Geometry
Difficulty: Medium

Question Paper 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Geometry
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 1

Time allowed: **81 minutes**

Score: **/70**

Percentage: **/100**

Grade Boundaries:

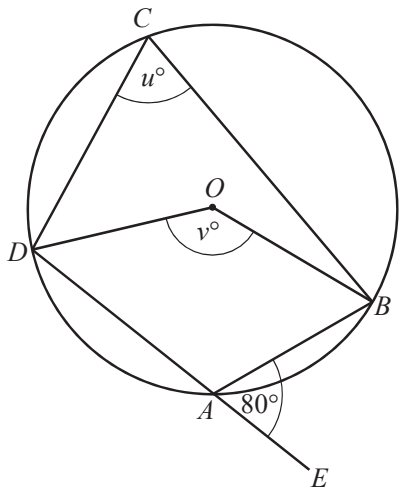
CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980) ~~Assembled by A.S.~~

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

(a)

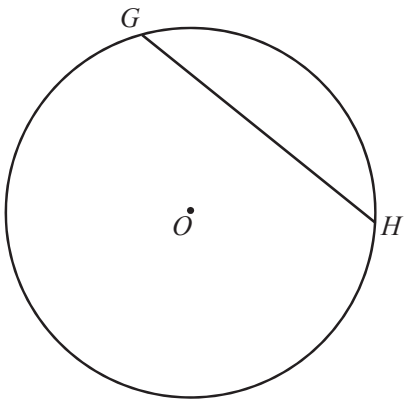


NOT TO SCALE

A, B, C and D lie on the circle, centre O.
DAE is a straight line.

Find the value of u and the value of v. [2]

(b)



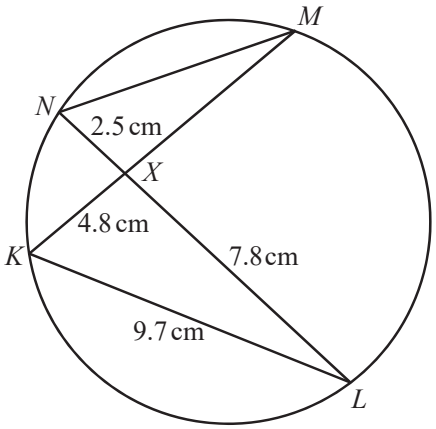
NOT TO SCALE

The diagram shows a circle, centre O, radius 8 cm.
GH is a chord of length 10 cm.

Calculate the length of the perpendicular from O to GH. [3]

(c) *K*, *L*, *M* and *N* lie on the circle.
KM and *LN* intersect at *X*.
KL = 9.7 cm, *KX* = 4.8 cm,
LX = 7.8 cm and *NX* = 2.5 cm.

Calculate *MN*.



NOT TO SCALE

[2]

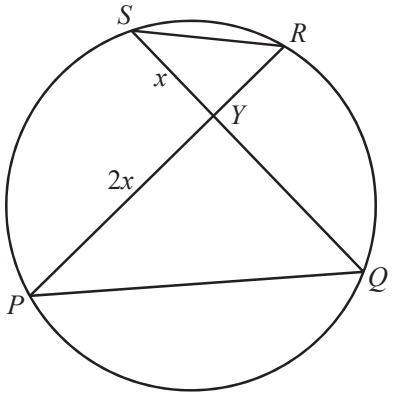
(d) All lengths are in centimetres.

P, *Q*, *R* and *S* lie on the circle.
PR and *QS* intersect at *Y*.
PY = 2*x* and *YS* = *x*.

The area of triangle $YRS = \frac{5}{12}x(x-1)$.

The area of triangle $YQP = x(x+1)$.

Find the value of *x*.



NOT TO SCALE

[4]

Question 2

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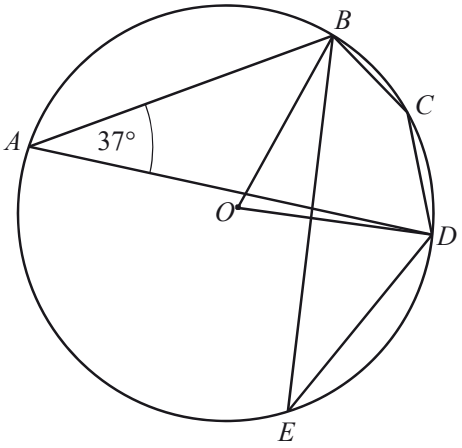


NOT TO SCALE

A, B, C, D and E are points on the circle, centre O.
Angle $BAD = 37°$.

Complete the following statements.

(a) Angle BED =

[2]

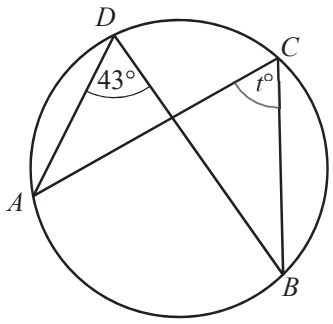
(b) Angle BOD =

[2]

(c) Angle BCD =

[2]

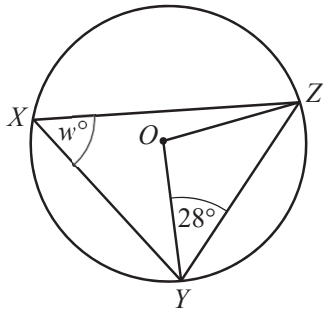
(a) (i) A, B, C and D lie on the circumference of the circle.



NOT TO SCALE

Find the value of t. [1]

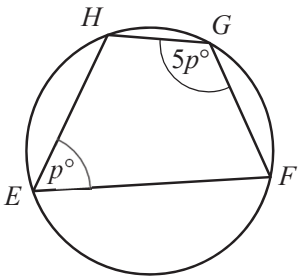
(ii) X, Y and Z lie on the circumference of the circle, centre O.



NOT TO SCALE

Find the value of w, giving reasons for your answer. [3]

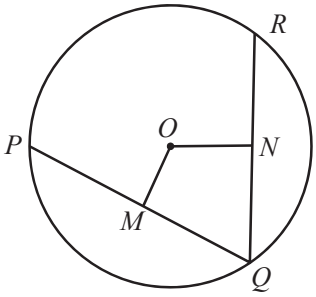
(iii) E, F, G and H lie on the circumference of the circle.



NOT TO SCALE

Find the value of p, giving a reason for your answer. [3]

(b)



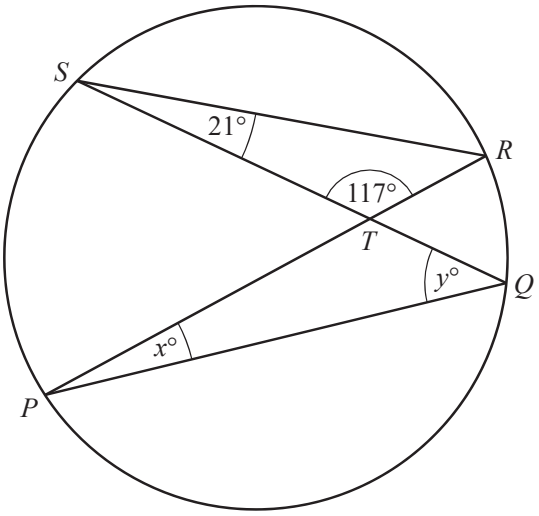
NOT TO SCALE

The diagram shows a circle, centre O.
PQ and QR are chords.
OM is the perpendicular from O to PQ.

(i) Complete the statement. [1]

(ii) ON is the perpendicular from O to QR and $PQ = QR$.

Complete the statements to show that triangle OMQ is congruent to triangle ONQ. [4]



NOT TO SCALE

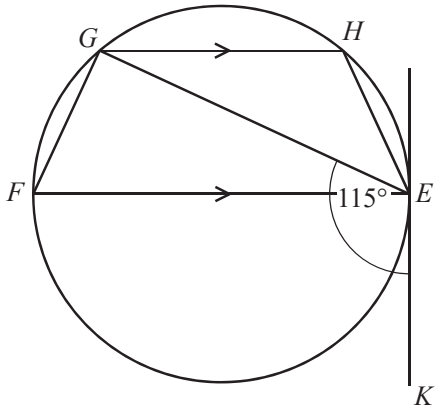
(a) The chords PR and SQ of the circle intersect at T.
Angle $RST = 21°$ and angle $STR = 117°$.

(i) Find the values of x and y. [2]

(ii) $SR = 8.23$ cm, $RT = 3.31$ cm and $PQ = 9.43$ cm.

Calculate the length of TQ. [2]

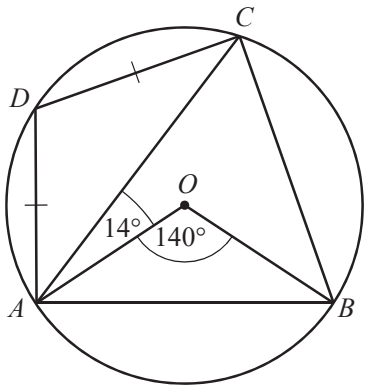
(b) *EFGH* is a cyclic quadrilateral.
EF is a diameter of the circle.
KE is the tangent to the circle at *E*.
GH is parallel to *FE* and angle *KEG* = 115°.



NOT TO SCALE

Calculate angle *GEH*. [4]

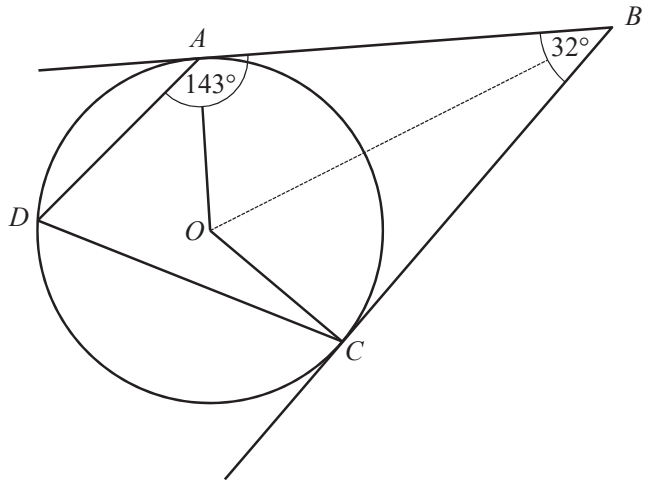
(c) *A*, *B*, *C* and *D* are points on the circle centre *O*.
Angle *AOB* = 140° and angle *OAC* = 14°.
AD = *DC*.



NOT TO SCALE

Calculate angle *ACD*. [5]

(a)



NOT TO SCALE

Points A, C and D lie on a circle centre O.
BA and BC are tangents to the circle.
Angle $ABC = 32°$ and angle $DAB = 143°$.

(i) Calculate angle AOC in quadrilateral $AOCB$. [2]

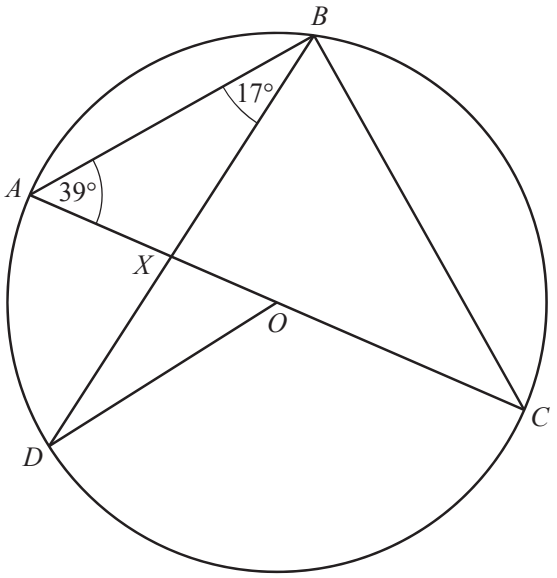
(ii) Calculate angle ADC. [1]

(iii) Calculate angle OCD. [2]

(iv) $OA = 6$cm.

Calculate the length of AB. [3]

(b)



NOT TO SCALE

A, B, C and D are on the circumference of the circle centre O.
AC is a diameter.
Angle $CAB = 39°$ and angle $ABD = 17°$.

(i) Calculate angle ACB. [2]

(ii) Calculate angle BXC. [2]

(iii) Give the reason why angle DOA is 34°. [1]

(iv) Calculate angle BDO. [1]

(v) The radius of the circle is 12 cm. Calculate the length of major arc $ABCD$. [3]

Quadrilaterals P and Q each have diagonals which

- are unequal,
- intersect at right angles.

P has two lines of symmetry. Q has one line of symmetry.

(a) (i) Sketch quadrilateral P.
Write down its geometrical name. [2]

(ii) Sketch quadrilateral Q.
Write down its geometrical name. [2]

(b) In quadrilateral P, an angle between one diagonal and a side is $x°$.
Write down, in terms of x, the four angles of quadrilateral P. [2]

(c) The diagonals of quadrilateral Q have lengths 20 cm and 12 cm.
Calculate the area of quadrilateral Q. [2]

(d) Quadrilateral P has the same area as quadrilateral Q.
The lengths of the diagonals and sides of quadrilateral P are all integer values.
Find the length of a side of quadrilateral P. [3]

Geometry
Difficulty: Hard

Question Paper 1

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Exam Board	CIE
Topic	Geometry
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Difficulty	Hard
Booklet	Question Paper 1

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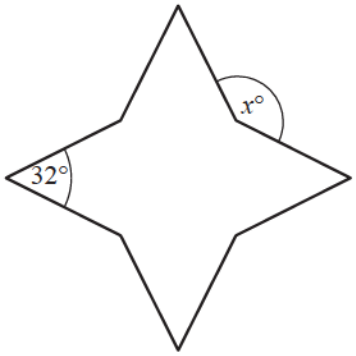
(a)

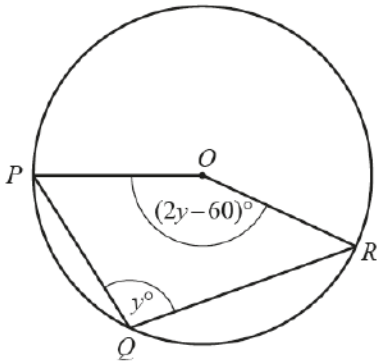


NOT TO SCALE

The diagram shows an octagon.
All of the sides are the same length.
Four of the interior angles are each 32°.
The other four interior angles are equal.

Find the value of x. [4]

(b)

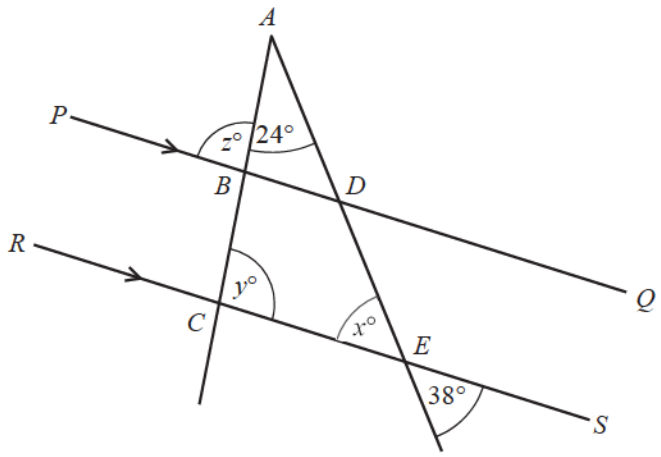


NOT TO SCALE

P, Q and R lie on a circle, centre O.
Angle $PQR = y°$ and angle $POR = (2y - 60)°$.

Find the value of y. [3]

(a)

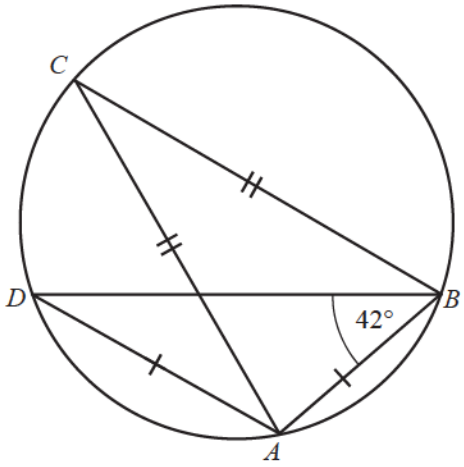


NOT TO SCALE

PQ is parallel to RS.
ABC and ADE are straight lines.

Find the values of x, y and z. [3]

(b)

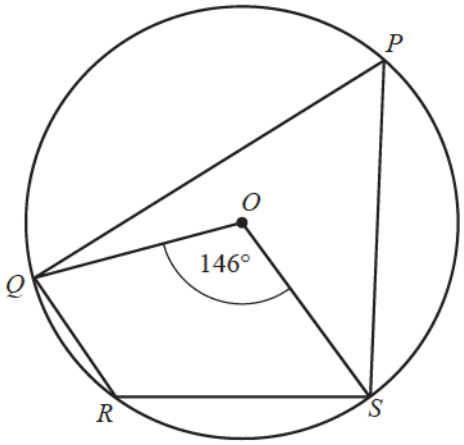


NOT TO SCALE

The points A, B, C and D lie on the circumference of the circle.
$AB = AD$, $AC = BC$ and angle $ABD = 42°$.

Find angle CAB. [3]

(c)

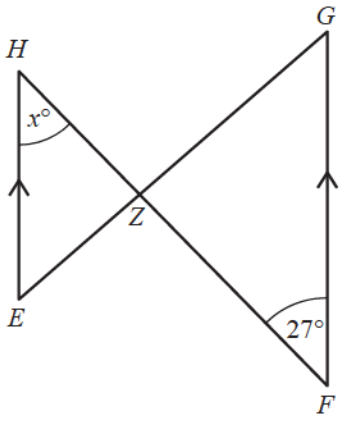


NOT TO SCALE

The points P, Q, R and S lie on the circumference of the circle, centre O.
Angle $QOS = 146°$.

Find angle QRS. [2]

(a)



NOT TO SCALE

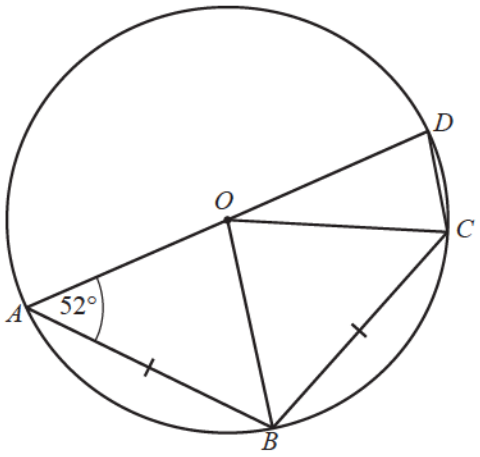
In the diagram, EH is parallel to FG.
The straight lines EG and FH intersect at Z.
Angle $ZFG = 27°$.

(i) Find the value of x. [1]

(ii) $EH = 5$ cm, $FG = 9$ cm and $ZG = 7$ cm.

Calculate EZ. [2]

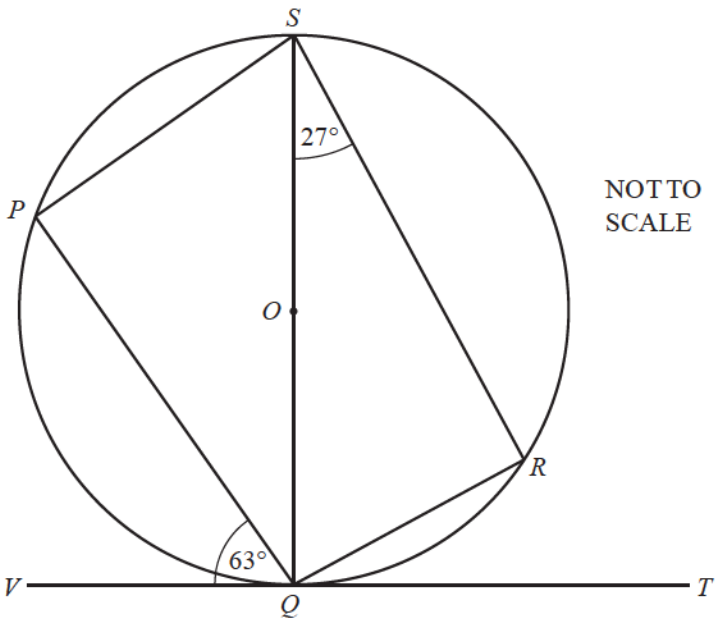
(b) The diagram shows points A, B, C and D on the circumference of a circle, centre O.
AD is a straight line, $AB = BC$ and angle $OAB = 52°$.



NOT TO SCALE

Find angle ADC. [3]

(c) The diagram shows points P, Q, R and S on the circumference of a circle, centre O.
VT is the tangent to the circle at Q.



Complete the statements.

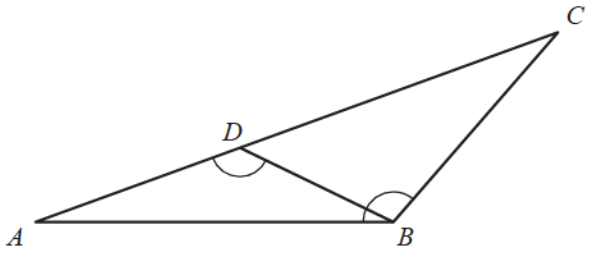
(i) Angle QPS = angle QRS = ... ° because ..... [2]

(ii) Angle SQP = ... ° because ..... [2]

(iii) **Part (c)(i)** and **part (c)(ii)** show that

the cyclic quadrilateral $PQRS$ is a ..... [1]

(a)



NOT TO SCALE

In the diagram, D is on AC so that angle ADB = angle ABC.

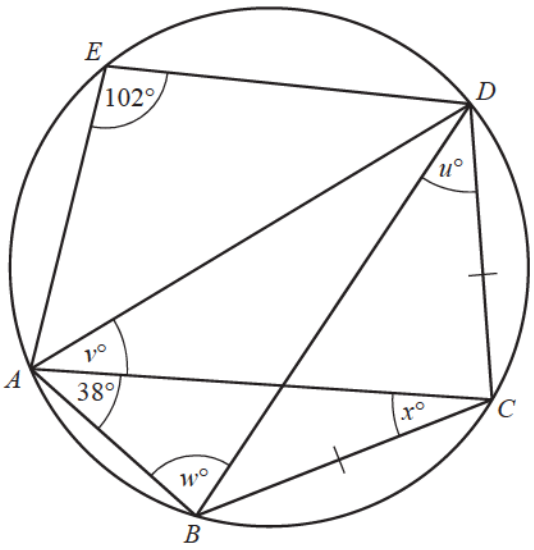
(i) Show that angle ABD is equal to angle ACB. [2]

(ii) Complete the statement. [1]

(iii) $AB = 12$ cm, $BC = 11$ cm and $AC = 16$ cm.

Calculate the length of BD. [2]

(b)



NOT TO SCALE

A, B, C, D and E lie on the circle.
Angle $AED = 102°$ and angle $BAC = 38°$.
$BC = CD$.

Find the value of

(i) u,

[1]

(ii) v,

[1]

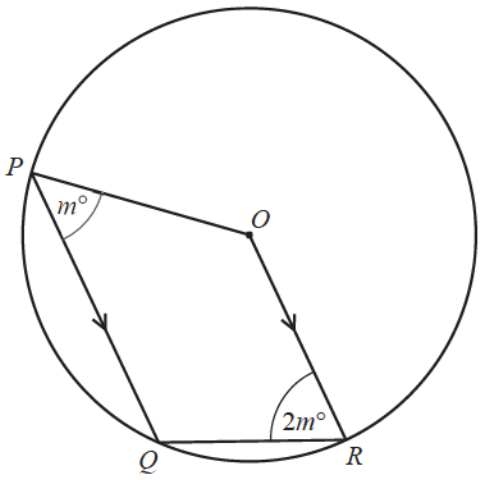
(iii) w,

[1]

(iv) x.

[1]

(c)

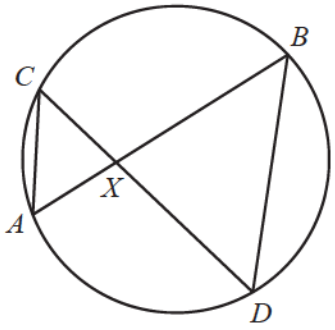


NOT TO SCALE

In the diagram, P, Q and R lie on the circle, centre O.
PQ is parallel to OR.
Angle $QPO = m°$ and angle $QRO = 2m°$.

Find the value of m. [5]

(a) The diagram shows a circle with two chords, AB and CD, intersecting at X.



NOT TO SCALE

(i) Show that triangles ACX and DBX are similar. [2]

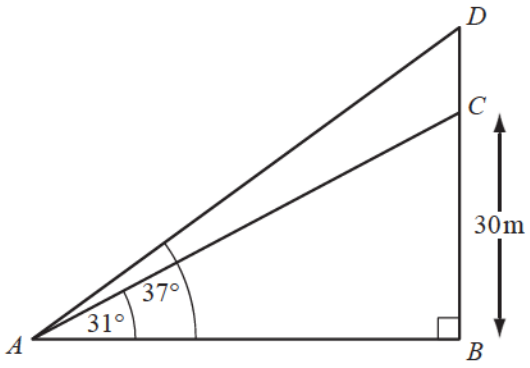
(ii) $AX = 3.2$ cm, $BX = 12.5$ cm, $CX = 4$ cm and angle $AXC = 110°$.

(a) Find DX. [2]

(b) Use the cosine rule to find AC. [4]

(c) Find the area of triangle BXD. [2]

(b)

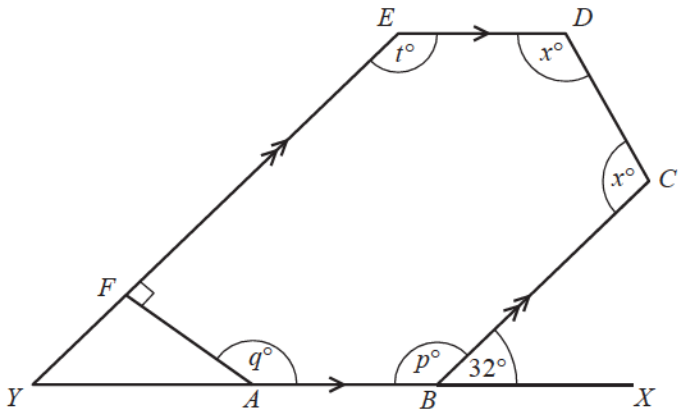


NOT TO SCALE

In the diagram, BC represents a building 30m tall.
A flagpole, DC, stands on top of the building.
From a point, A, the angle of elevation of the top of the building is 31°.
The angle of elevation of the top of the flagpole is 37°.

Calculate the height, DC, of the flagpole. [5]

(a)



NOT TO SCALE

ABCDEF is a hexagon.
AB is parallel to *ED* and *BC* is parallel to *FE*.
YFE and *YABX* are straight lines.
Angle *CBX* = 32° and angle *EFA* = 90°.

Calculate the value of

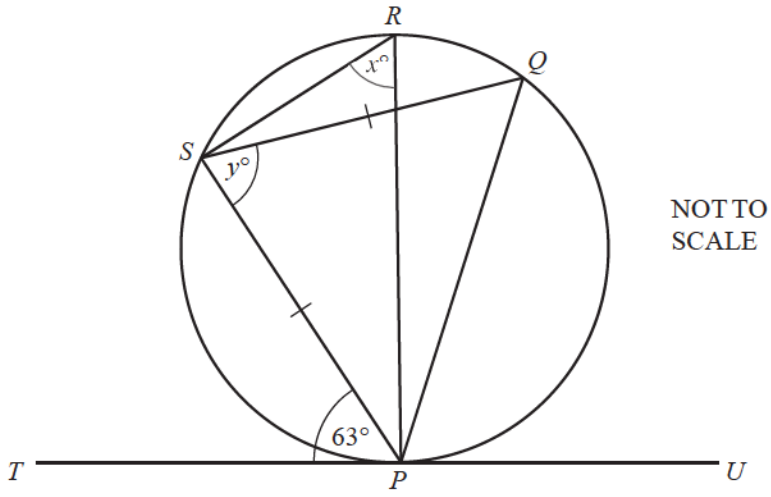
(i) p, [1]

(ii) q, [2]

(iii) t, [1]

(iv) x. [3]

(b)



P, Q, R and S are points on a circle and $PS = SQ$.
PR is a diameter and TPU is the tangent to the circle at P.
Angle $SPT = 63°$.

Find the value of

(i) x, [2]

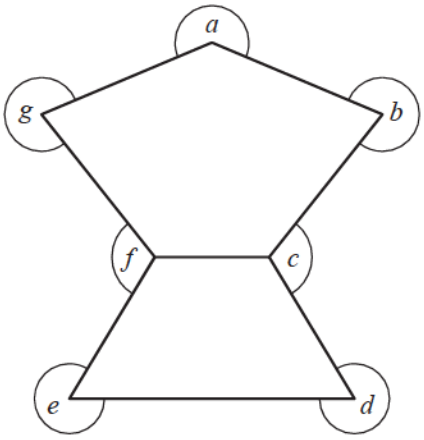
(ii) y. [2]

(a) One angle of an isosceles triangle is 48°.

Write down the possible pairs of values for the remaining two angles. [2]

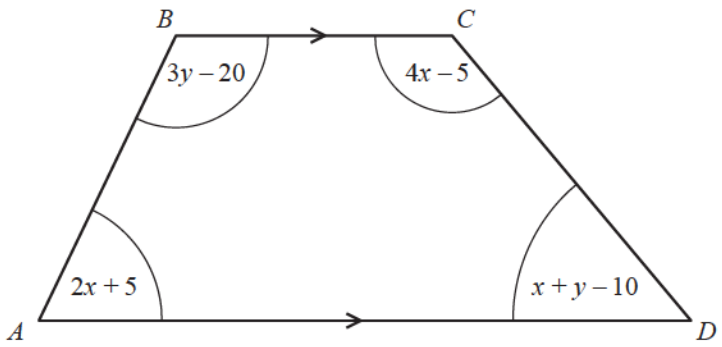
(b) Calculate the sum of the interior angles of a pentagon. [2]

(c) Calculate the sum of the angles a, b, c, d, e, f and g shown in this diagram. [2]



NOT TO SCALE

(d) The trapezium, $ABCD$, has four angles as shown.
All the angles are in degrees.



NOT TO SCALE

(i) Show that $7x + 4y = 390$. [1]

(ii) Show that $2x + 3y = 195$. [1]

(iii) Solve these simultaneous equations. [4]

(iv) Use your answer to **part (d)(iii)** to find the sizes of all four angles of the trapezium. [1]

Geometry
Difficulty: Hard

Question Paper 2

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Geometry
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 2

Time allowed: **100 minutes**

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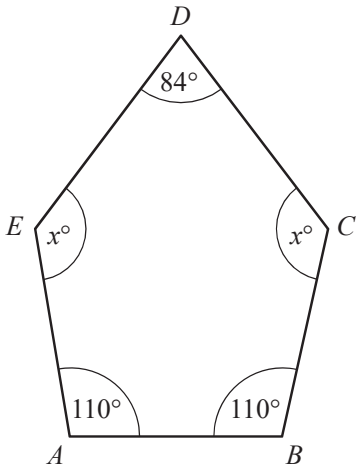
A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

(a)



NOT TO SCALE

In the pentagon $ABCDE$, angle EAB = angle ABC = 110° and angle CDE = 84°.
Angle BCD = angle DEA = x°.

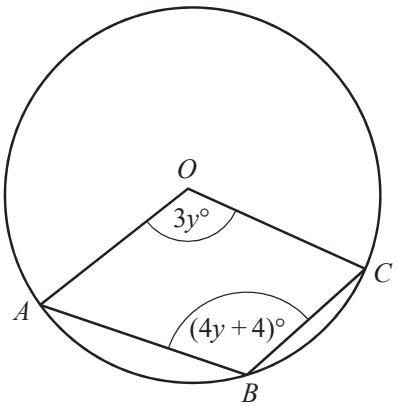
(i) Calculate the value of x. [2]

(ii) $BC = CD$.
Calculate angle CBD. [1]

(iii) This pentagon also has one line of symmetry.
Calculate angle ADB. [1]

(b) A, B and C lie on a circle centre O.
Angle AOC = $3y$° and angle ABC = $(4y + 4)$°.

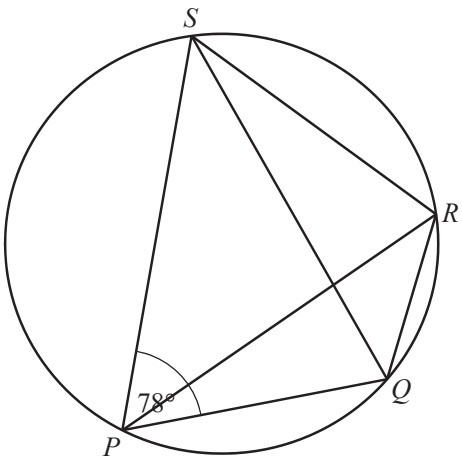
Find the value of y.



NOT TO SCALE

[4]

(c)



NOT TO SCALE

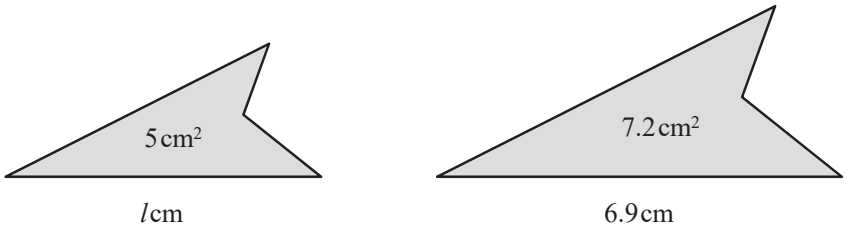
In the cyclic quadrilateral $PQRS$, angle $SPQ = 78°$.

(i) Write down the geometrical reason why angle $QRS = 102°$. [1]

(ii) Angle PRQ : Angle $PRS = 1 : 2$.

Calculate angle PQS. [3]

(d)



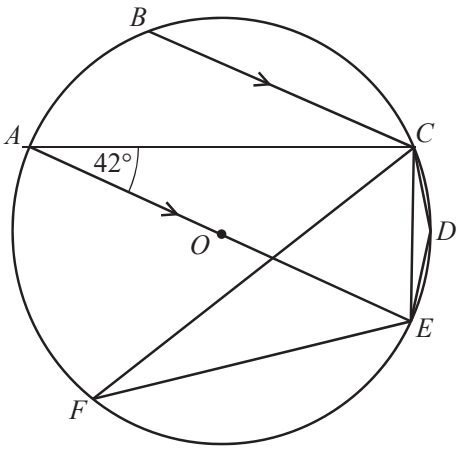
NOT TO SCALE

The diagram shows two similar figures.
The areas of the figures are 5 cm² and 7.2 cm².
The lengths of the bases are l cm and 6.9 cm.

Calculate the value of l. [3]

Question 2

(a)



NOT TO SCALE

A, B, C, D, E and F are points on the circumference of a circle centre O.
AE is a diameter of the circle.
BC is parallel to AE and angle $CAE = 42°$.

Giving a reason for each answer, find

(i) angle BCA,

[2]

(ii) angle ACE,

[2]

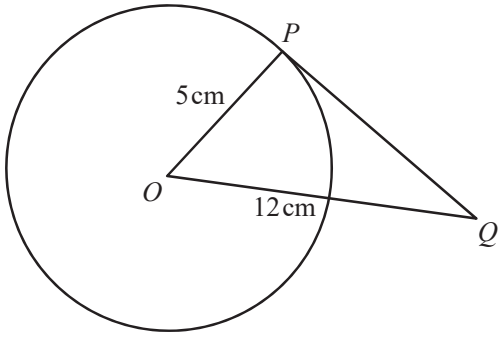
(iii) angle CFE,

[2]

(iv) angle CDE.

[2]

(b)

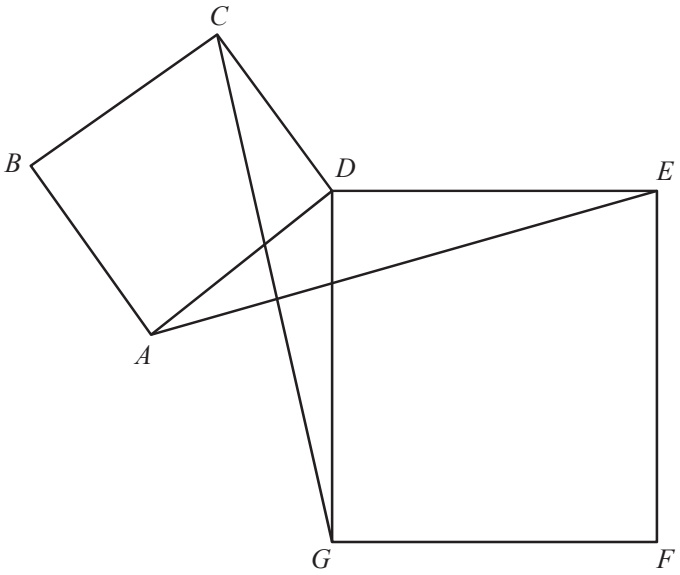


NOT TO SCALE

In the diagram, O is the centre of the circle and PQ is a tangent to the circle at P.
$OP = 5$ cm and $OQ = 12$ cm.

Calculate PQ. [3]

(c)



NOT TO SCALE

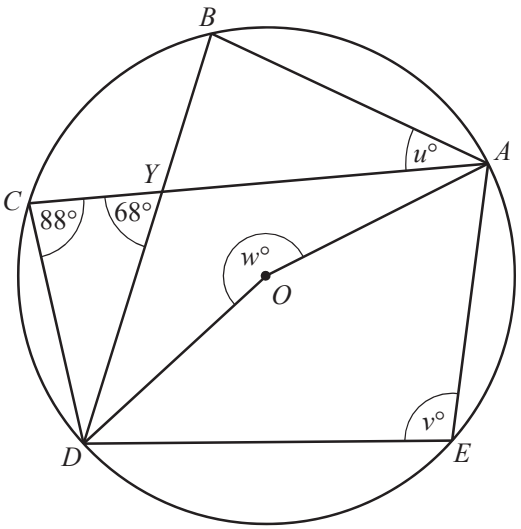
In the diagram, $ABCD$ and $DEFG$ are squares.

(i) In the triangles CDG and ADE, explain with a reason which sides and/or angles are equal.

[3]

(ii) Complete the following statement. [1]

(a)



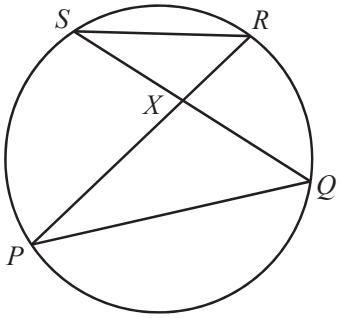
NOT TO SCALE

A, B, C, D and E lie on the circle, centre O.
CA and BD intersect at Y.
Angle $DCA = 88°$ and angle $CYD = 68°$.
Angle $BAC = u°$, angle $AED = v°$ and reflex angle $AOD = w°$.

[4]

Calculate the values of u, v and w.

(b)



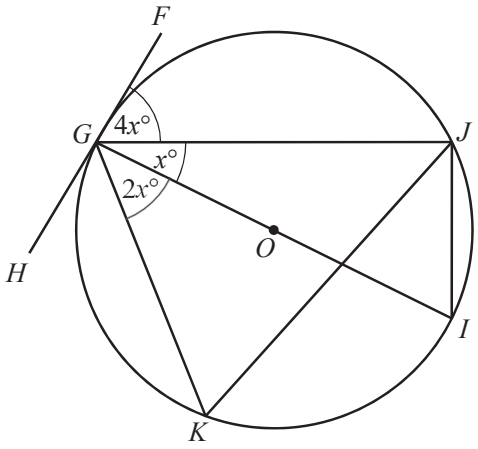
NOT TO SCALE

P, Q, R and S lie on the circle. PR and QS intersect at X.
The area of triangle $RSX = 1.2$ cm^2 and $PX = 3\,SX$.

Calculate the area of triangle PQX.

[2]

(c)



NOT TO SCALE

GI is a diameter of the circle.
FGH is a tangent to the circle at *G*.
J and *K* also lie on the circle.
Angle *JGI* = $x°$, angle *FGJ* = $4x°$ and angle *KGI* = $2x°$.

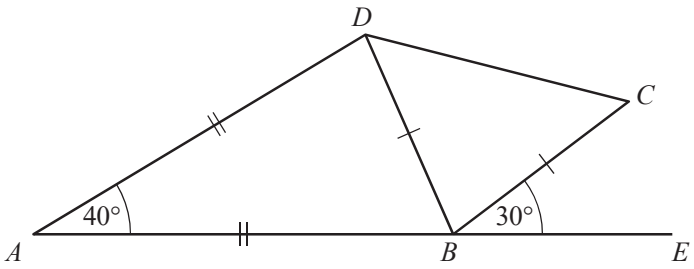
Find

(i) the value of x, [2]

(ii) the size of angle JKG, [2]

(iii) the size of angle GJK. [1]

(a)



NOT TO SCALE

$ABCD$ is a quadrilateral with angle $BAD = 40°$.
AB is extended to E and angle $EBC = 30°$.
$AB = AD$ and $BD = BC$.

(i) Calculate angle BCD. [3]

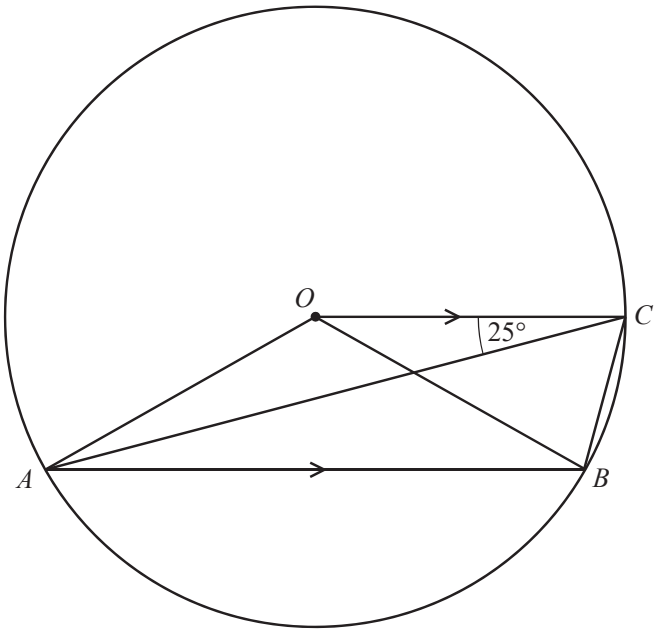
(ii) Give a reason why DC is not parallel to AE. [1]

(b) A regular polygon has n sides.

Each exterior angle is $\frac{5n}{2}$ degrees.

Find the value of n. [3]

(c)

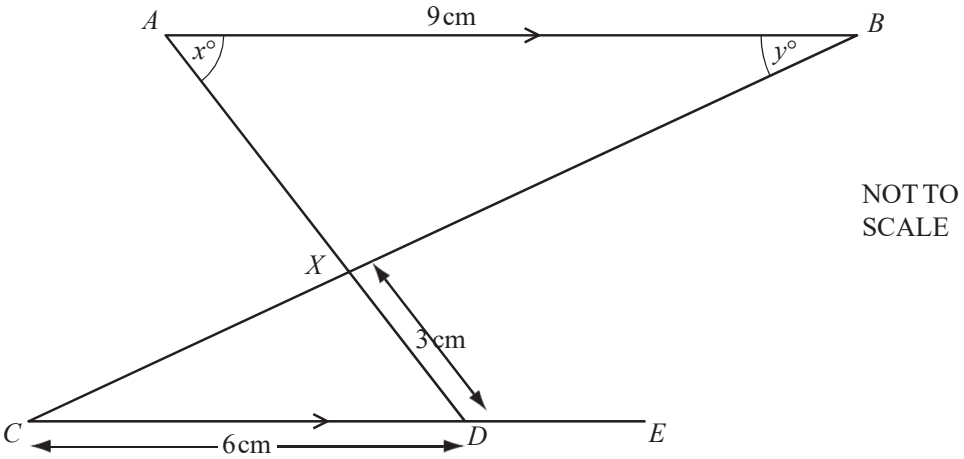


NOT TO SCALE

The diagram shows a circle centre O.
A, B and C are points on the circumference.
OC is parallel to AB.
Angle $OCA = 25°$.

Calculate angle OBC. [3]

(a)



NOT TO SCALE

The lines AB and CDE are parallel.
AD and CB intersect at X.
$AB = 9$ cm, $CD = 6$ cm and $DX = 3$ cm.

(i) Complete the following statement.

Triangle ABX is ..... to triangle DCX. [1]

(ii) Calculate the length of AX. [2]

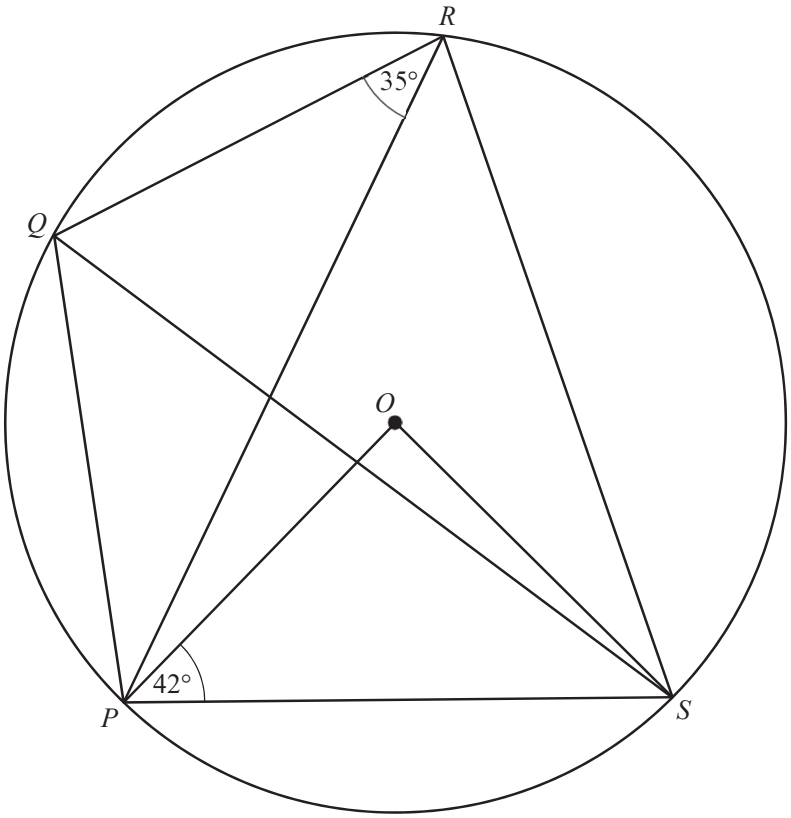
(iii) The area of triangle DCX is 6 cm^2.

Calculate the area of triangle ABX. [2]

(iv) Angle $BAX = x°$ and angle $ABX = y°$.

Find angle AXB and angle XDE in terms of x and/or y. [2]

(b)



NOT TO SCALE

P, Q, R and S lie on a circle, centre O.
Angle $OPS = 42°$ and angle $PRQ = 35°$.

Calculate

(i) angle POS, [1]

(ii) angle PRS, [1]

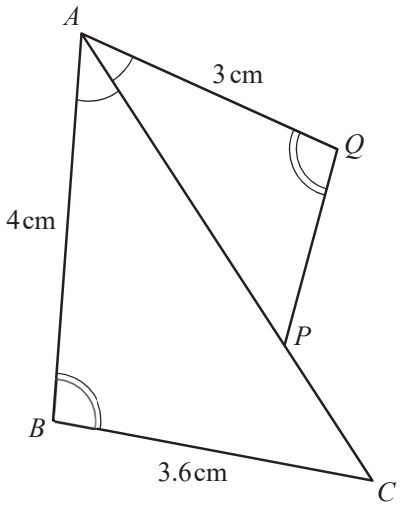
(iii) angle SPQ, [1]

(iv) angle PSQ. [1]

(c) The interior angle of a regular polygon is 8 times as large as the exterior angle.

Calculate the number of sides of the polygon. [3]

(a)



NOT TO SCALE

The diagram shows two triangles ACB and APQ.

Angle PAQ = angle BAC and angle AQP = angle ABC.

AB = 4 cm, BC = 3.6 cm and AQ = 3 cm.

(i) Complete the following statement.

Triangle ACB is ..... to triangle APQ. [1]

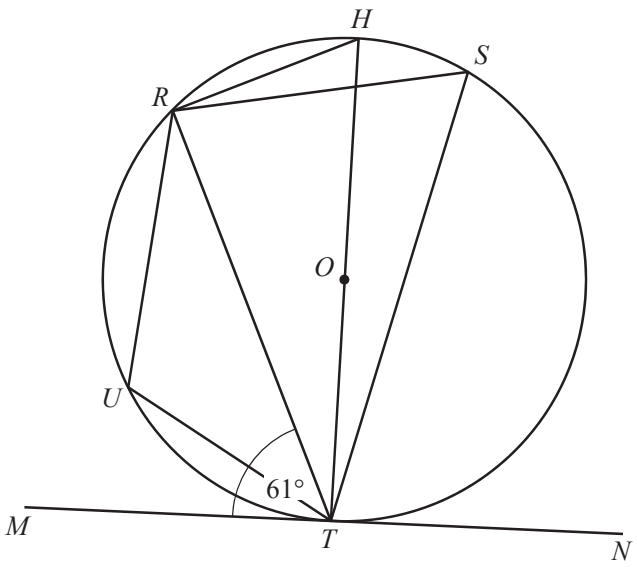
(ii) Calculate the length of PQ.

[2]

(iii) The area of triangle ACB is 5.6 cm^2.

Calculate the area of triangle APQ. [2]

(b)



NOT TO SCALE

R, H, S, T and U lie on a circle, centre O.
HT is a diameter and MN is a tangent to the circle at T.
Angle $RTM = 61°$.

Find

(i) angle RTH, [1]

(ii) angle RHT, [1]

(iii) angle RST, [1]

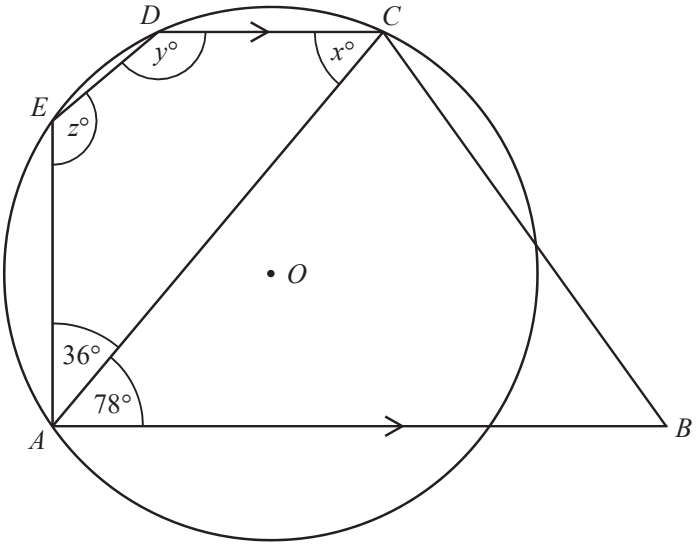
(iv) angle RUT. [1]

(c) $ABCDEF$ is a hexagon.
The interior angle B is 4° greater than interior angle A.
The interior angle C is 4° greater than interior angle B, and so on, with each of the next interior angles 4° greater than the previous one.

(i) By how many degrees is interior angle F greater than interior angle A? [1]

(ii) Calculate interior angle A. [3]

NOT TO SCALE



ABCDE is a pentagon.
A circle, centre *O*, passes through the points *A*, *C*, *D* and *E*.
Angle *EAC* = 36°, angle *CAB* = 78° and *AB* is parallel to *DC*.

(a) Find the values of *x*, *y* and *z*, giving a reason for each. [6]

(b) Explain why *ED* is **not** parallel to *AC*. [1]

(c) Find the value of angle *EOC*. [1]

(d) *AB* = *AC*.
Find the value of angle *ABC*. [1]