IGCSE · Cambridge (CIE) · Maths

1 hour 18 questions

Calculator Questions

Circle Theorems

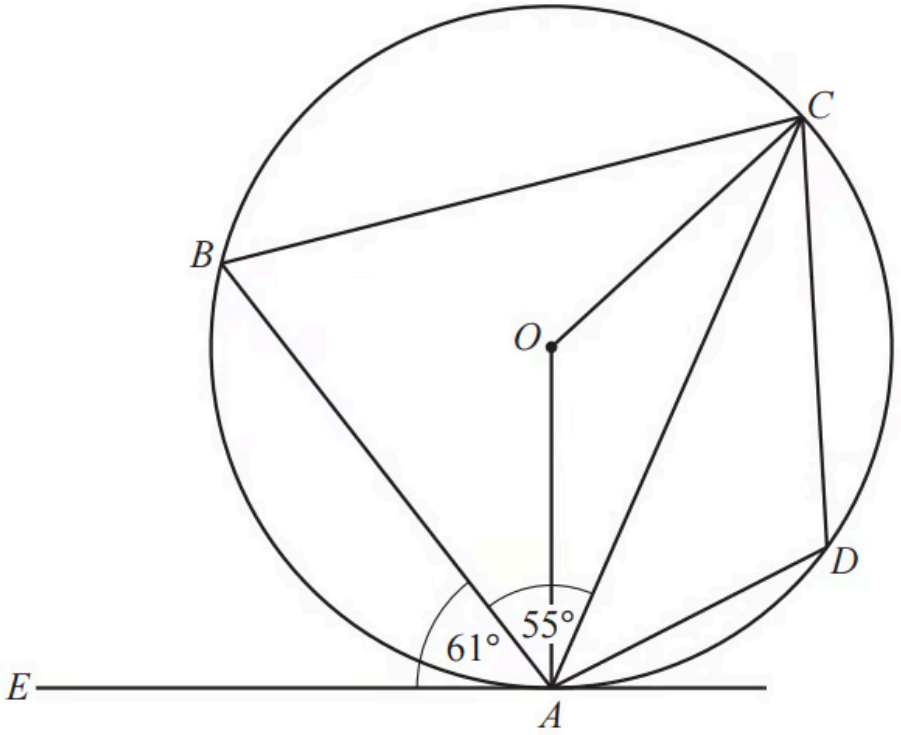
Angles at Centre & Circumference / Angle in a Semicircle / Theorems with Chords & Tangents / Angles in Cyclic Quadrilaterals / Angles in the Same Segment / The Alternate Segment Theorem

Medium (6 questions)	/26
Hard (7 questions)	/37
Very Hard (5 questions)	/21
Total Marks	**/84**

Scan here to return to the course
or visit savemyexams.com

Medium Questions

1 (a)



NOT TO SCALE

In the diagram, *A*, *B*, *C* and *D* lie on the circle, centre *O*.
EA is a tangent to the circle at *A*.
Angle *EAB* = 61° and angle *BAC* = 55°.

Find angle *BAO*.

Angle *BAO* = ...

(1 mark)

(b) Find angle *AOC*.

Angle *AOC* = ...

(2 marks)

(c) Find angle *ABC*.

Angle *ABC* = ...

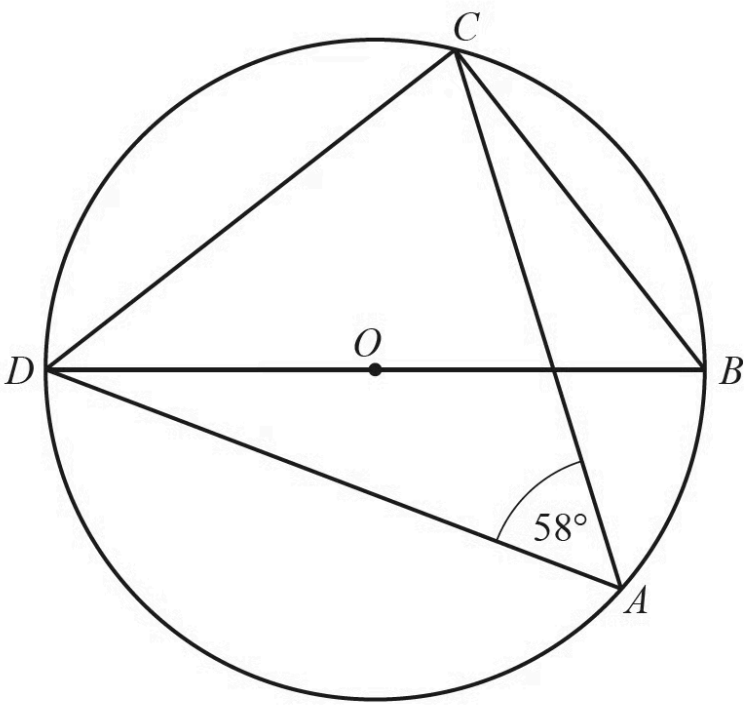
(1 mark)

(d) Find angle *CDA*.

Angle *CDA* = ...

(1 mark)

2



NOT TO SCALE

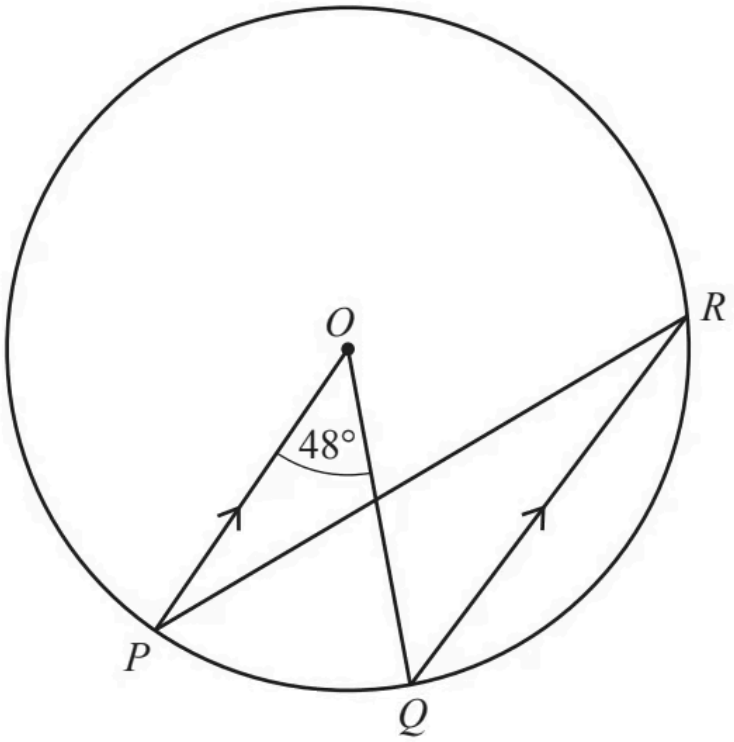
A, *B*, *C* and *D* are points on the circumference of the circle, centre *O*. *DOB* is a straight line and angle *DAC* = 58°.

Find angle *CDB*.

Angle *CDB* = ...

(3 marks)

3



NOT TO SCALE

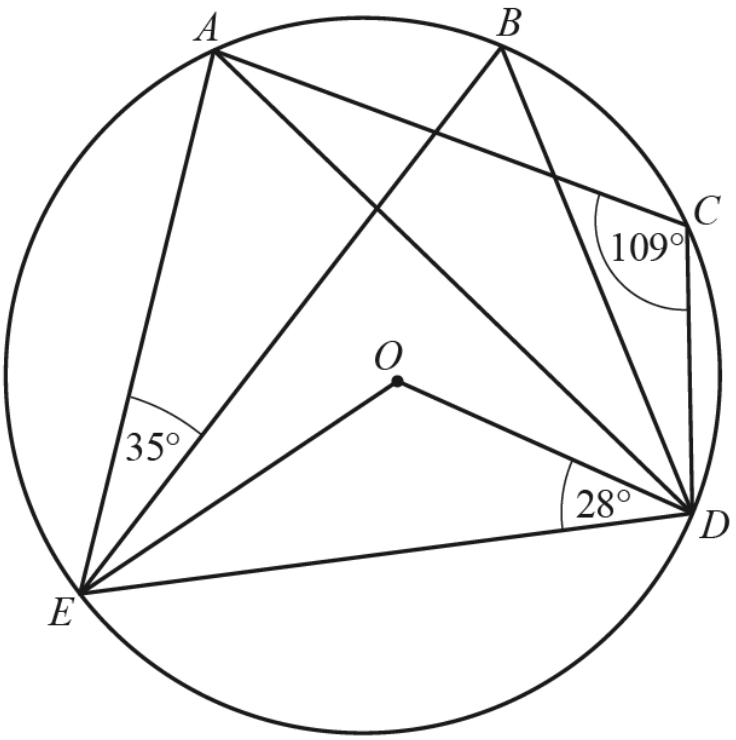
P, *Q* and *R* are points on the circumference of the circle, centre *O*.
PO is parallel to *QR* and angle *POQ* = 48°.

Find angle *OPR*.

Angle *OPR* = ...

(2 marks)

4 (a)



NOT TO SCALE

A, *B*, *C*, *D* and *E* lie on the circle, centre *O*.
Angle *AEB* = 35°, angle *ODE* = 28° and angle *ACD* = 109°.

Work out the following angles, giving reasons for your answers.

i) Angle *EBD* = ... because .....

[3]

ii) Angle EAD = ... because .....

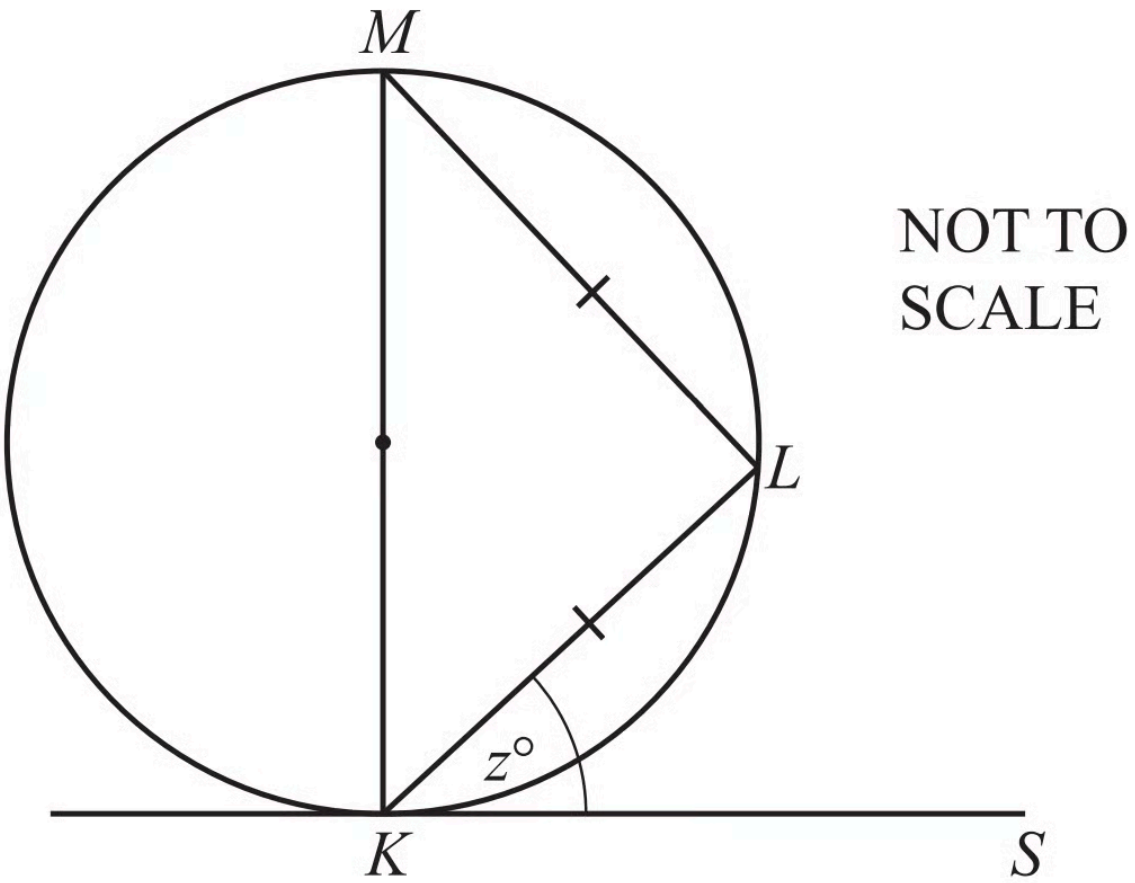
[2]
(5 marks)

(b) Work out angle *BEO*.

Angle *BEO* = ...

(3 marks)

5



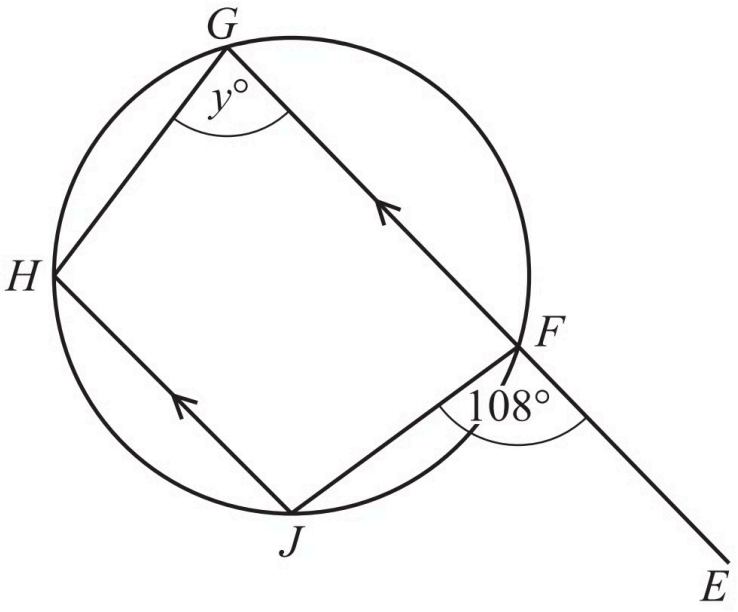
K, *L* and *M* are points on the circle.
KS is a tangent to the circle at *K*.
KM is a diameter and triangle *KLM* is isosceles.

Find the value of z.

$z =$ .....

(2 marks)

6



NOT TO SCALE

F, *G*, *H* and *J* are points on the circle.
EFG is a straight line parallel to *JH*.

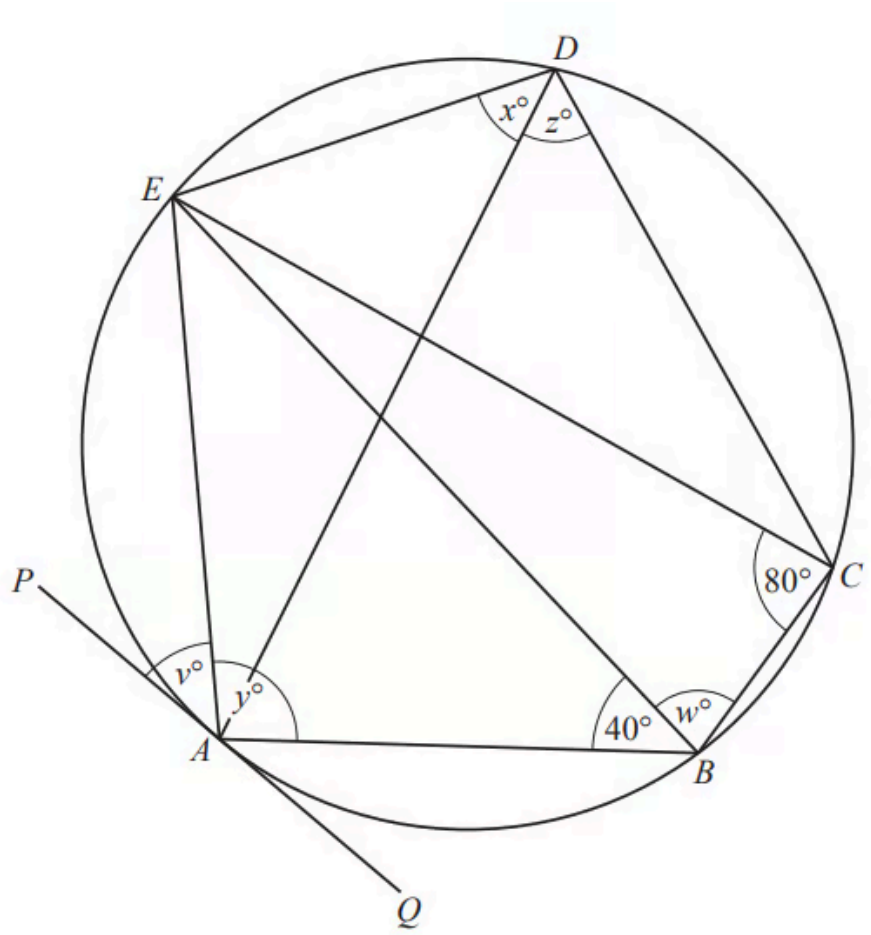
Find the value of y.

$y =$ .....

(6 marks)

Hard Questions

1



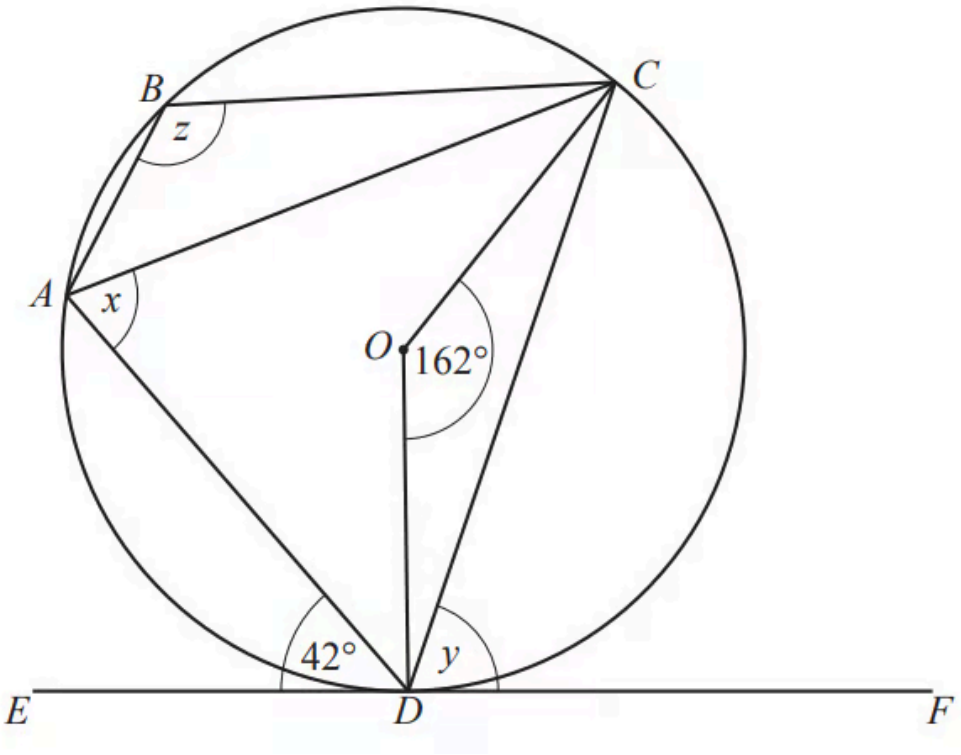
The points *A*, *B*, *C*, *D* and *E* lie on the circle.
PAQ is a tangent to the circle at *A* and *EC* = *EB*.
Angle *ECB* = 80° and angle *ABE* = 40°.

Find the values of v, w, x, y and z.

v = ... w = ... x = ... y = ... z = ...

(5 marks)

2



NOT TO SCALE

A, *B*, *C* and *D* are points on the circle, centre *O*.
EF is a tangent to the circle at *D*.
Angle *ADE* = 42° and angle *COD* = 162°.

Find the following angles, giving reasons for each of your answers.

i) Angle x

x = ... because ..... [2]

ii) Angle y

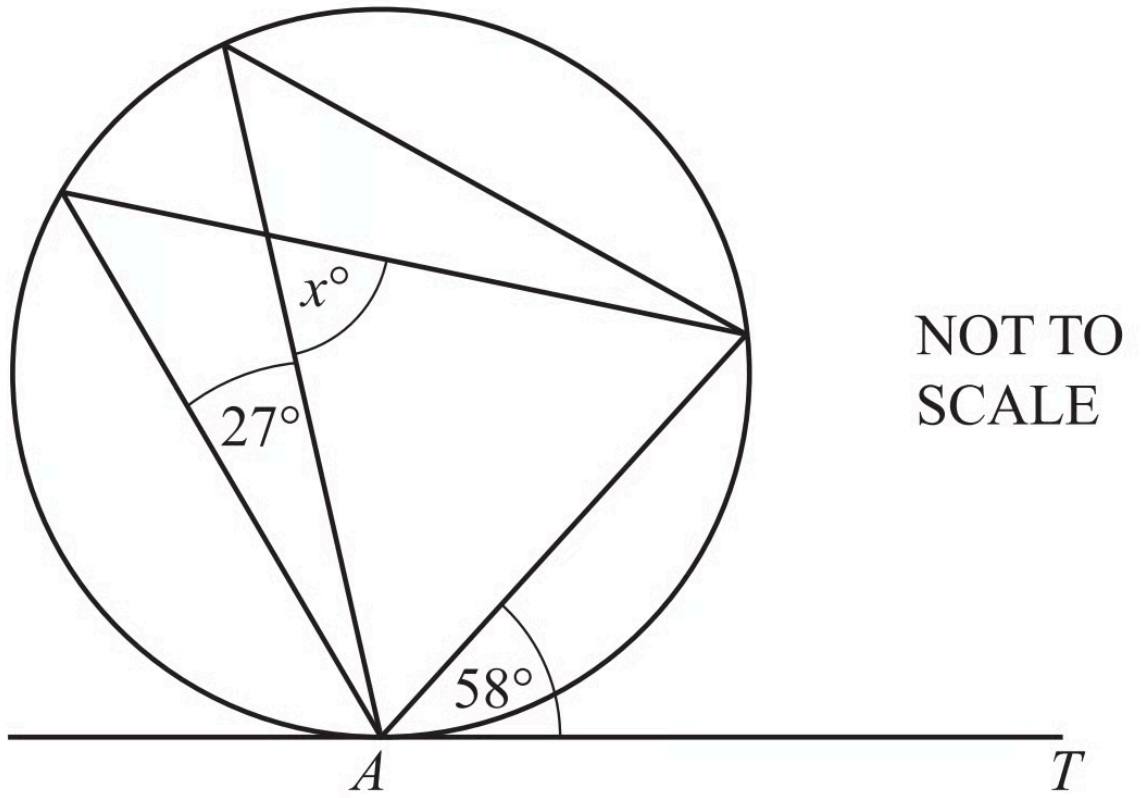
y = ... because ..... [2]

iii) Angle z

z = ... because ..... [3]

(7 marks)

3



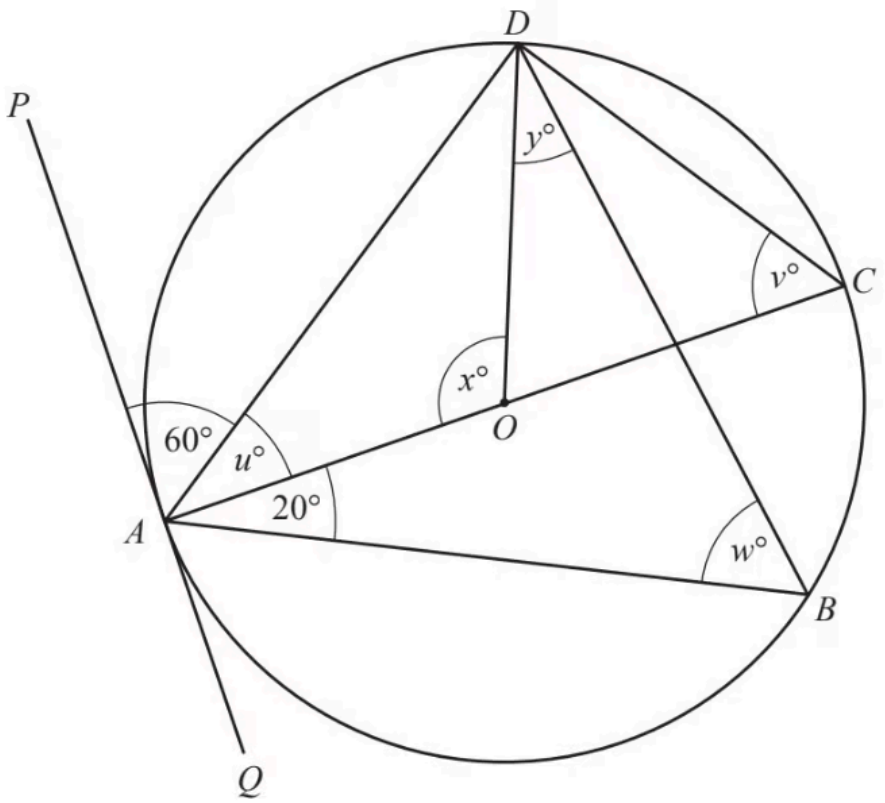
AT is a tangent to the circle at *A*.

Find the value of x.

$x =$ .....

(2 marks)

4



NOT TO SCALE

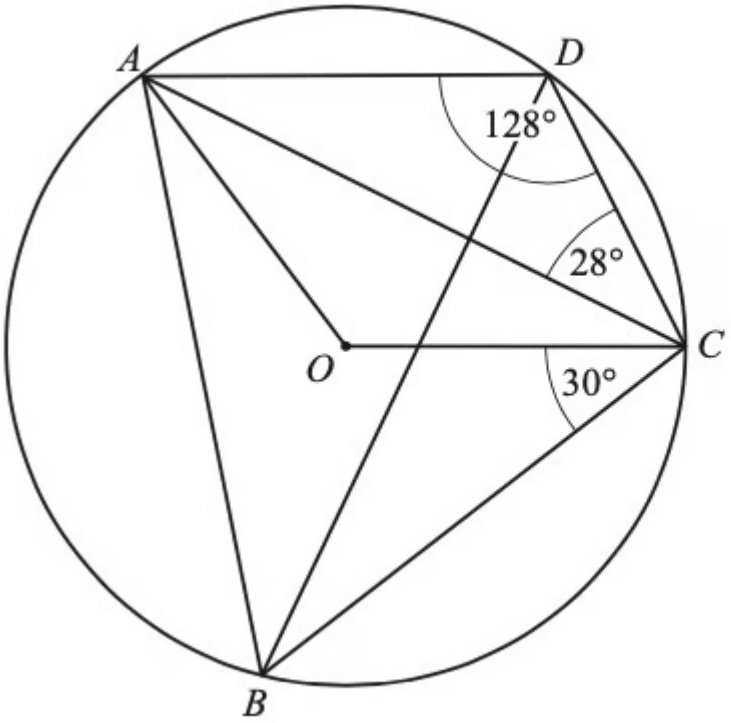
A, *B*, *C* and *D* lie on the circle, centre *O*, with diameter *AC*.
PQ is a tangent to the circle at *A*.
Angle *PAD* = 60° and angle *BAC* = 20°.

Find the values of u, v, w, x and y.

u = ... , v = ..., w = ... , x = ... , y = ...

(6 marks)

5 (a)



NOT TO SCALE

In the diagram, *A*, *B*, *C* and *D* lie on the circle, centre *O*.
Angle *ADC* = 128°, angle *ACD* = 28° and angle *BCO* = 30°.

Show that obtuse angle *AOC* = 104°.

Give a reason for each step of your working.

(3 marks)

(b) i) Find angle *BAO*.

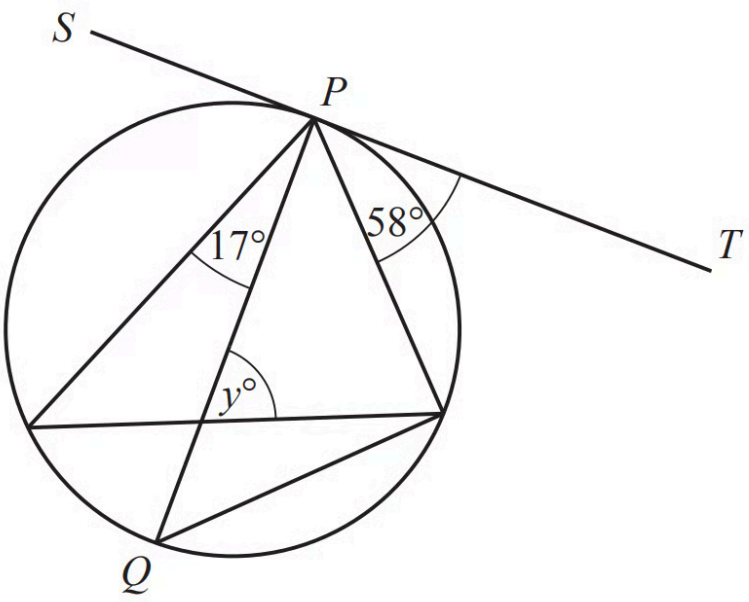
Angle *BAO* = ... [2]

ii) Find angle *ABD*.

Angle *ABD* = ... [1]

(3 marks)

6



NOT TO SCALE

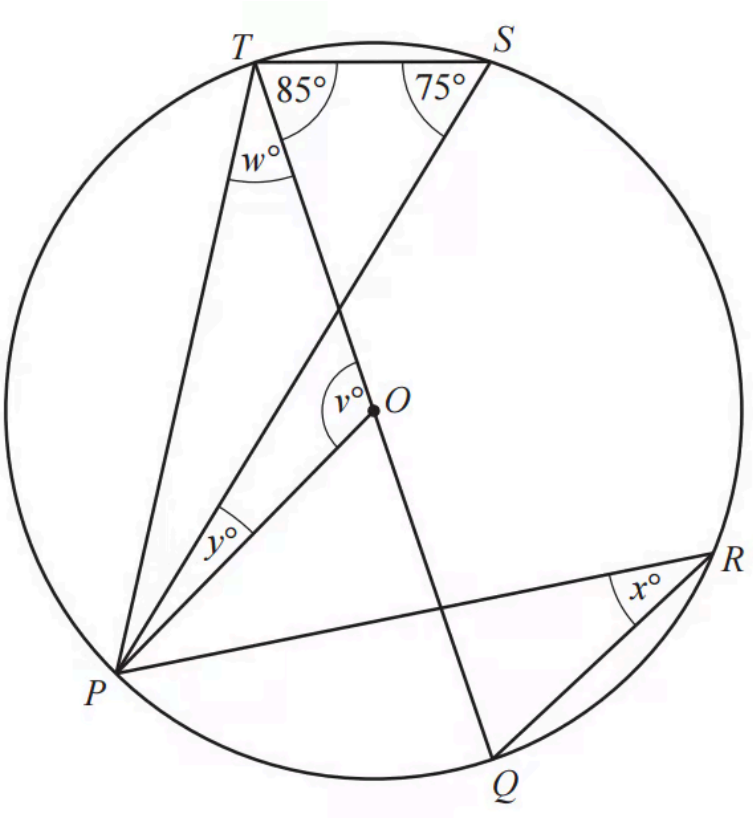
The diagram shows a circle with diameter PQ.
SPT is a tangent to the circle at P.

Find the value of y.

y = ...

(5 marks)

7



NOT TO SCALE

P, *Q*, *R*, *S* and *T* lie on the circle, centre *O*.
Angle *PST* = 75° and angle *QTS* = 85°.

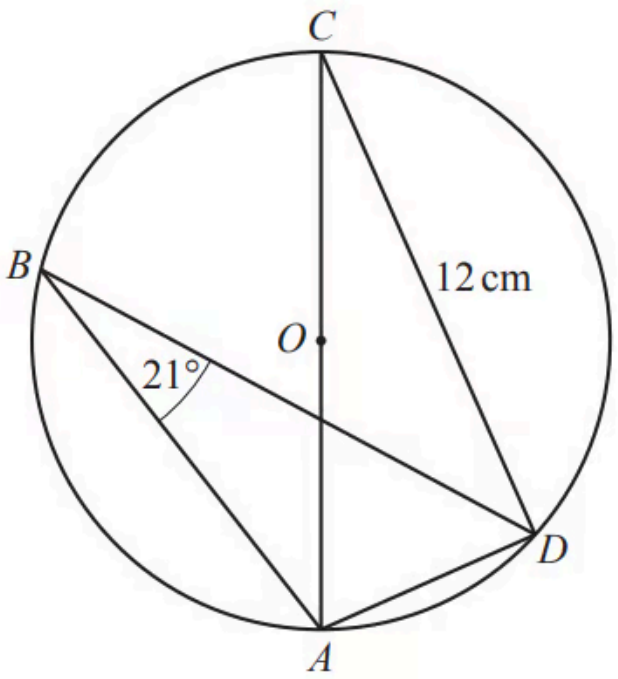
Find the values of v, w, x and y.

v = ...
w = ...
x = ...
y = ...

(6 marks)

Very Hard Questions

1



NOT TO SCALE

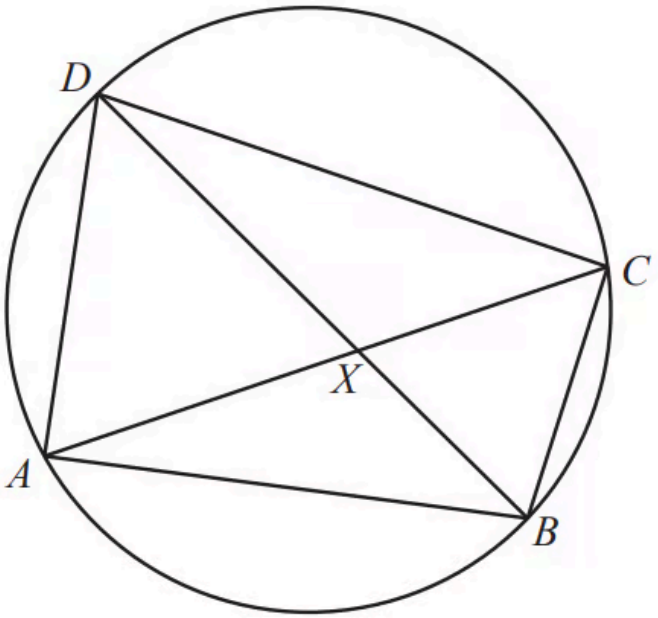
A, *B*, *C* and *D* are points on the circle, centre *O*.
Angle *ABD* = 21° and *CD* = 12 cm.

Calculate the area of the circle.

..... cm^2

(5 marks)

2



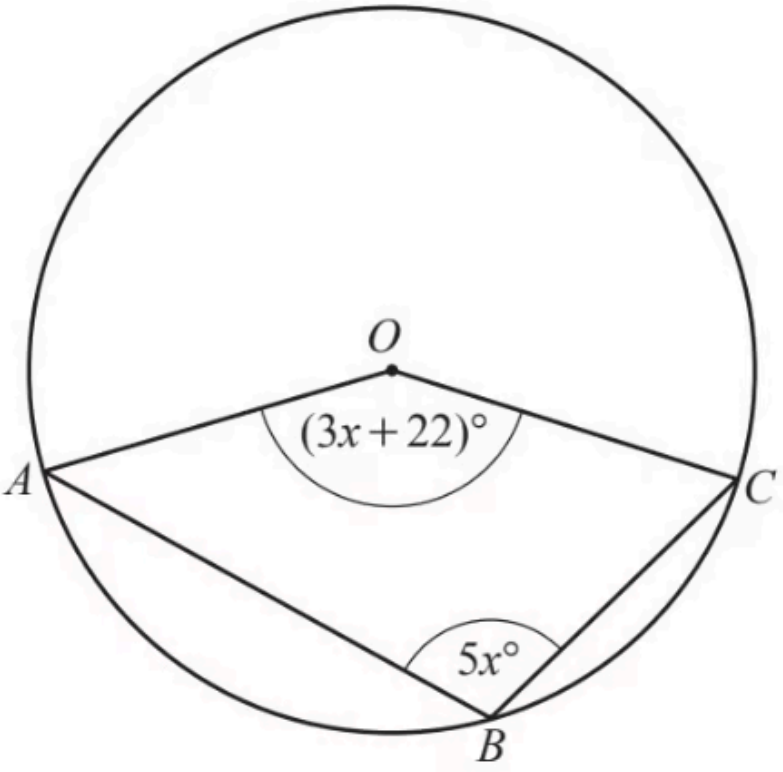
NOT TO SCALE

The diagonals of the cyclic quadrilateral *ABCD* intersect at *X*.

Explain why triangle *ADX* is similar to triangle *BCX*.
Give a reason for each statement you make.

(3 marks)

3



NOT TO SCALE

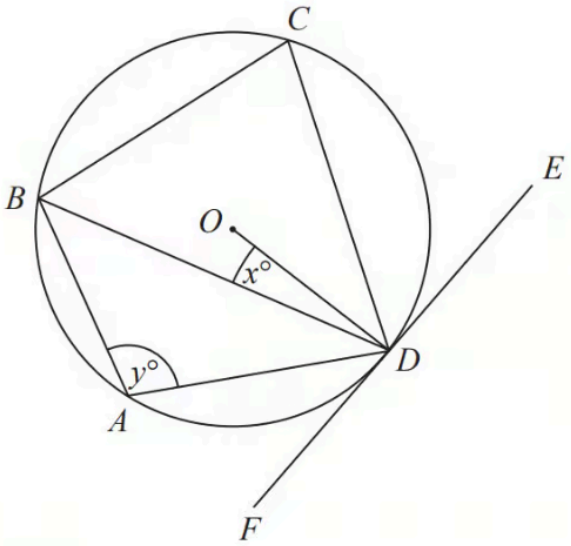
A, *B* and *C* lie on the circle, centre *O*.
Angle *AOC* = $(3x + 22)°$ and angle *ABC* = $5x°$.

Find the value of x.

x = ...

(4 marks)

4 (a)



A, B, C and D are points on the circumference of a circle, centre O.
FDE is a tangent to the circle.

Show that $y - x = 90$
You must give a reason for each stage of your working.

(3 marks)

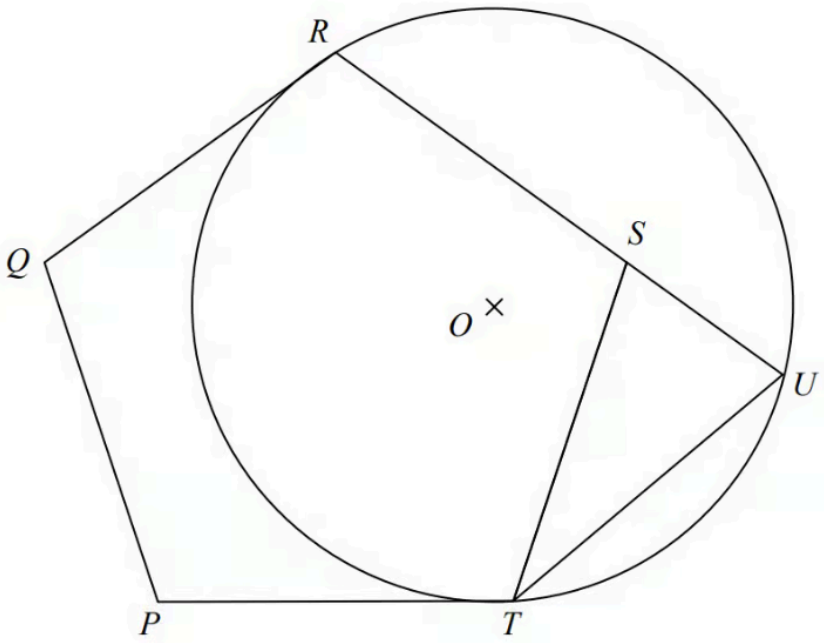
(b) Dylan was asked to give some possible values for x and y.

He said, "y could be 200 and x could be 110, because 200 − 110 = 90"

Is Dylan correct?
You must give a reason for your answer.

(1 mark)

5



$PQRST$ is a regular pentagon.
R, U and T are points on a circle, centre O.
QR and PT are tangents to the circle.
RSU is a straight line.

Prove that $ST = UT$.

(5 marks)