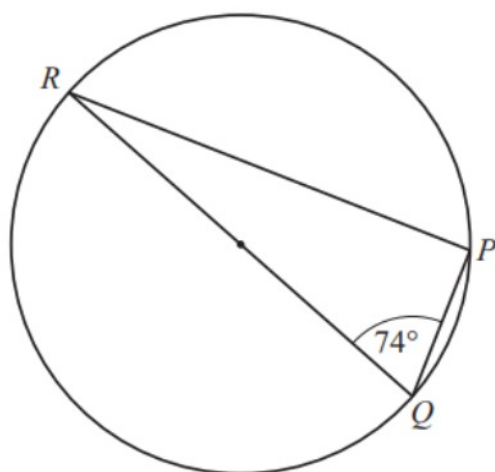


NOT TO
SCALE

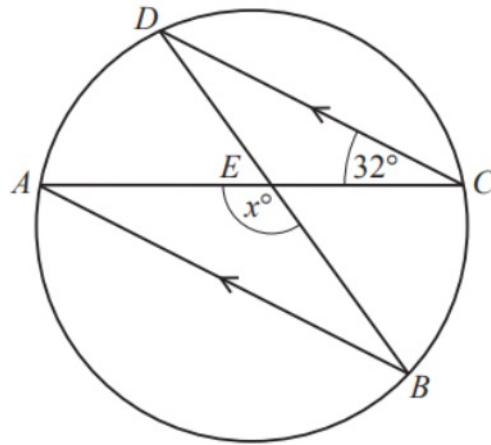
P , Q and R lie on a circle.
 QR is a diameter.

Find angle PRQ .
Give geometrical reasons for your answer.

Angle $PRQ = \dots\dots\dots$ because $\dots\dots\dots$

[2]

13

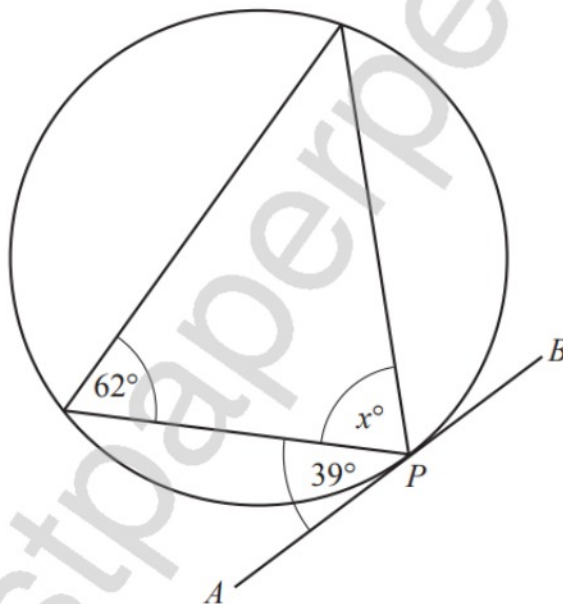
NOT TO
SCALE

A , B , C and D are points on a circle.
 AB is parallel to DC and angle $ACD = 32^\circ$.
 Chords AC and DB intersect at E .

Find the value of x .

$x = \dots\dots\dots$ [2]

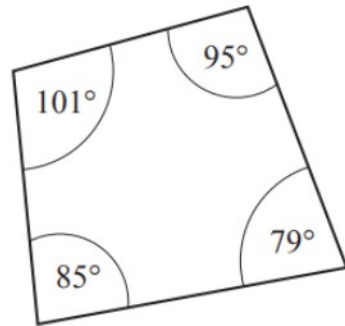
10

NOT TO
SCALE

APB is a tangent to the circle at P .

Work out the value of x .

$x = \dots\dots\dots$ [2]



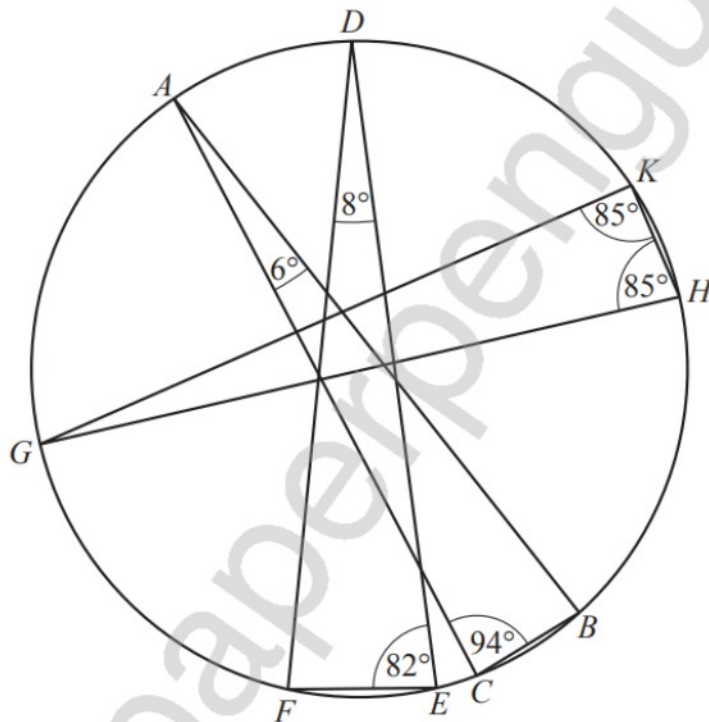
NOT TO
SCALE

The diagram shows a quadrilateral.

Give a geometrical reason why this is a cyclic quadrilateral.

[1]

- 11 ABC , DEF and GHK are triangles with all vertices on the circumference of a circle.

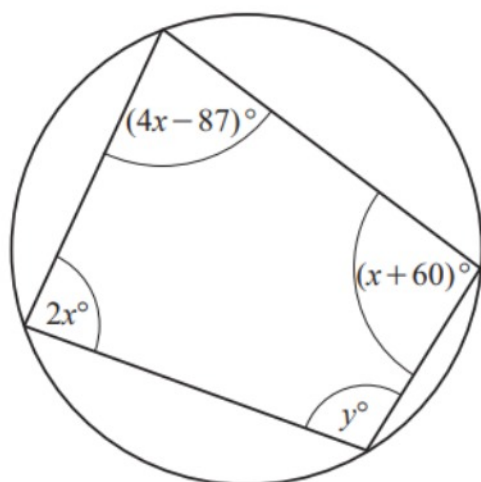


NOT TO
SCALE

From the list, draw a ring around the line that is a diameter of the circle.

AB AC DE DF GH GK

[1]

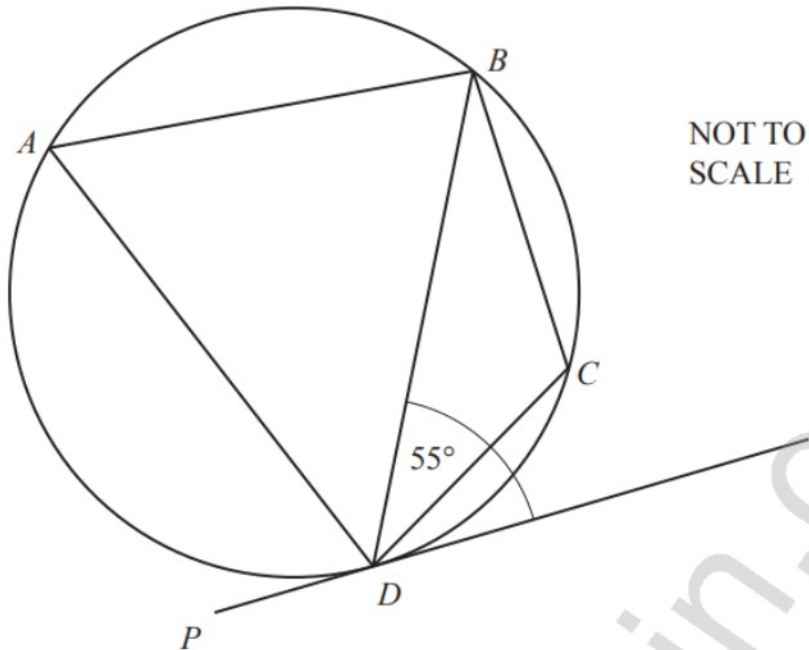


NOT TO
SCALE

The diagram shows a cyclic quadrilateral.

Find the value of y .

$y = \dots\dots\dots$ [4]



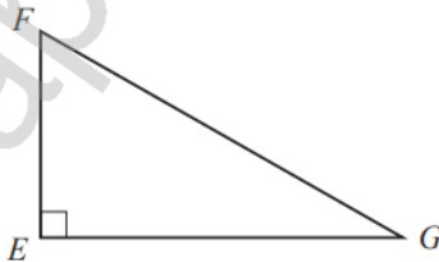
A, B, C and D are points on the circle.
 PQ is a tangent to the circle at D .
 Angle $BDQ = 55^\circ$.

Complete these statements giving a reason for each answer.

(a) Angle $BAD = \dots\dots\dots$ because $\dots\dots\dots$ [2]

(b) Angle $BCD = \dots\dots\dots$ because $\dots\dots\dots$ [2]

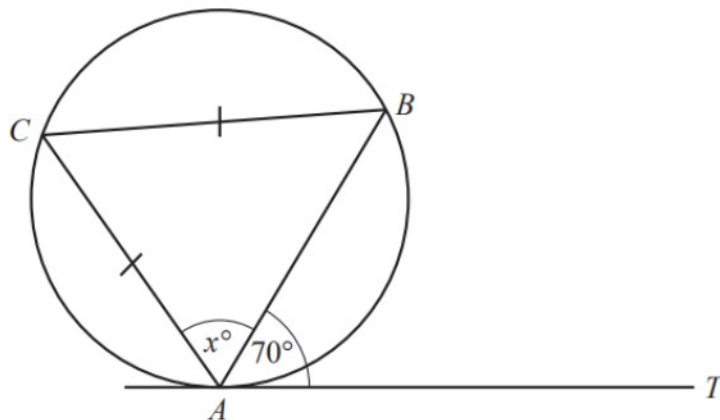
(b)



EFG is a right-angled triangle.
 A circle can be drawn that passes through the three vertices of the triangle.

On the diagram, mark the position of the centre of the circle with a cross.
 Explain how you decide.

$\dots\dots\dots$
 $\dots\dots\dots$ [2]

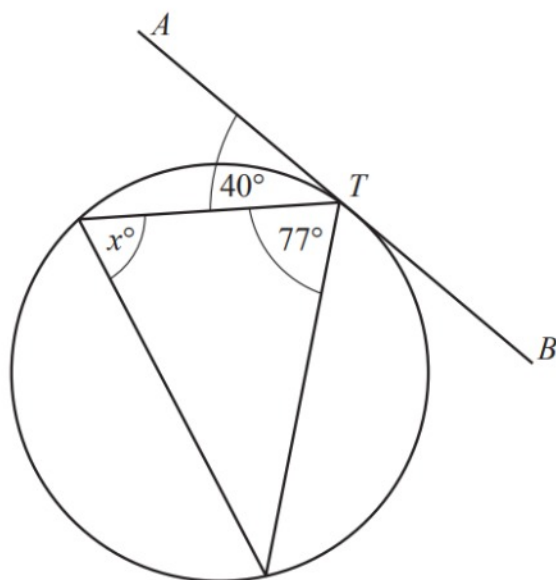


NOT TO
SCALE

A , B and C are points on a circle.
 TA is a tangent to the circle at A .
 $CA = CB$ and angle $BAT = 70^\circ$.

Work out the value of x .

$x =$ [2]



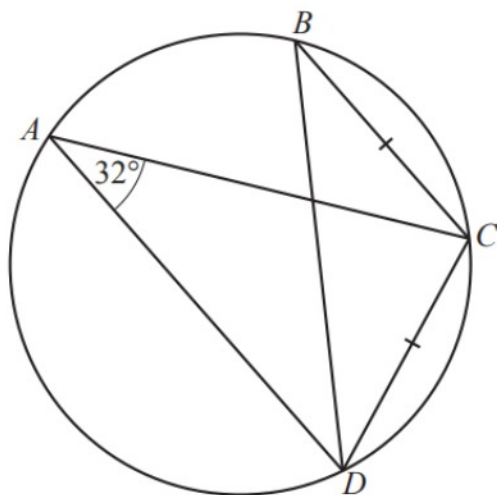
NOT TO
SCALE

AB is a tangent to the circle at T .

Find the value of x .

$x = \dots\dots\dots$ [2]

12 (a)



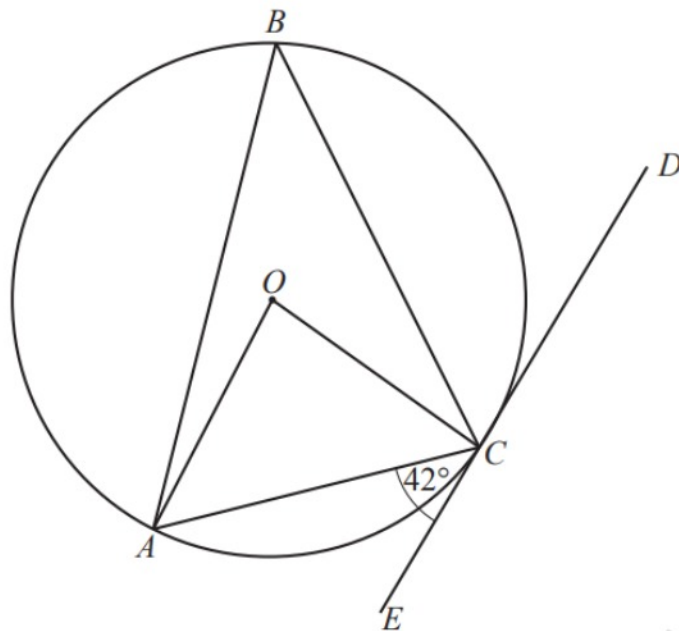
NOT TO
SCALE

$A, B, C,$ and D are points on a circle.
Angle $DAC = 32^\circ$.
 $BC = DC$.

Find angle BCD .

Angle $BCD = \dots\dots\dots$ [2]

(b)



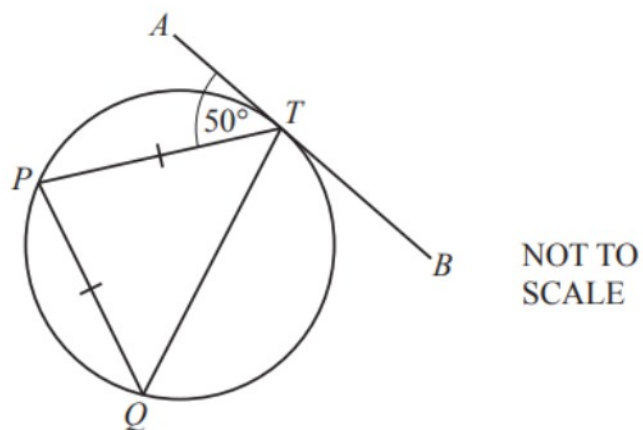
NOT TO
SCALE

A , B and C are points on the circle centre O .
 ECD is a tangent to the circle at C .
Angle $ACE = 42^\circ$.

Find angle AOC .

Angle $AOC = \dots\dots\dots$ [2]

19 (a)

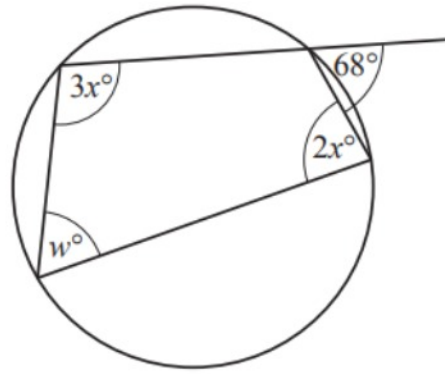


P , Q and T are points on a circle.
 ATB is a tangent to the circle at T and $PT = PQ$.

Find angle TPQ .

Angle $TPQ = \dots\dots\dots$ [2]

(b)



NOT TO
SCALE

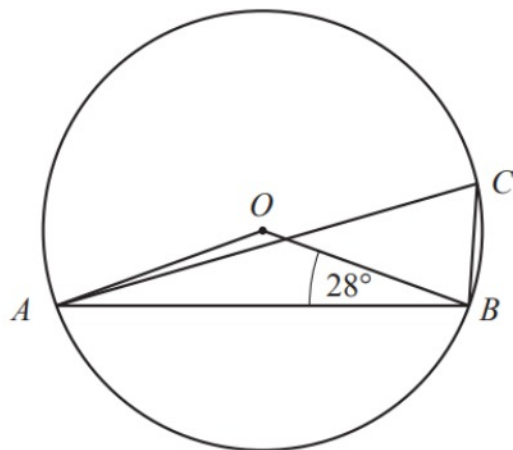
The diagram shows a cyclic quadrilateral with an exterior angle of 68° .

Find the value of w and the value of x .

$w =$

$x =$ [3]

17 (a)



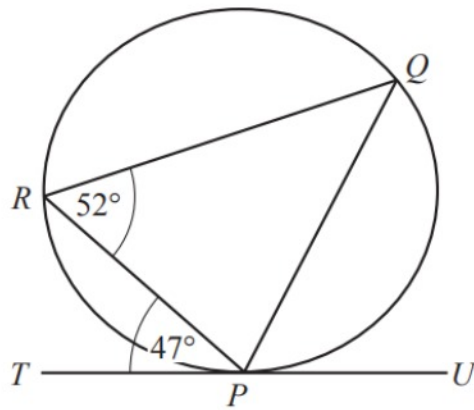
NOT TO
SCALE

A , B and C are points on a circle, centre O .
Angle $OBA = 28^\circ$.

Find angle ACB .

Angle $ACB = \dots\dots\dots$ [2]

(b)

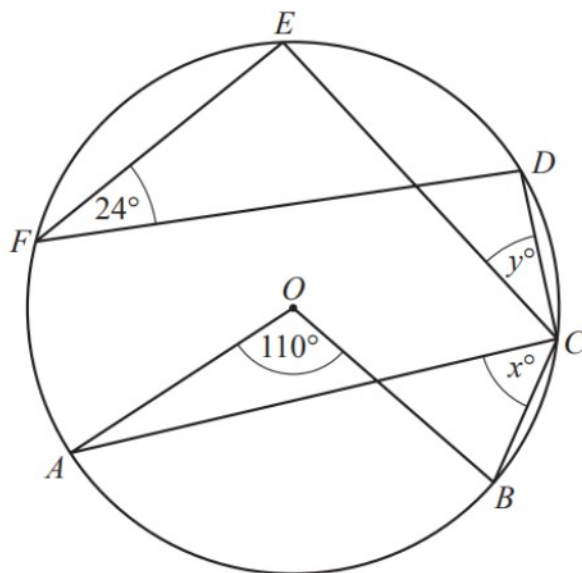


NOT TO
SCALE

P , Q and R are points on a circle.
 TU is a tangent to the circle at P .
Angle $TPR = 47^\circ$ and angle $PRQ = 52^\circ$.

Find angle RPQ .

Angle $RPQ = \dots\dots\dots$ [2]



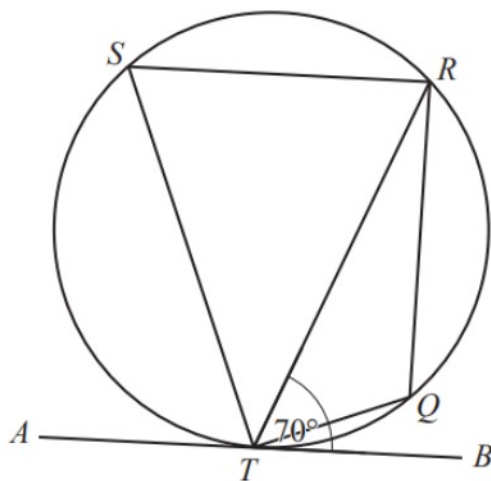
NOT TO
SCALE

Points A, B, C, D, E and F lie on the circle, centre O .

Find the value of x and the value of y .

$x = \dots\dots\dots$

$y = \dots\dots\dots$ [2]

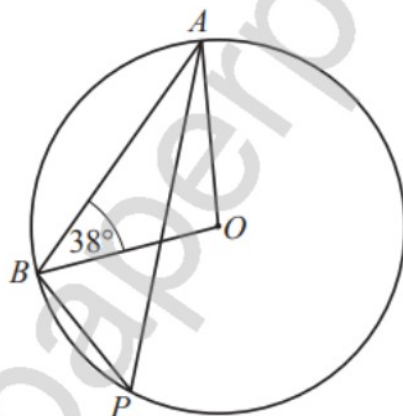
NOT TO
SCALE

Points Q , R , S and T lie on the circle.
 AB is a tangent to the circle at T .
 Angle $RTB = 70^\circ$.

Find angle RQT .

Angle $RQT = \dots\dots\dots$ [2]

2 (a)

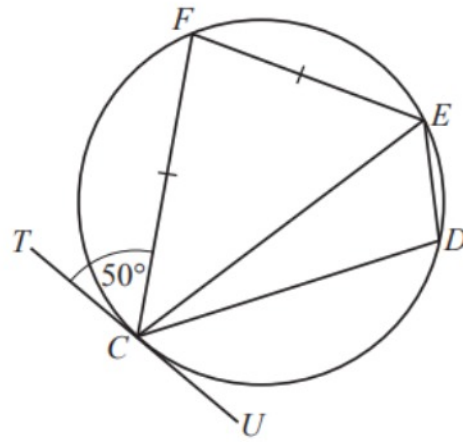
NOT TO
SCALE

A , B and P are points on a circle, centre O and angle $OBA = 38^\circ$.

Find angle APB .

Angle $APB = \dots\dots\dots$ [3]

(b)



NOT TO
SCALE

$CDEF$ is a cyclic quadrilateral and $FC = FE$.
 TU is a tangent to the circle at C and angle $TCF = 50^\circ$.

Find

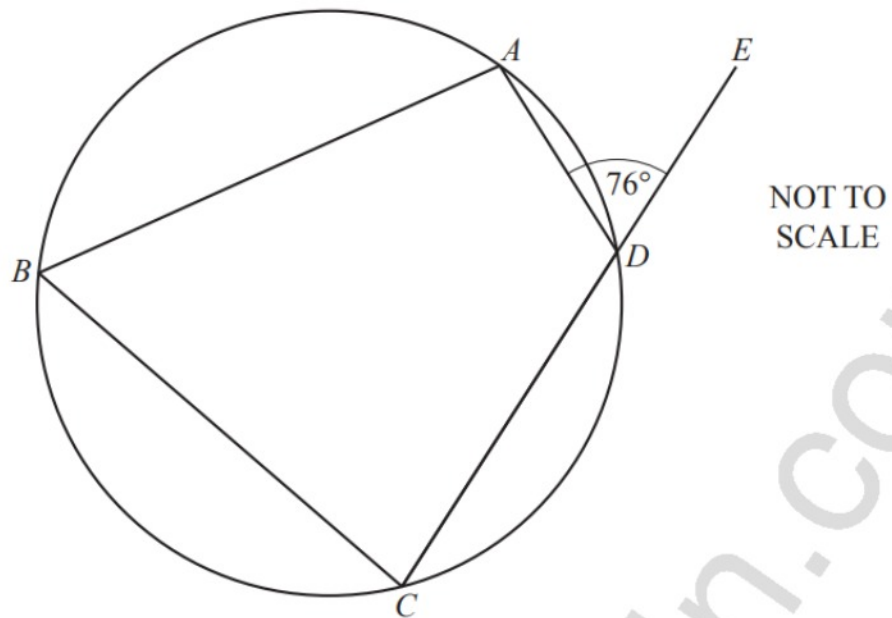
(i) angle EFC ,

Angle $EFC = \dots\dots\dots$ [2]

(ii) angle CDE .

Angle $CDE = \dots\dots\dots$ [1]

9 (a)

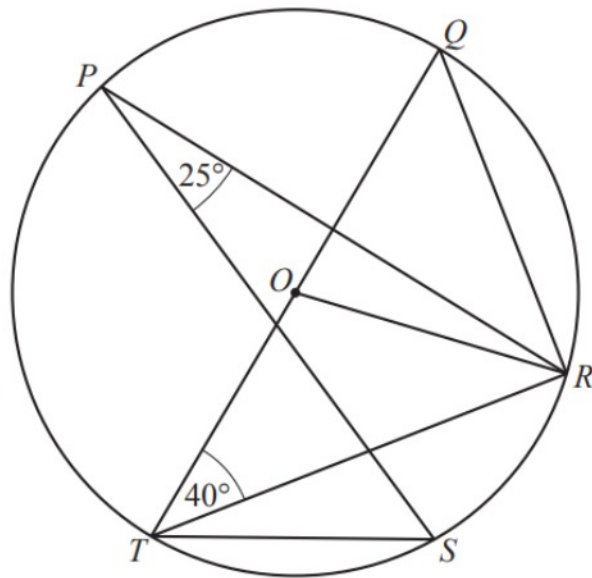


A , B , C , and D are points on a circle.
 CDE is a straight line.

Find angle ABC .

Angle $ABC = \dots\dots\dots$ [1]

(b)



NOT TO
SCALE

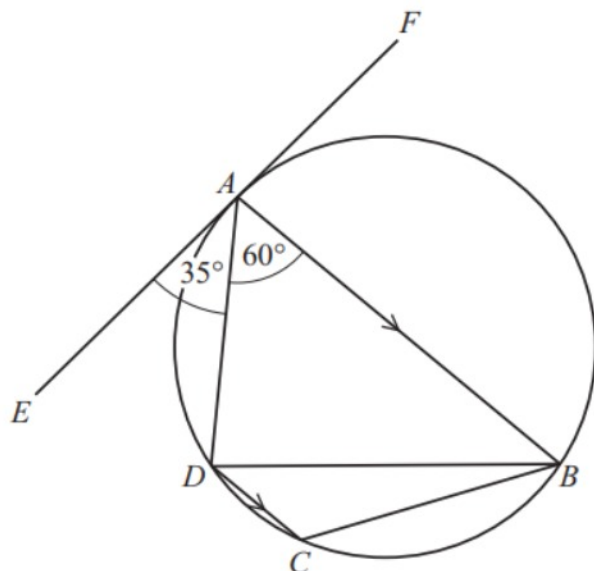
P, Q, R, S and T are points on the circle centre O .
 TOQ is a straight line.

(i) Find angle STR .

Angle $STR = \dots\dots\dots$ [1]

(ii) Find angle QOR .

Angle $QOR = \dots\dots\dots$ [1]



NOT TO
SCALE

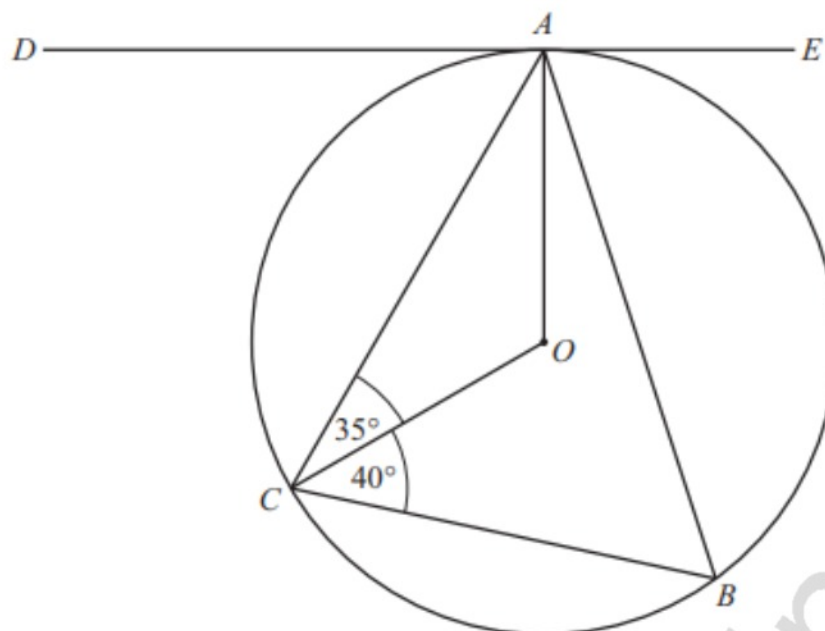
A , B , C and D are points on a circle.
 EF is a tangent to the circle at A .
 AB is parallel to DC .

- (a) Find angle DCB , giving a geometrical reason.

Angle DCB = because
 [2]

- (b) Find angle DBC .

Angle DBC = [2]



NOT TO
SCALE

A , B and C are three points on a circle, centre O .

DE is a tangent to the circle at A .

Angle $ACO = 35^\circ$ and angle $BCO = 40^\circ$.

Find

(a) angle AOC

Angle $AOC = \dots\dots\dots$ [1]

(b) angle ABC

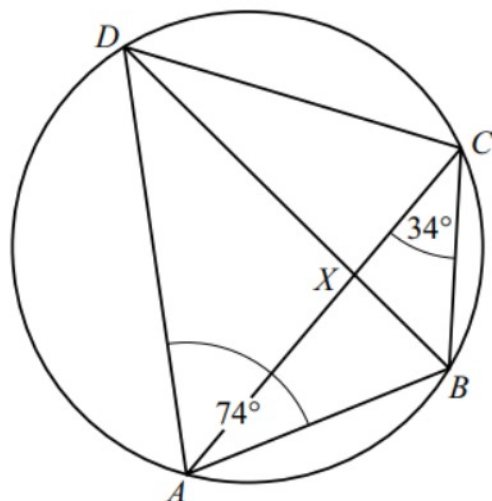
Angle $ABC = \dots\dots\dots$ [1]

(c) angle DAC

Angle $DAC = \dots\dots\dots$ [1]

(d) angle OAB .

Angle $OAB = \dots\dots\dots$ [1]



NOT TO
SCALE

The diagram shows a cyclic quadrilateral $ABCD$.
 BD and AC intersect at X .

- (a) Angle $BAD = 74^\circ$ and angle $BCA = 34^\circ$.

Find

- (i) angle BDA

Angle $BDA = \dots\dots\dots$ [1]

- (ii) angle BCD

Angle $BCD = \dots\dots\dots$ [1]

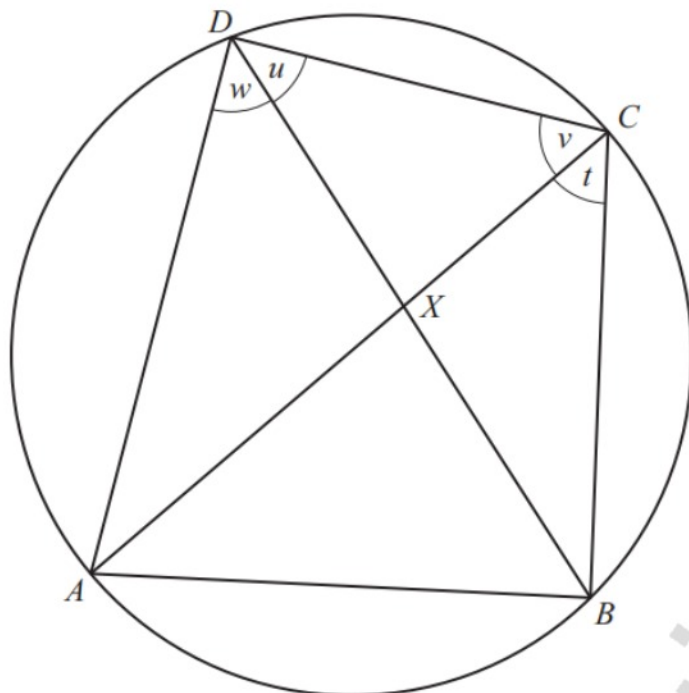
- (iii) angle ABD .

Angle $ABD = \dots\dots\dots$ [1]

- (b) In the diagram, triangle ADX is similar to triangle BCX .
 $BC = 4.5$ cm, $AD = 9$ cm and $CX = 3.3$ cm.

Work out XD .

$XD = \dots\dots\dots$ cm [2]



NOT TO
SCALE

$ABCD$ is a cyclic quadrilateral and the diagonals AC and BD intersect at X .

- (a) Complete the statement using two of t , u , v and w .

Angle is equal to angle

[1]

- (b) Angle $DAB = 75^\circ$.

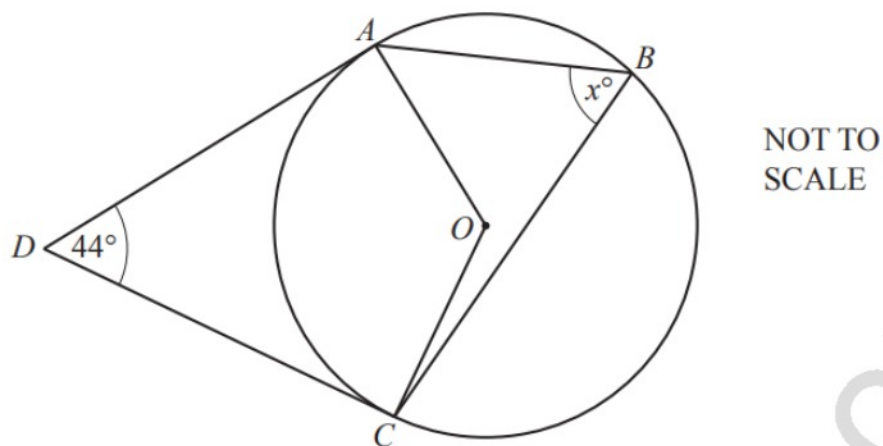
Find angle DCB .

Angle $DCB = \dots\dots\dots$ [1]

- (c) $AB = 8$ cm, $AX = 6$ cm, $BX = 4$ cm and $DC = 5$ cm.

Work out CX .

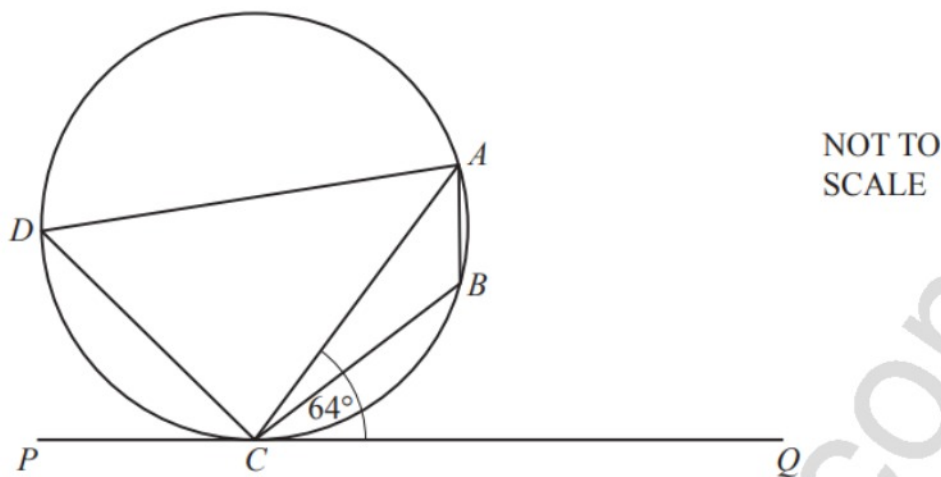
$CX = \dots\dots\dots$ cm [2]



A , B and C are points on a circle, centre O .
 DA and DC are tangents.
Angle $ADC = 44^\circ$.

Work out the value of x .

$x = \dots\dots\dots$ [3]



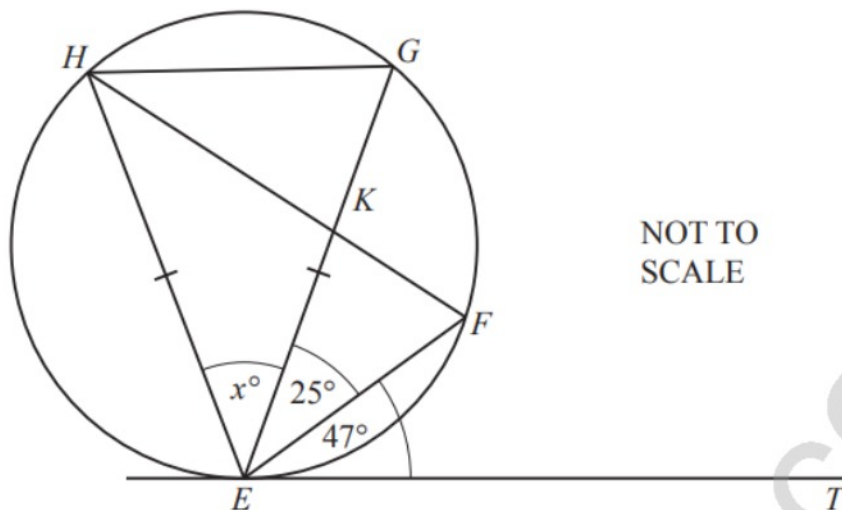
A , B , C and D lie on the circle.
 PCQ is a tangent to the circle at C .
 Angle $ACQ = 64^\circ$.

Work out angle ABC , giving reasons for your answer.

Angle $ABC = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$

$\dots\dots\dots$ [3]



Points E , F , G and H lie on the circle and $EG = EH$.

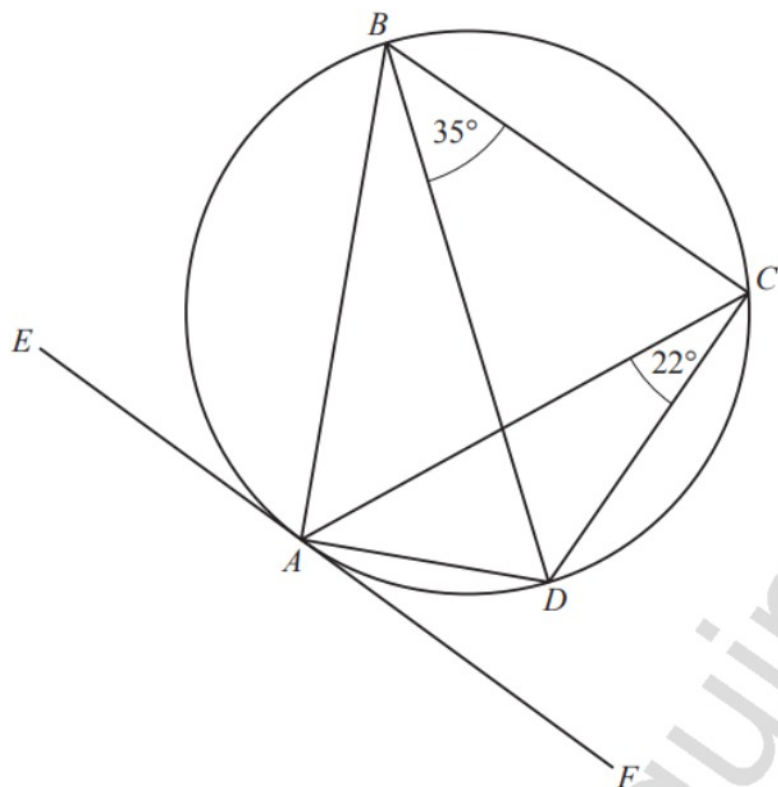
HF and EG intersect at K .

ET is a tangent to the circle at E .

Angle $FET = 47^\circ$ and angle $FEG = 25^\circ$.

Find the value of x .

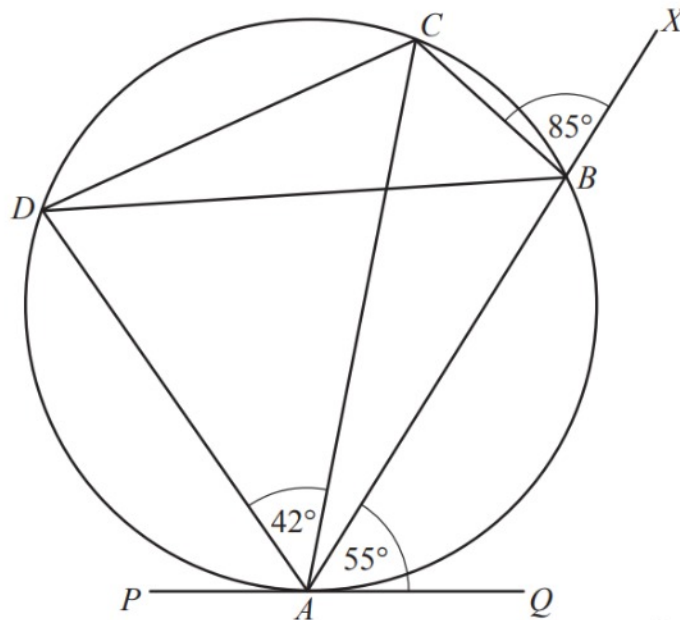
$x = \dots\dots\dots$ [2]

NOT TO
SCALE

A, B, C and D are points on the circle.
 EF is a tangent to the circle at A .
 Angle $DBC = 35^\circ$ and angle $ACD = 22^\circ$.

Find

(a) angle ABD Angle $ABD = \dots\dots\dots$ [1](b) angle ADC Angle $ADC = \dots\dots\dots$ [1](c) angle CAF .Angle $CAF = \dots\dots\dots$ [1]



NOT TO
SCALE

$ABCD$ is a cyclic quadrilateral, ABX is a straight line and PQ is a tangent to the circle at A .
Angle $CBX = 85^\circ$, angle $BAQ = 55^\circ$ and angle $CAD = 42^\circ$.

Find

(a) angle CBD

Angle $CBD = \dots\dots\dots$ [1]

(b) angle ACB

Angle $ACB = \dots\dots\dots$ [1]

(c) angle ADC

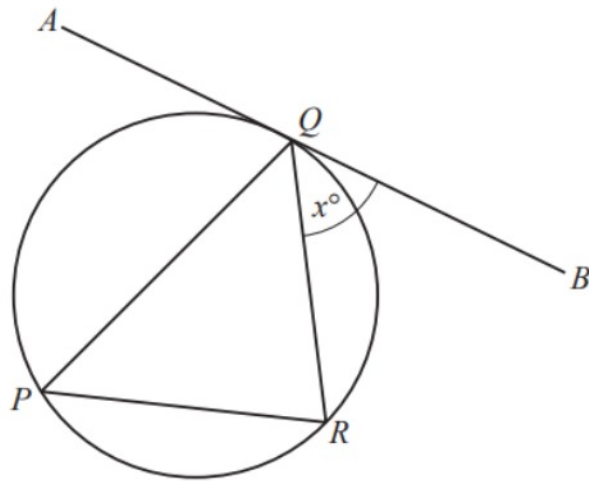
Angle $ADC = \dots\dots\dots$ [1]

(d) angle BCD

Angle $BCD = \dots\dots\dots$ [2]

(e) angle PAD .

Angle $PAD = \dots\dots\dots$ [1]



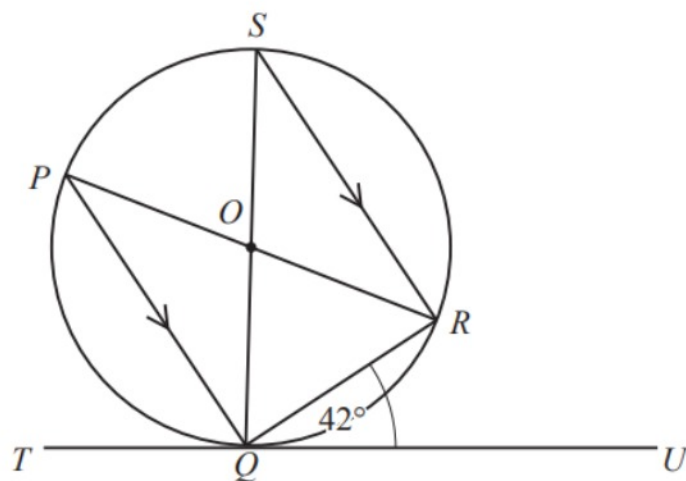
NOT TO
SCALE

P , R and Q are points on the circle.
 AB is a tangent to the circle at Q .
 QR bisects angle PQB .
Angle $BQR = x^\circ$ and $x < 60$.

Use this information to show that triangle PQR is an isosceles triangle.
Give a geometrical reason for each step of your work.

[3]

(b)



NOT TO
SCALE

P , Q , R and S are points on the circle and TQU is a tangent to the circle at Q .
 PR and SQ intersect at the centre of the circle, O , and PQ is parallel to SR .
Angle $RQU = 42^\circ$.

Calculate

(i) angle QSR

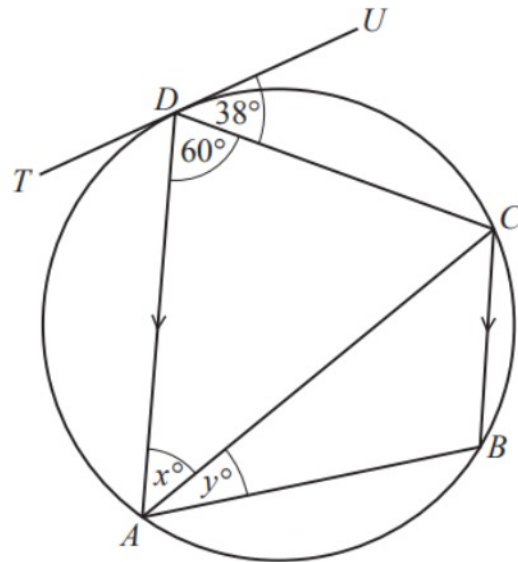
Angle $QSR = \dots\dots\dots$ [1]

(ii) angle PQS

Angle $PQS = \dots\dots\dots$ [1]

(iii) angle POS .

Angle $POS = \dots\dots\dots$ [1]



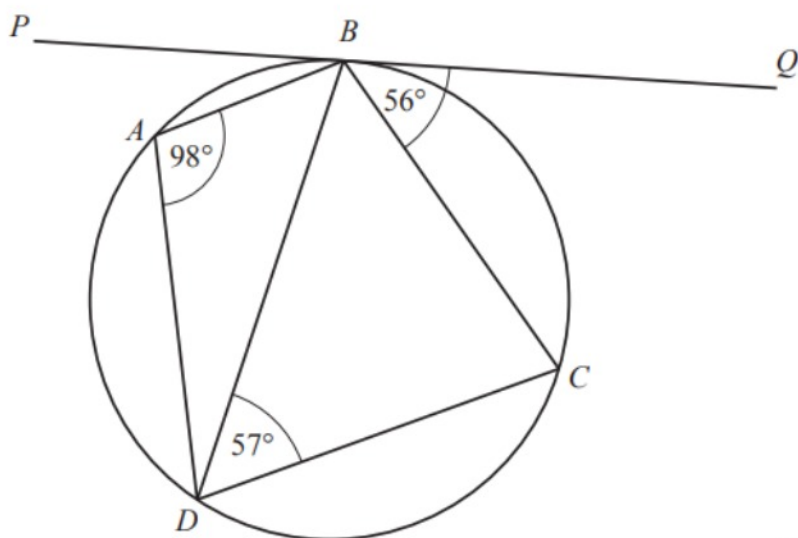
NOT TO
SCALE

A , B , C and D are points on a circle.
 TU is a tangent to the circle at D .
 DA is parallel to CB .

Find the value of x and the value of y .

$x =$

$y =$ [3]



A , B , C and D are points on the circle.
 PBQ is a straight line.

- (a) Find angle DCB , giving a reason for your answer.

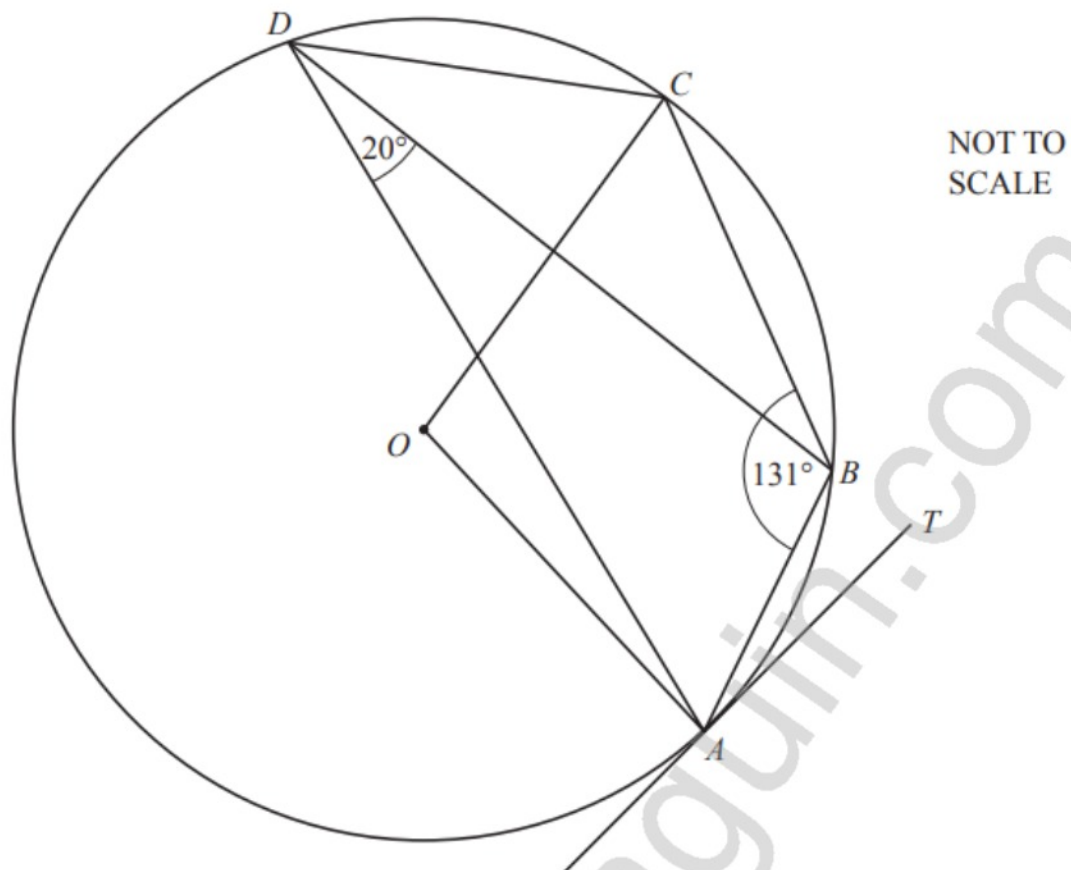
Angle DCB = because

[2]

- (b) Is PBQ a tangent to the circle?
 Give a reason for your answer.

..... because

[1]



A, B, C and D lie on the circle, centre O .
 TA is a tangent to the circle at A .
 Angle $ABC = 131^\circ$ and angle $ADB = 20^\circ$.

Find

(a) angle ADC ,

Angle $ADC = \dots\dots\dots$ [1]

(b) angle AOC ,

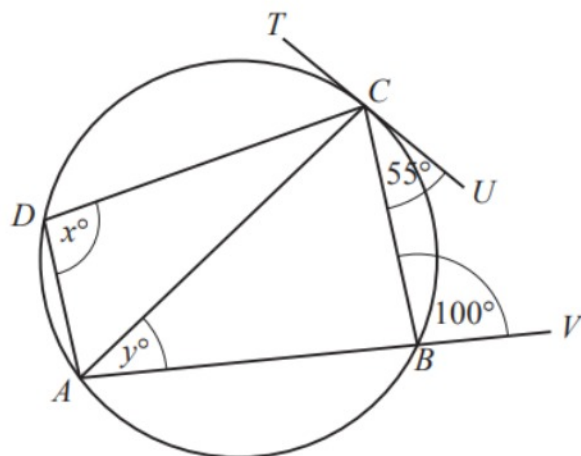
Angle $AOC = \dots\dots\dots$ [1]

(c) angle BAT ,

Angle $BAT = \dots\dots\dots$ [1]

(d) angle OAB .

Angle $OAB = \dots\dots\dots$ [1]



NOT TO
SCALE

$ABCD$ is a cyclic quadrilateral.

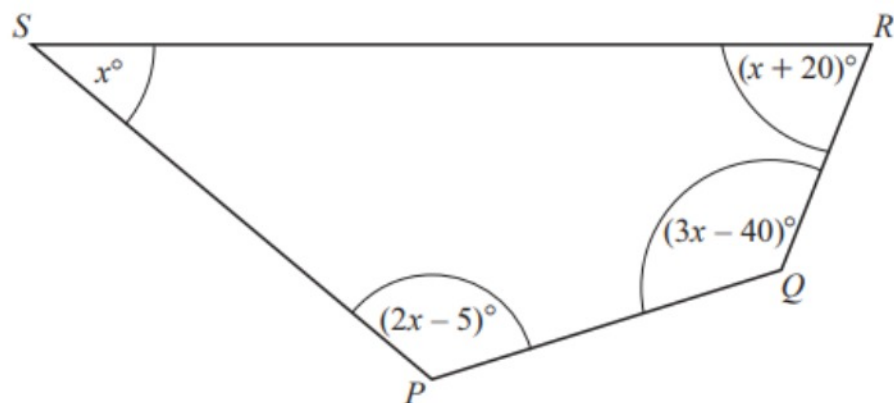
ABV is a straight line and TU is a tangent to the circle at C .

Find the value of x and the value of y .

$x =$

$y =$ [2]

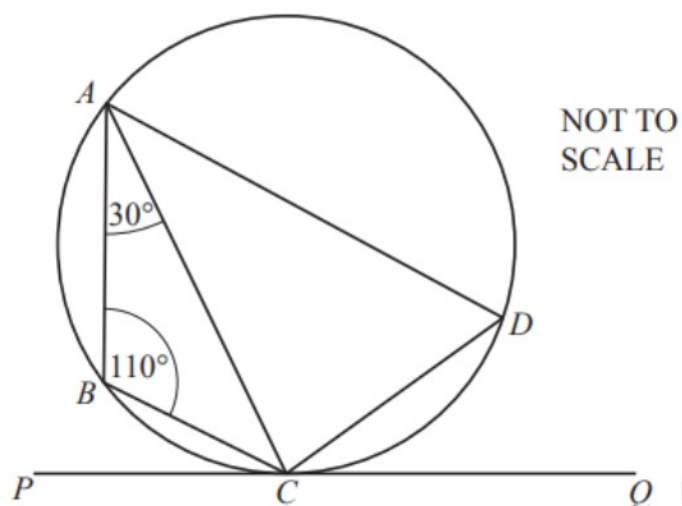
(d)



NOT TO
SCALE

Show that $PQRS$ is a cyclic quadrilateral.

[5]



The points A , B , C and D lie on a circle.
 PCQ is a tangent to the circle at C .
 Angle $ABC = 110^\circ$ and angle $BAC = 30^\circ$.

Find

(a) angle ADC ,

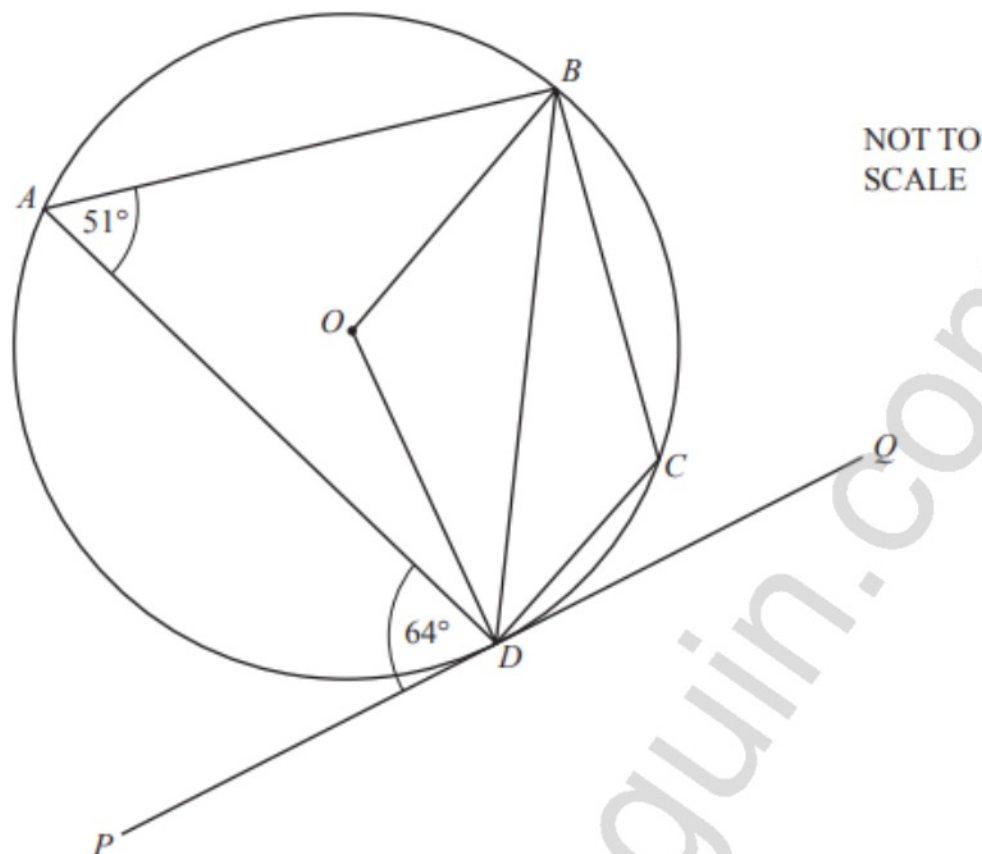
Angle $ADC = \dots\dots\dots$ [1]

(b) angle ACP ,

Angle $ACP = \dots\dots\dots$ [1]

(c) angle PCB .

Angle $PCB = \dots\dots\dots$ [1]



A, B, C and D are points on the circle centre O .
 PDQ is a tangent to the circle at D .
 Angle $BAD = 51^\circ$ and angle $PDA = 64^\circ$.

Find

(a) angle BCD

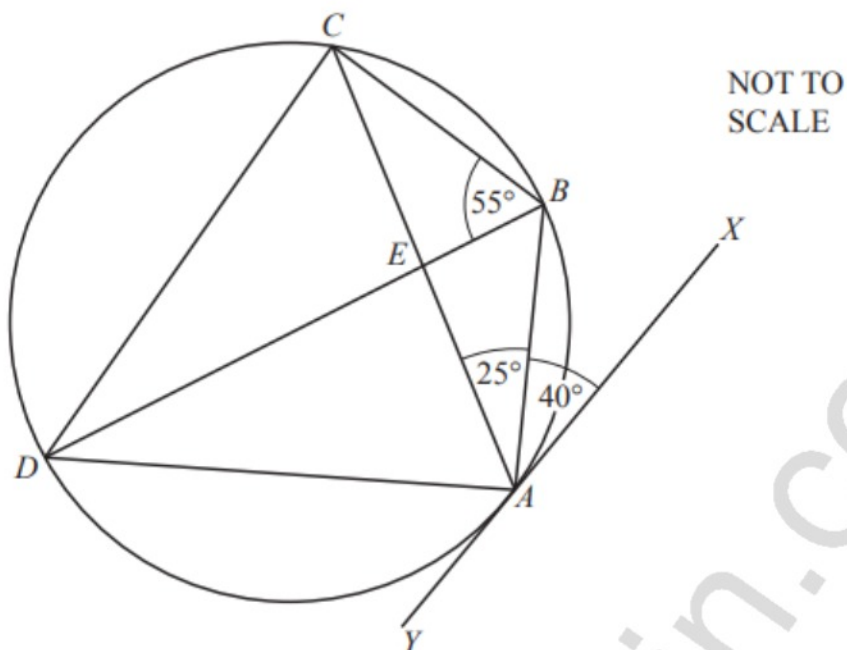
Angle $BCD = \dots\dots\dots$ [1]

(b) angle ABD

Angle $ABD = \dots\dots\dots$ [1]

(c) the obtuse angle BOD .

Angle $BOD = \dots\dots\dots$ [1]



A , B , C and D are four points on a circle.

AC and BD meet at E .

XAY is a tangent to the circle at A .

Find

(a) angle CDB ,

Angle CDB = [1]

(b) angle ACB ,

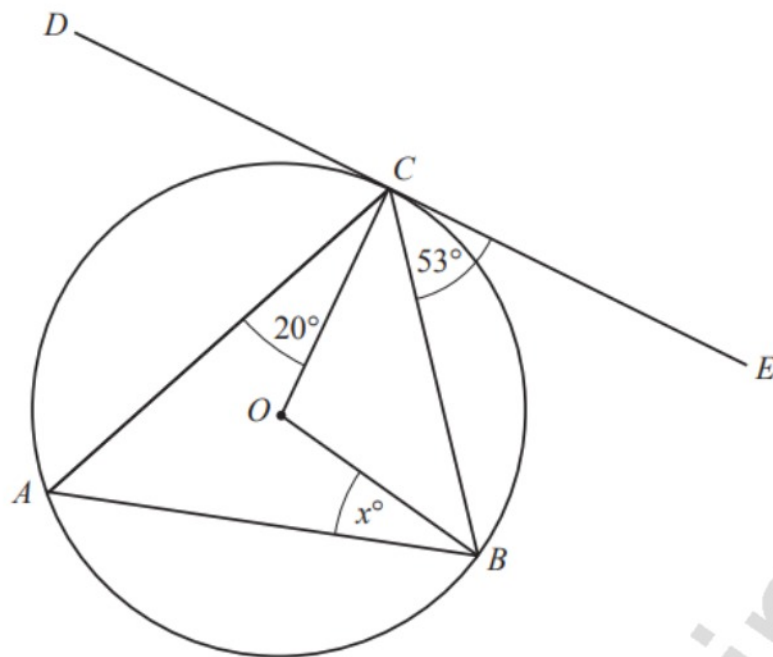
Angle ACB = [1]

(c) angle DCE ,

Angle DCE = [1]

(d) angle YAD .

Angle YAD = [1]



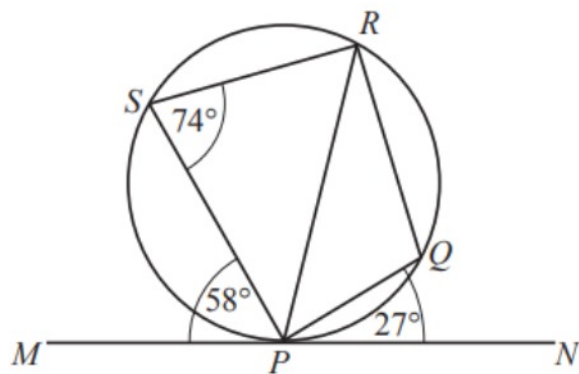
NOT TO
SCALE

A , B and C are points on the circumference of a circle, centre O .
Tangent DE touches the circle at C .
Angle $BCE = 53^\circ$ and angle $ACO = 20^\circ$.

Find the value of x .

$x = \dots\dots\dots$ [3]

(b)



NOT TO
SCALE

P, Q, R and S lie on a circle.

MPN is a tangent to the circle at P .

Angle $MPS = 58^\circ$, angle $PSR = 74^\circ$ and angle $QPN = 27^\circ$.

(i) Find angle PRS .

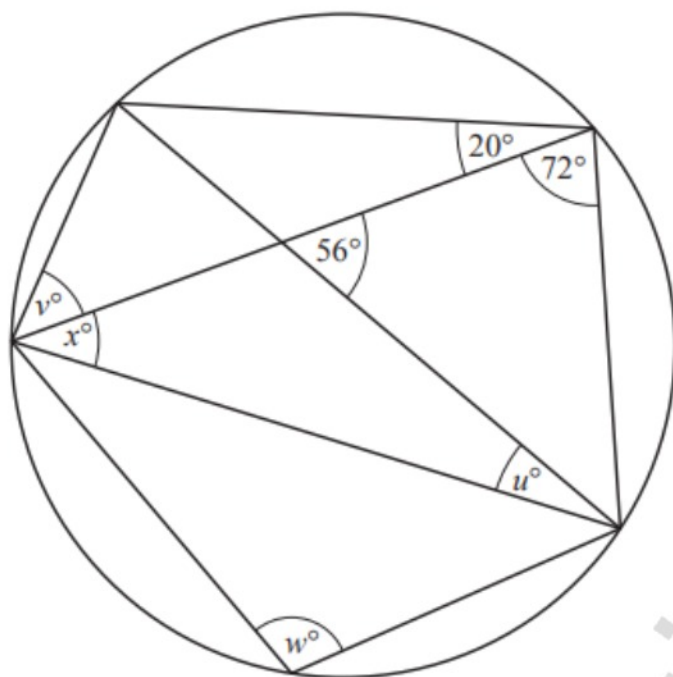
Angle $PRS = \dots\dots\dots$ [1]

(ii) Find angle PQR .

Angle $PQR = \dots\dots\dots$ [1]

(iii) Find angle RPQ .

Angle $RPQ = \dots\dots\dots$ [2]



NOT TO
SCALE

The diagram shows a circle and eight chords.

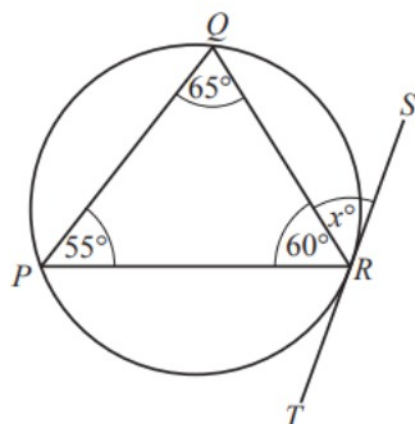
Calculate the values of u , v , w and x .

$u =$

$v =$

$w =$

$x =$ [4]



NOT TO
SCALE

P , Q and R are points on a circle.
 ST is a tangent to the circle at R .

- (a) Write down the value of x .
Give a geometrical reason for your answer.

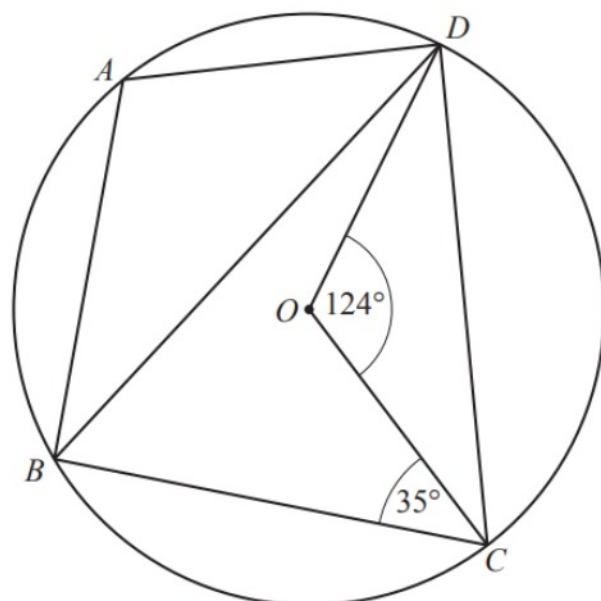
$x =$ because.....
..... [2]

- (b) Another tangent from the point S touches the circle at V .

Give a geometrical reason why triangle SVR is isosceles.

.....
..... [1]

5 (a)



NOT TO
SCALE

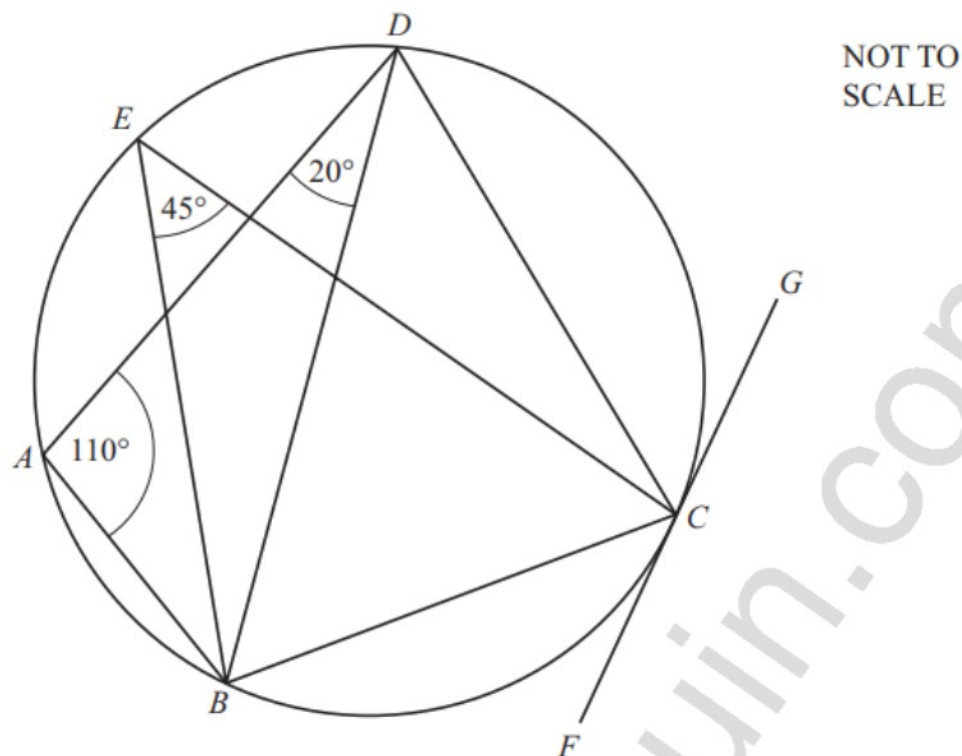
A, B, C and D are points on a circle, centre O .
Angle $COD = 124^\circ$ and angle $BCO = 35^\circ$.

- (i) Work out angle CBD .
Give a geometrical reason for your answer.

Angle $CBD = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

- (ii) Work out angle BAD .
Give a geometrical reason for each step of your working.

Angle $BAD = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$
 $\dots\dots\dots$ [4]



A, B, C, D and E lie on a circle.

FG is a tangent to the circle at C .

Angle $BAD = 110^\circ$, angle $ADB = 20^\circ$ and angle $BEC = 45^\circ$.

(a) Find angle BCD .

Give a geometrical reason for your answer.

Angle $BCD = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

(b) (i) Find angle DBC .

Angle $DBC = \dots\dots\dots$ [2]

(ii) Find angle DCG .

Angle $DCG = \dots\dots\dots$ [1]