

Write your name here

Surname

Other names

In the style of:

Edexcel GCSE

Centre Number

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Candidate Number

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Mathematics A

Solutions

Circle Theorems

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- **Calculators must not be used.**



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►



1. $ABCD$ is a cyclic quadrilateral within a circle centre O .
 XY is the tangent to the circle at A .
 Angle $XAB = 58^\circ$
 Angle $BAD = 78^\circ$
 Angle $DBC = 34^\circ$

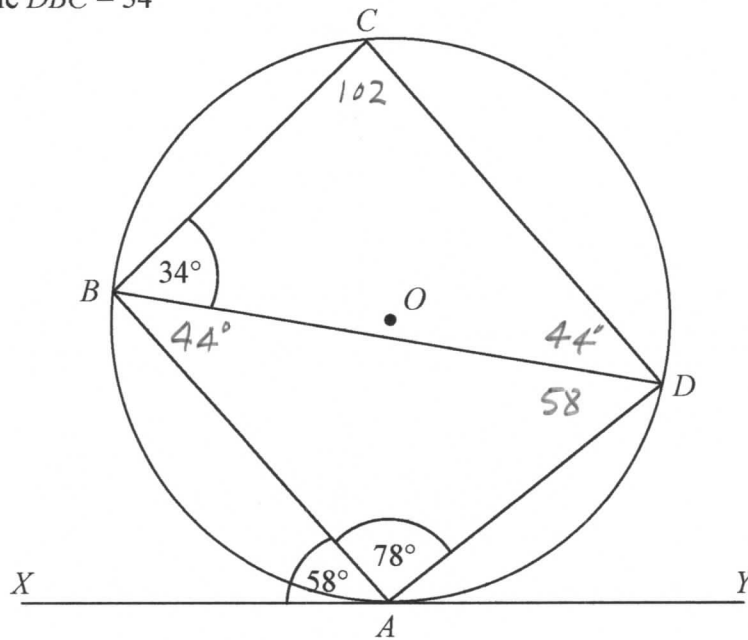


Diagram NOT accurately drawn

Prove that AB is parallel to CD .

$$\angle ADB = 58^\circ \text{ (alternate segment theorem)}$$

$$\Rightarrow \angle ABD = 180 - (78 + 58) = 44^\circ \text{ (}\angle \text{ sum of } \Delta \text{)}$$

$$\angle ACD = 180 - 78 = 102^\circ \text{ (opposite } \angle \text{s of cyclic quad add up to } 180^\circ \text{)}$$

$$\Rightarrow \angle BDC = 180 - (34 + 102) = 44^\circ \text{ (}\angle \text{ sum of } \Delta \text{)}$$

$\Rightarrow CD$ and AB are parallel because
 $\angle BDC$ and $\angle ABD = 44^\circ$ and are alternate angles.

(5)

A* Question



2.(a) Here is a circle with centre O .

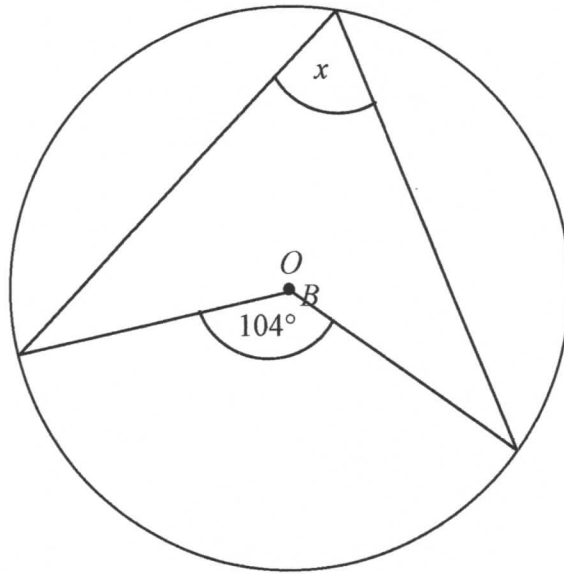


Diagram NOT
accurately drawn

Write down the value of x .

(Angle subtended at centre
is twice angle subtended at circumference) 52 degrees
(1)

(b) Here is a different circle.

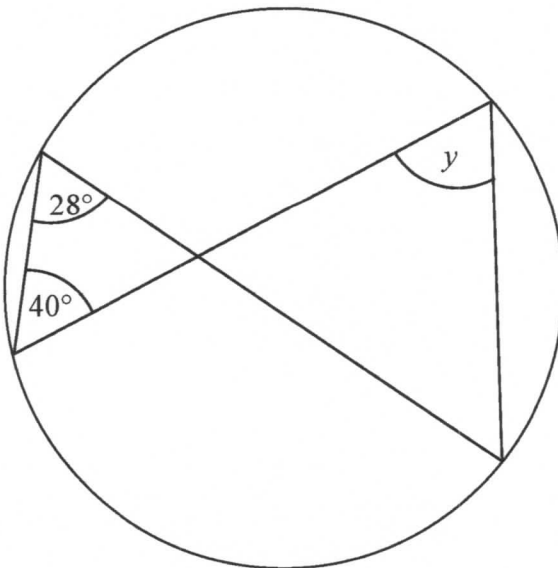


Diagram NOT
accurately drawn

Write down the value of y .

(Angles in same segment are equal) 28 degrees
(1)

Grade B Question



3.

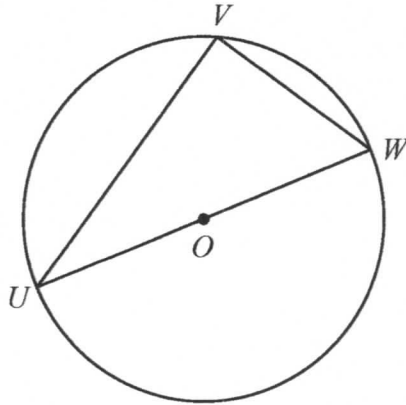


Diagram NOT accurately drawn

U, V and W are points on the circumference of a circle, centre O . UW is a diameter of the circle.

(a) (i) Write down the size of angle UVW .

90°

(ii) Give a reason for your answer.

Angle in a semi-circle = 90°

(2)

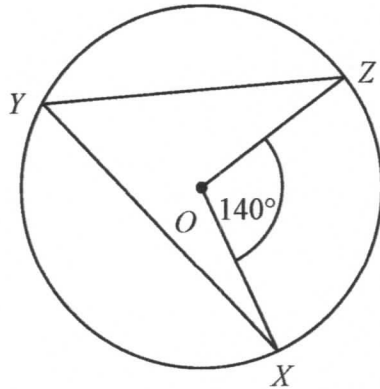


Diagram NOT accurately drawn

X, Y and Z are points on the circumference of a circle, centre O . Angle $XOZ = 140^\circ$.

(b) (i) Work out the size of angle XYZ .

70°

(ii) Give a reason for your answer.

Angle subtended at centre is twice angle subtended at circumference

(2)



*4.

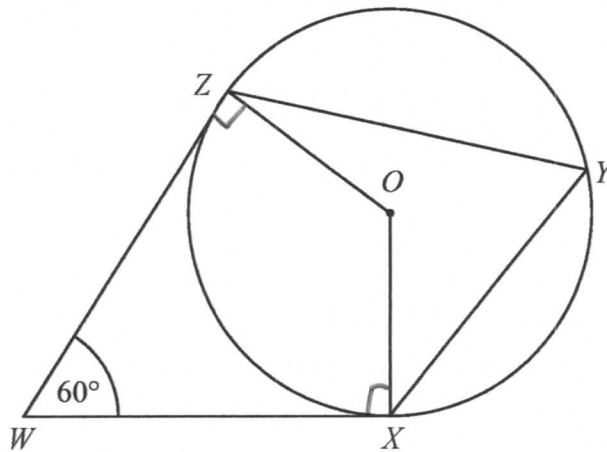


Diagram NOT
accurately drawn

X , Y and Z are points on the circumference of a circle, centre O .
 WX and WZ are tangents to the circle.

Angle $ZWX = 60^\circ$

Work out the size of angle XYZ .

Give a reason for each stage in your working.

$$\angle WZO = 90^\circ \quad (\text{angle between tangent and radius} = 90^\circ)$$

$$\angle WZO = 90^\circ \quad \text{"}$$

$$\Rightarrow \angle XOZ = 360 - (60 + 90 + 90) = 120^\circ \quad (\angle \text{sum of quad})$$

$$\Rightarrow \angle XYZ = 60^\circ \quad (\text{angle at centre is twice angle at circumference})$$

(Total 4 marks)



5.

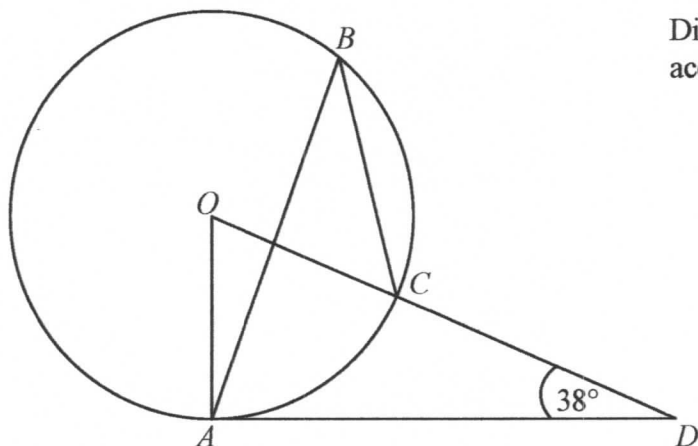


Diagram NOT accurately drawn

The diagram shows a circle centre O .
 A , B and C are points on the circumference.

DCO is a straight line.
 DA is a tangent to the circle.

Angle $ADO = 38^\circ$

(a) Work out the size of angle AOD .

$$\begin{aligned} \angle OAD &= 90^\circ \text{ (tangent and radius)} \\ \angle AOD &= 180 - (90 + 38) \text{ (sum of } \Delta) \\ &= 52^\circ \end{aligned}$$

..... 52 °
 (2)

(b) (i) Work out the size of angle ABC .

..... 26 °

(ii) Give a reason for your answer.

Angle at centre is twice angle at circumference
 (3)

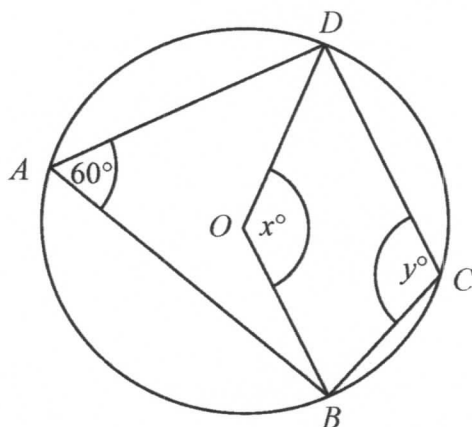
(Total 5 marks)

Grade B Question



6.

Diagram NOT
accurately drawn



In the diagram, A, B, C and D are points on the circumference of a circle, centre O .
Angle $BAD = 60^\circ$.

Angle $BOD = x^\circ$.

Angle $BCD = y^\circ$.

(a) (i) Work out the value of x .

$$x = 120^\circ$$

(ii) Give a reason for your answer.

Angle at centre is twice angle at
circumference

(2)

(b) (i) Work out the value of y .

$$y = 120^\circ$$

(ii) Give a reason for your answer.

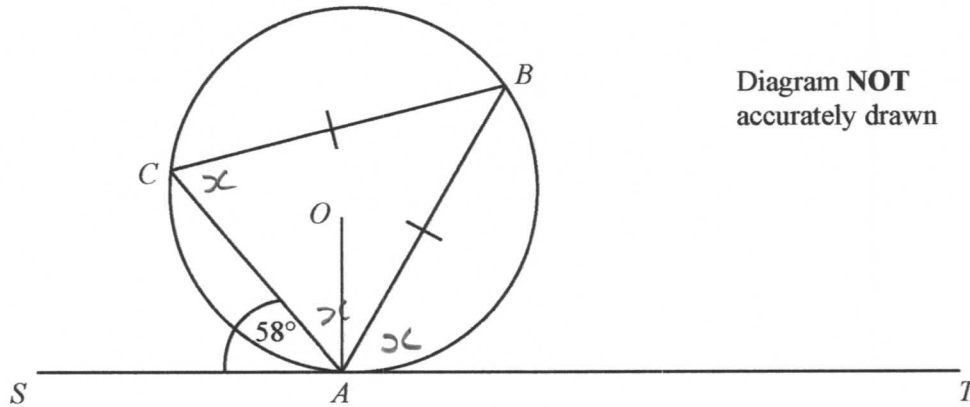
Opposite angles of cyclic quad add up
to 180°

(2)

(Total 4 marks)



7.

Diagram NOT
accurately drawn

A , B and C are points on the circumference of a circle, centre O .
The line SAT is the tangent at A to the circle.

$CB = AB$.

Angle $ATP = 60^\circ$. - this does not relate to this question !!

Calculate the size of angle OAB .

Give a reason for each stage in your working.

$$\text{Let } \angle TAB = x$$

$$\Rightarrow \angle ACB = x \quad (\text{alternate segment theorem})$$

$$\Rightarrow \angle CAB = x \quad (\text{base angles of isos } \Delta \text{ are equal})$$

$$\Rightarrow 58 + x + x = 180^\circ \quad (\text{angles on a straight line})$$

$$2x = 180 - 58$$

$$2x = 122$$

$$x = \frac{122}{2}$$

$$x = 61^\circ$$

$$\angle AOB = 90 - x \quad (\text{tangent - radius})$$

$$= 90 - 61$$

$$= 29$$

..... 29 °

(Total 5 marks)

A* Question



8.

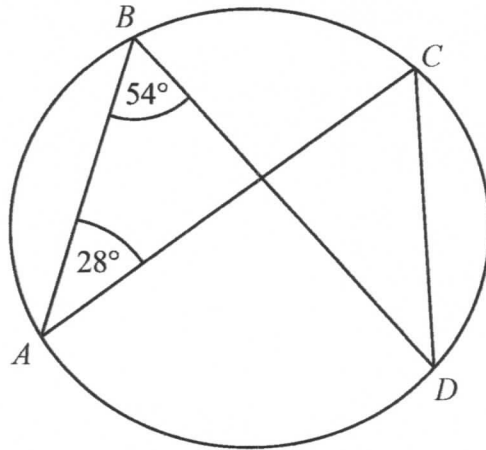


Diagram **NOT**
accurately drawn

A, B, C and D are points on the circumference of a circle.
Angle $ABD = 54^\circ$.
Angle $BAC = 28^\circ$.

(i) Find the size of angle ACD .

54 °
.....

(ii) Give a reason for your answer.

Angles in same segment are equal
.....
.....

(Total 2 marks)

Grade 8 Question



9.

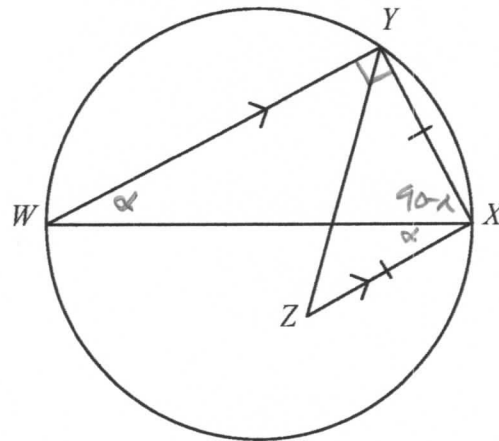


Diagram **NOT** accurately drawn

WX is a diameter of a circle.

Y is a point on the circle.

Z is the point inside the circle such that $ZX = XY$ and XZ is parallel to YW .

Find the size of angle XZY .

You must give reasons for your answer.

$$\text{Let } \angle XWY = \alpha$$

$$\Rightarrow \angle WXZ = \alpha \text{ (alternate angles)}$$

$$\angle WYX = 90^\circ \text{ (angle in semi-circle)}$$

$$\Rightarrow \angle WXY = 90 - \alpha \text{ (angle sum of } \triangle WYX)$$

$$\Rightarrow \angle YXZ = 90 - \alpha + \alpha = 90^\circ$$

$$\therefore \angle XZY = \angle XYZ = 45^\circ \text{ (base angles of isos } \triangle XYZ)$$

45 ° Q9
.....
(Total 4 marks)

A^* Question



10.

$ABCD$ is a cyclic quadrilateral.

AE is a tangent at A .

CDE is a straight line.

Angle $CAD = 32^\circ$

Angle $ABD = 40^\circ$

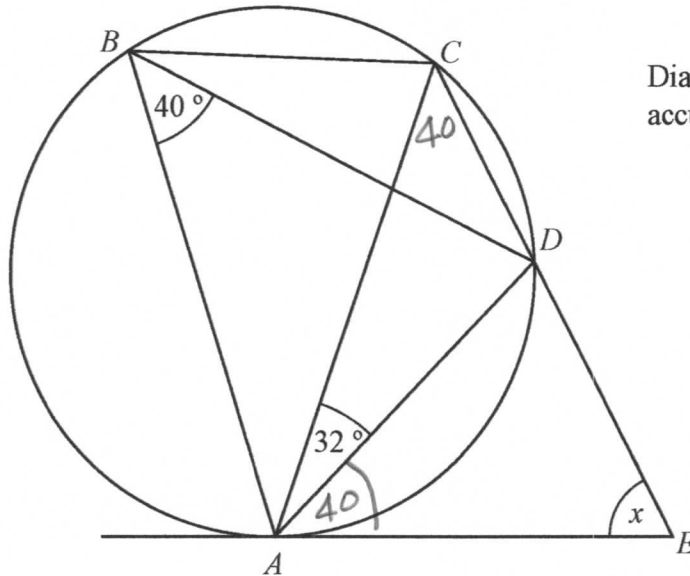


Diagram NOT
accurately drawn

Work out the size of angle AED , marked x , on the diagram.

You **must** show your working.

Give reasons for any angles you work out.

$$\angle DAE = 40^\circ \text{ (alternate segment theorem)}$$

$$\angle ACD = 40^\circ \text{ (angles in same segment are equal)}$$

$$x = 180 - (40 + (40 + 32)) \text{ (angle sum of } \triangle ACE)$$

$$x = 68^\circ$$

A* Question

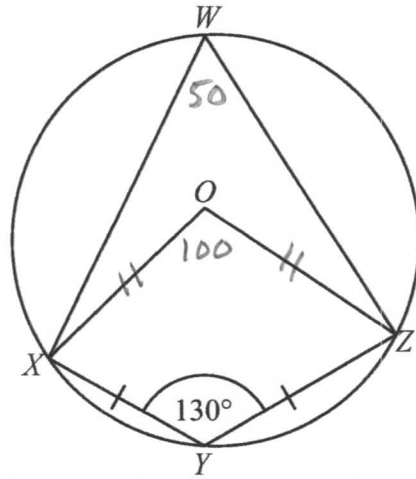
..... 68 degrees

(Total 5 marks)



11.

Diagram NOT accurately drawn



W, X, Y and Z are points on a circle, centre O .
 $XY = YZ$.
 Angle $XYZ = 130^\circ$.

- (a) Write down the size of angle XWZ .
 Give a reason for your answer.

(opposite angles of cyclic quad add up to 180°)

50°

 (2)

- (b) Work out the size of angle OZY .
 Give reasons for your answer.

$\angle XOZ = 100^\circ$ (angle at centre twice angle at circumference)

By symmetry of kite $XOZY$

$\angle OZY = \angle OXY = \frac{360 - (100 + 130)}{2}$ (angle sum of quadrilateral)

$\angle OZY = 65^\circ$

A* Question

65°

 (4)

(Total 6 marks)

