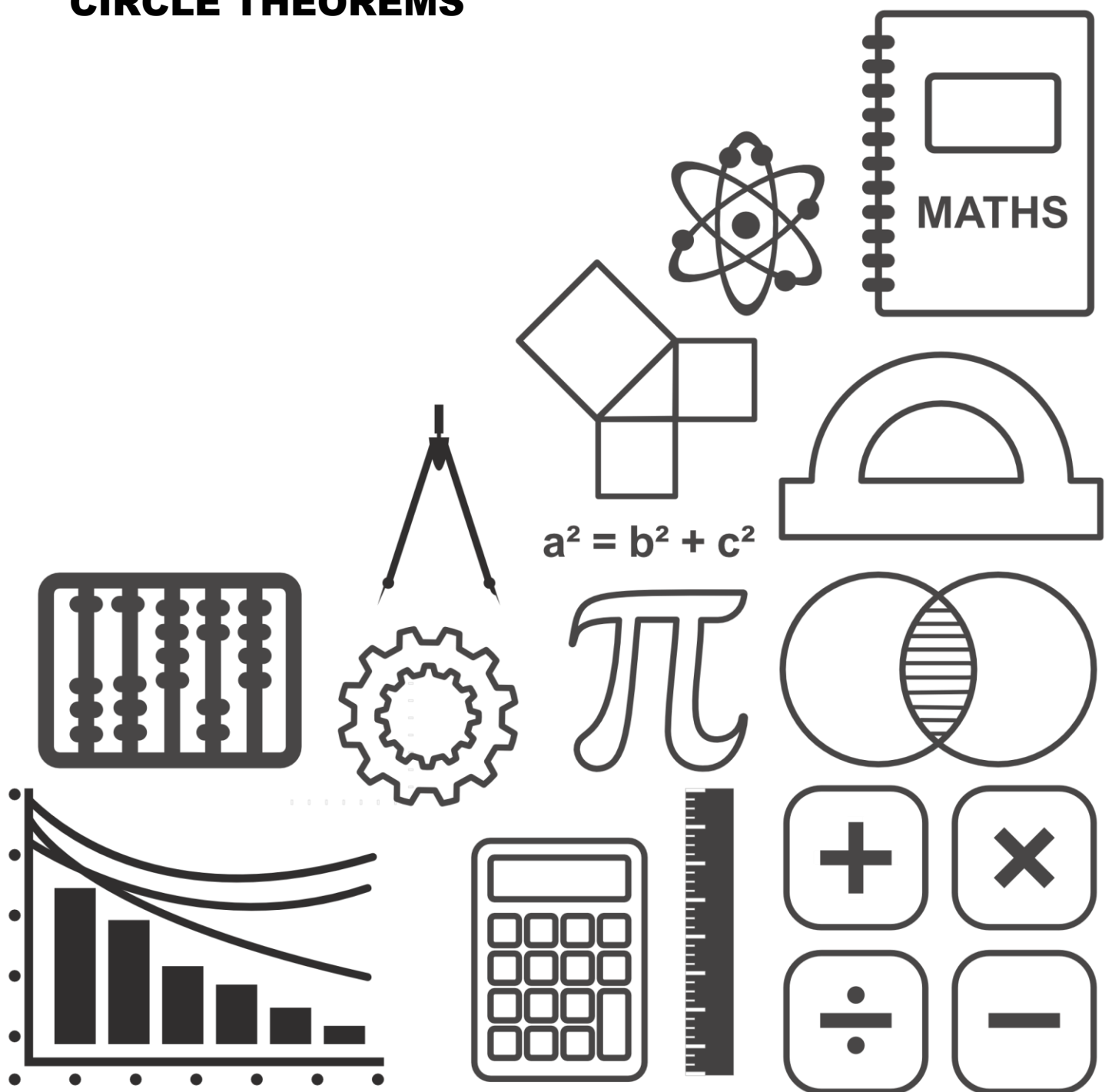


GCSE TOPIC BOOKLET CIRCLE THEOREMS



1.

- (a) The points A , B and C lie on the circumference of a circle, centre O .

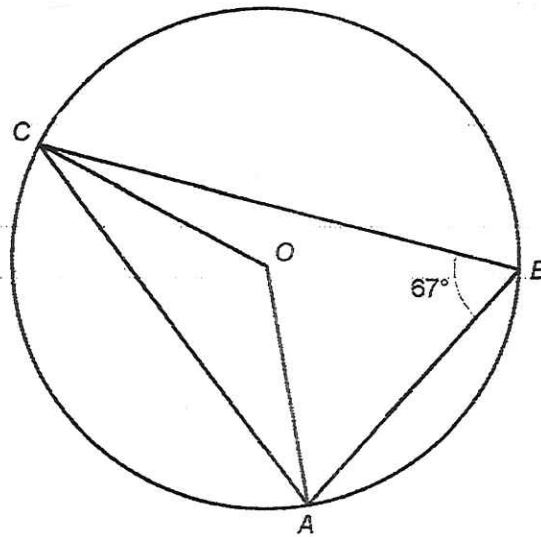


Diagram not drawn to scale

Find the size of $\angle OAC$.

[3]

- (b) The points D , E and F lie on the circumference of another circle.
 GH is a tangent to the circle at F .

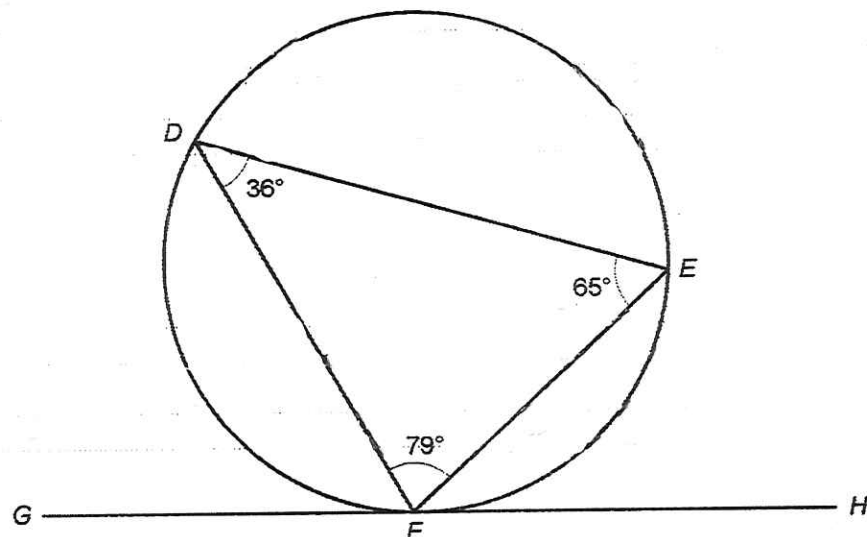


Diagram not drawn to scale

Write down the size of $\angle EFH$, giving a reason for your answer.

[2]

$\angle EFH = \dots\dots\dots^\circ$

Reason: $\dots\dots\dots$

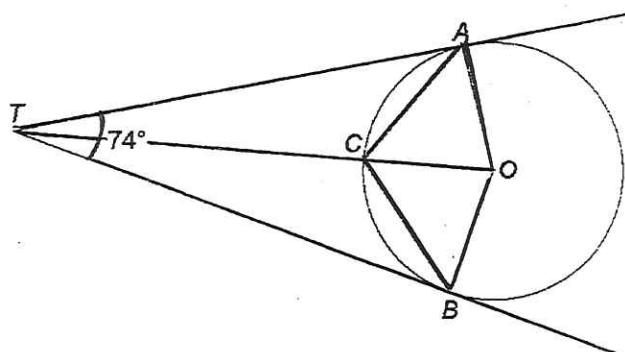


Diagram not drawn to scale

The diagram shows a circle with centre O.

AT and BT are tangents to the circle and $\angle ATB = 74^\circ$.

(a) Calculate the size of each of the following angles.

(i) $\angle AOT$

[2]

(ii) $\angle OBC$

[2]

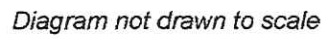
(iii) $\angle ACB$

[1]

(b) The radius of the circle is 8 cm.
Calculate the perimeter of the quadrilateral $TAOB$.

[4]

$\hat{QRB} = x$, where x is measured in degrees.



[4]

[illegible]

4.

The diagram shows a circle with centre O .
The straight lines AC and CE are tangents to the circle at B and D respectively.
 $\angle BFD = 78^\circ$.

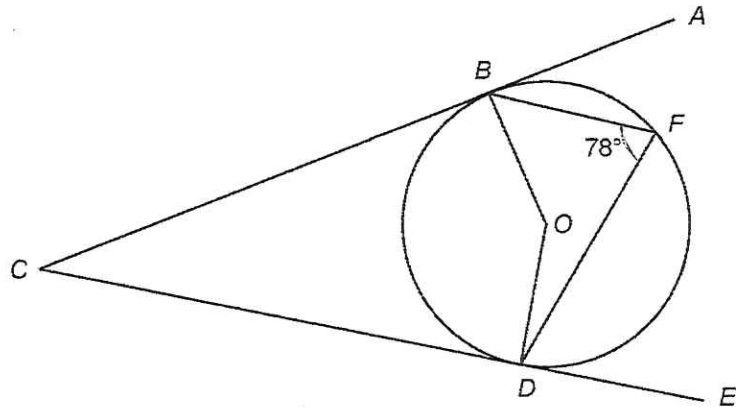


Diagram not drawn to scale

Find the size of $\angle BCD$. You **must** give reasons in your solution.

[4]

5.

The points A , B , C and D lie on the circumference of a circle, centre O .
 EF is a tangent to the circle at C .
 $AB = AC$.
 $\widehat{BCE} = 38^\circ$ and $\widehat{ACD} = 41^\circ$.

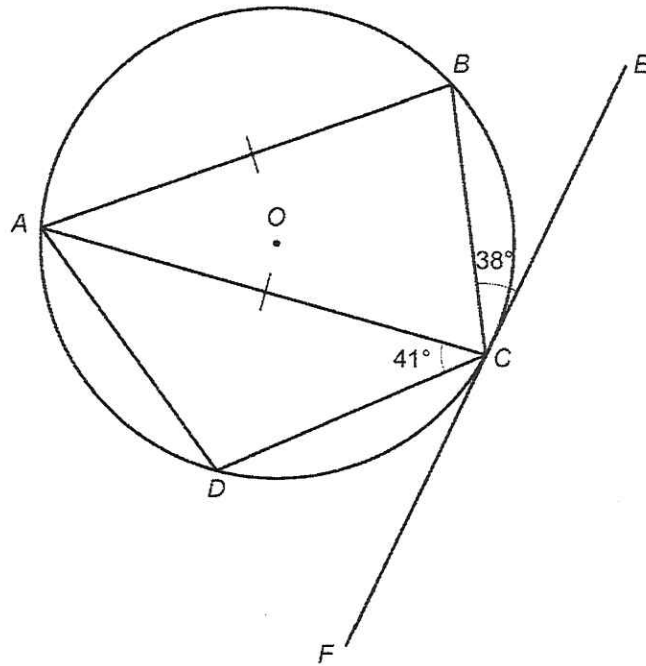


Diagram not drawn to scale

Write down the size of

(a) $\widehat{BAC}$

[1]

(b) $\widehat{ABC}$

[1]

(c) $\widehat{ADC}$

[1]

(d) $\widehat{COB}$

[1]

6.

The points A and B lie on the circumference of a circle with centre O .
The straight lines PAQ and RBQ are tangents to the circle.

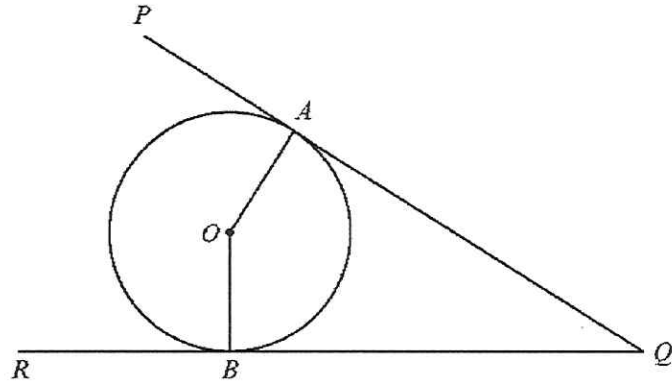


Diagram not drawn to scale

You are given that $\angle AOB = 2x$, where x is measured in degrees.

Write down the size of $\angle AOQ$ in terms of x .
Give reasons in your answer.

[4]

7.

- (a) The diagram shows a circle with centre O and a tangent TAP . The points A , B and C lie on the circumference of the circle.

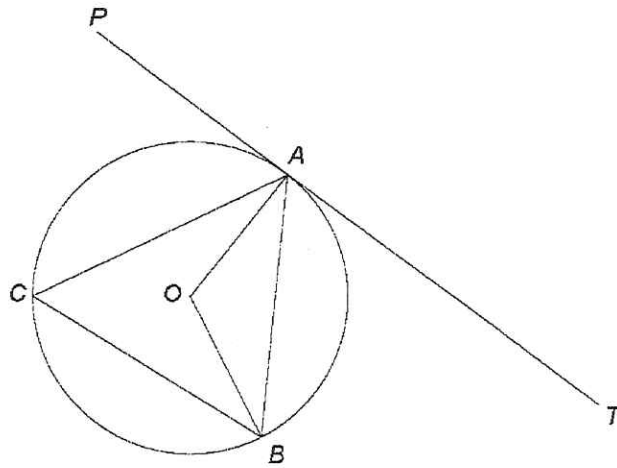


Diagram not drawn to scale

Given that $\hat{TAB} = 50^\circ$, calculate the reflex angle $\hat{AOB}$.
You must show all your working.

[3]

- (b) The points B , C , D and E lie on the circumference of another circle.
The point A lies outside the circle.
 ABE and ACD are straight lines.

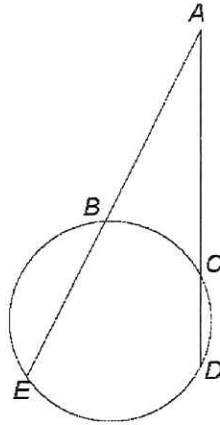


Diagram not drawn to scale

Given that $AB = 9\text{cm}$, $AC = 10\text{cm}$ and $CD = 8\text{cm}$, calculate the length of BE . [2]

8.

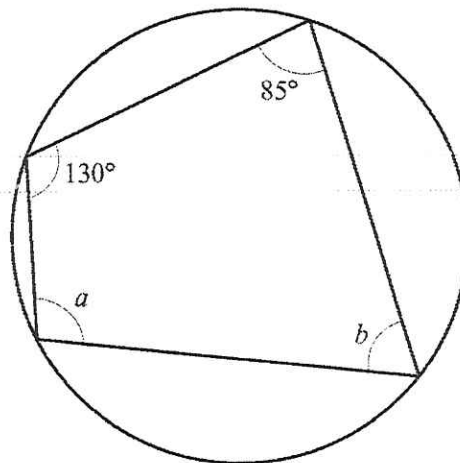


Diagram not drawn to scale

Giving a reason for your answers, calculate the size of the angles marked a and b in the diagram.

$a = \dots\dots\dots^\circ$ $b = \dots\dots\dots^\circ$ [3]

9.

The points A , B , C and D lie on the circumference of a circle, centre O .

AE and CE are tangents to the circle.

$$\angle CDA = 108^\circ$$

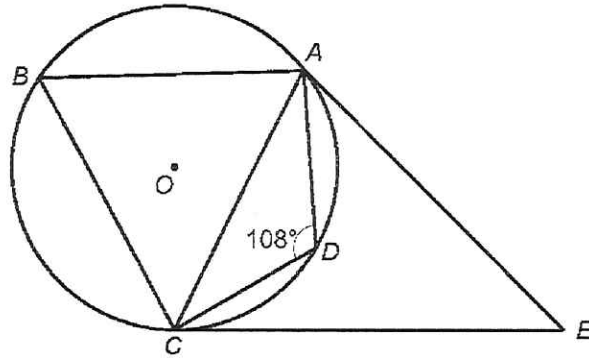


Diagram not drawn to scale

Giving reasons for your answers, find

- (a) the size of $\angle ABC$, [2]

.....

.....

.....

- (b) the size of $\angle CEA$. [3]

.....

.....

.....

.....

.....

10.

The points A , B , C and D lie on the circumference of a circle, centre O .
 Triangle ABC is **equilateral**.
 EF is a tangent to the circle at A .
 $\angle ACD = 46^\circ$.

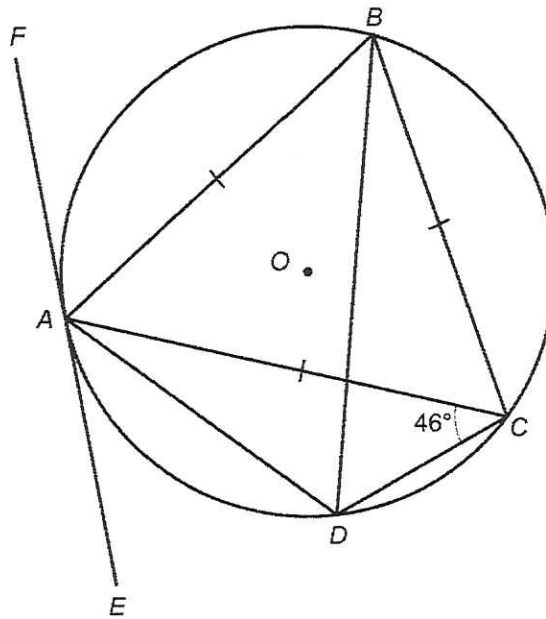


Diagram not drawn to scale

Write down the size of

(a) $\angle ABD$ [1]

.....

.....

(b) $\angle CAE$ [1]

.....

.....

(c) $\angle AOB$ [1]

.....

.....

(d) $\angle BAD$ [1]

.....

.....

11.

The three points A , B and C lie on the circumference of a circle centre O .
The tangent XAY touches the circle at A .

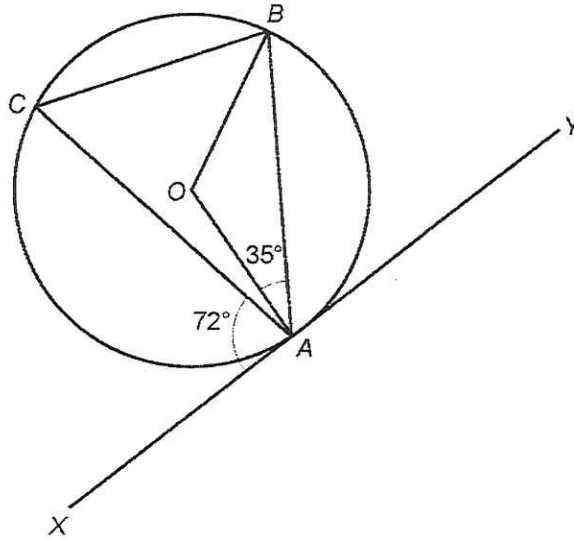


Diagram not drawn to scale

Find each of the following angles.
Give reasons for your answers.

(a) $\hat{CBO}$

[2]

.....

.....

.....

.....

(b) $\hat{BCA}$

[2]

.....

.....

.....

.....

$\widehat{BCD} = x$, where x is measured in degrees.

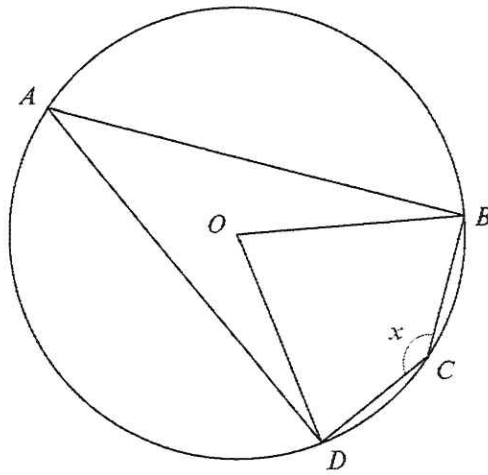


Diagram not drawn to scale

Show, giving reasons in your answer, that the size of $\widehat{DOB}$ in degrees is $360 - 2x$.

[illegible]

[4]

13.

The diagram shows a circle with $BC = 30\text{ cm}$, $AB = 50\text{ cm}$ and $CD = 25\text{ cm}$.

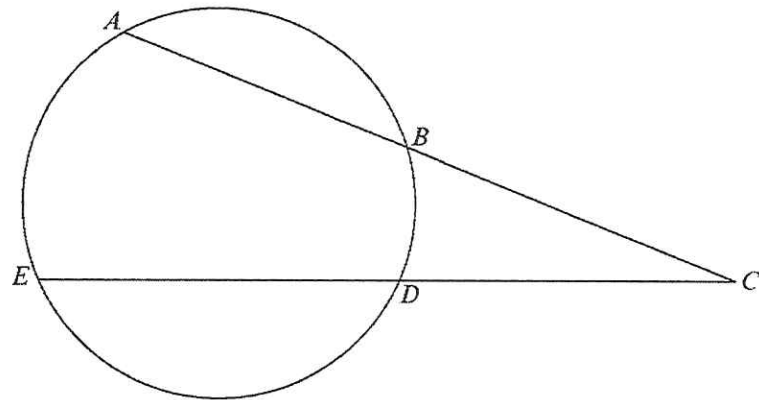


Diagram is not drawn to scale

Calculate the length of ED .

[4]

14.

The diagram shows a circle with centre O and a tangent PT that touches the circle at C .

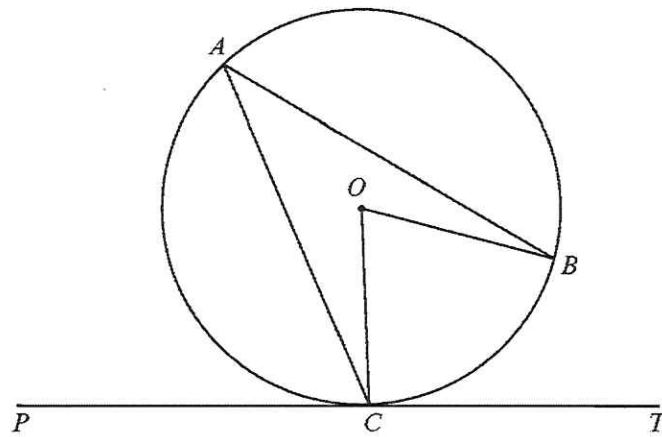


Diagram not drawn to scale

The reflex angle at the centre of the circle is 280° .
Find the size of each of the following angles.
You must give a reason for each answer.

(a) $\hat{BAC}$

.....

.....

.....

.....

[2]

(b) $\hat{BCP}$

.....

.....

.....

.....

[3]

15.

(a)

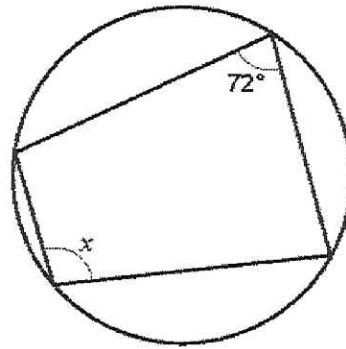


Diagram not drawn to scale

Calculate the size of the angle x in the diagram above.

[1]

$x = \dots\dots\dots^\circ$

- (b) The diagram below shows a circle with centre O .
 A , B and C are points on the circumference of the circle.
 The tangent, PAH , touches the circle at A .
 OBH is a straight line.

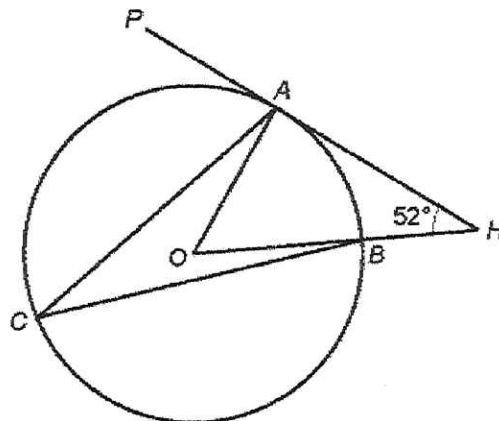


Diagram not drawn to scale

Given that $\hat{AHB} = 52^\circ$, calculate $\hat{ACB}$.
 You must show your working.

[3]

$\hat{ACB} = \dots\dots\dots^\circ$

16.

The diagram shows a circle with centre O .
The straight lines RT and ST are tangents to the circle, meeting the circle at B and C respectively.

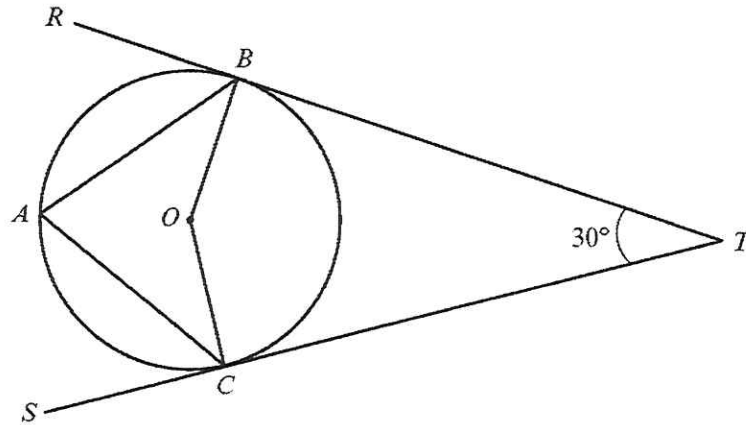


Diagram not drawn to scale

Given that $\widehat{BTC} = 30^\circ$, calculate the size of $\widehat{BAC}$.
You must give reasons in your solution.

[4]

17.

The points A , B , C and D lie on the circumference of a circle with centre O . All the angles are measured in degrees.

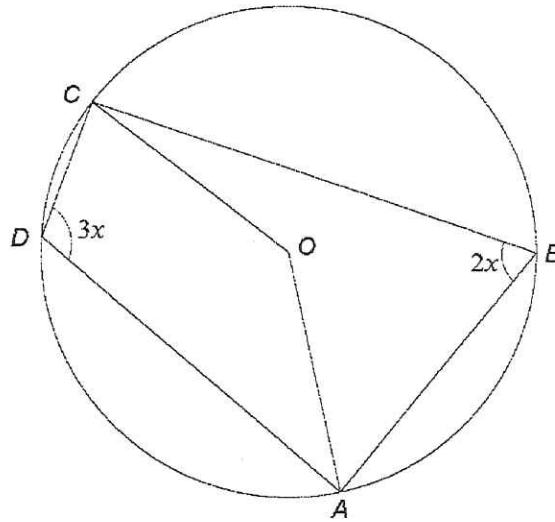


Diagram not drawn to scale

Find the size of the obtuse angle $\widehat{AOC}$.

[4]

(a)

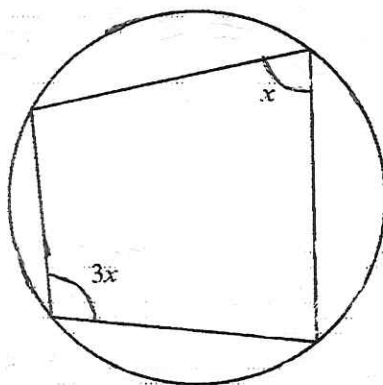


Diagram not drawn to scale

Find the size of angle x .

[2]

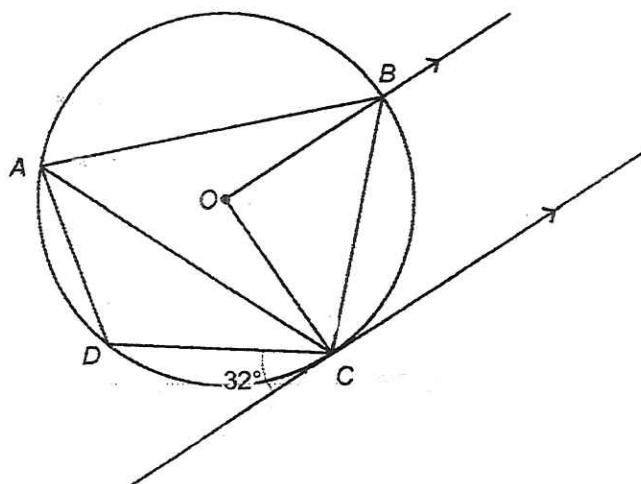
(b) In the diagram, O is the centre of the circle and OB is parallel to the tangent at C .

Diagram not drawn to scale

Calculate the size of $\hat{DAB}$.
You must indicate any angles you calculate.

[4]

 $\hat{DAB} = \dots\dots\dots^\circ$

19.

The points A , B and C lie on the circumference of a circle, centre O .
 AD is a tangent to the circle. DCB is a straight line.

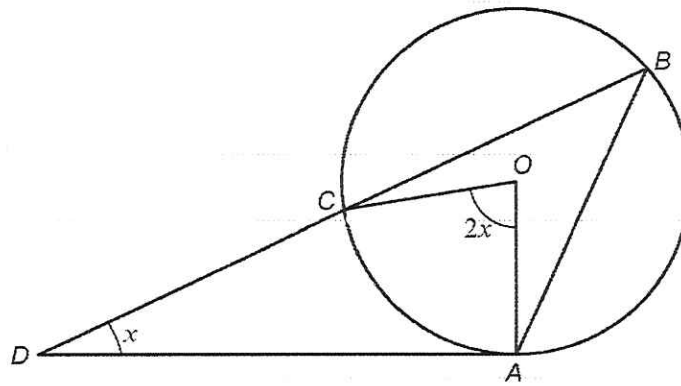


Diagram not drawn to scale

Find the size of each of the following angles, in terms of x .
 Write your answers in their simplest form.

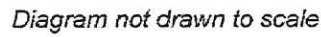
(a) $\widehat{OCD}$,

[2]

(b) $\widehat{OAB}$.

[3]

Points A , B , C and D lie on the circumference of a circle, centre O .
 BD is a diameter of the circle.
 The straight line $BC = 4.7$ cm and $\hat{BAC} = 28^\circ$.



[5 + 2 OCW]

[illegible]