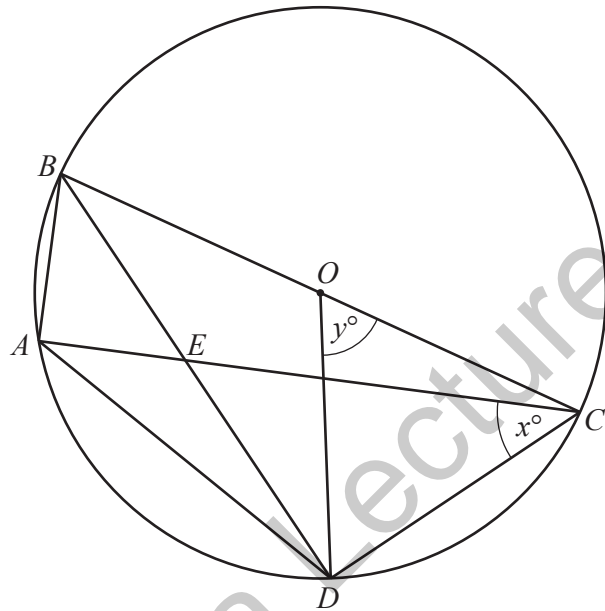


Name:

Section:

Angle Properties of Circles

1



NOT TO
SCALE

A , B , C and D are points on the circumference of a circle, centre O .
 BD and AC intersect at E and BC is a diameter of the circle.
 $\widehat{ACD} = x^\circ$ and $\widehat{DOC} = y^\circ$.

Find an expression, in terms of x and/or y , for

(i) \widehat{DBC} ,

(ii) \widehat{ABD} ,

$\widehat{DBC} = \dots\dots\dots$ [1]

$\widehat{ABD} = \dots\dots\dots$ [1]

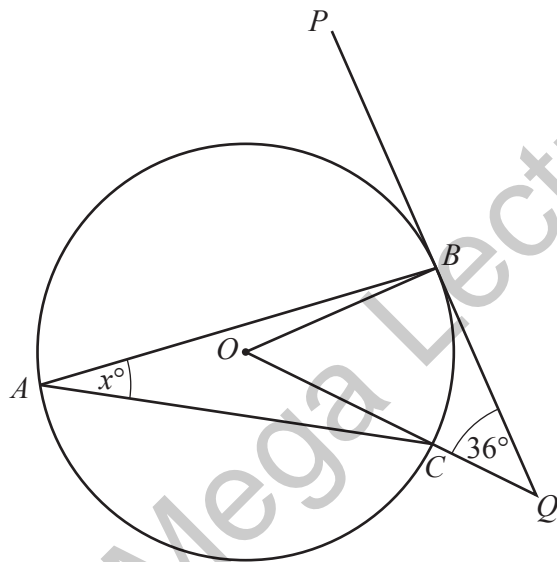
(iii) $\hat{A}ED$,

$\hat{A}ED = \dots\dots\dots$ [2]

(iv) $\hat{B}DA$.

$\hat{B}DA = \dots\dots\dots$ [1]

2

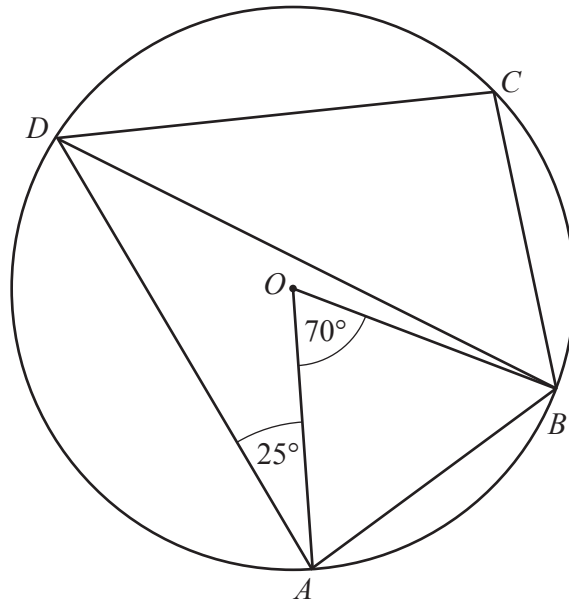


NOT TO
SCALE

A , B and C lie on a circle, centre O .
The line PBQ is a tangent to the circle at B .
 OCQ is a straight line.
 $B\hat{Q}O = 36^\circ$ and $B\hat{A}C = x^\circ$.

Find the value of x .

3



NOT TO SCALE

A, B, C and D are points on the circle, centre O .

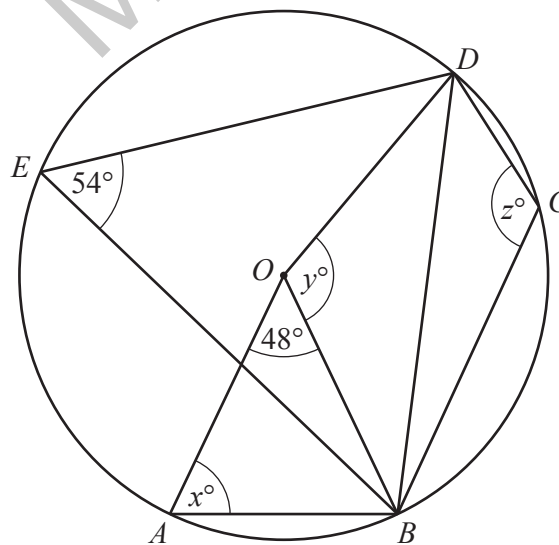
(a) Find \hat{ADB} .

$\hat{ADB} = \dots\dots\dots$ [1]

(b) Find \hat{BCD} .

$\hat{BCD} = \dots\dots\dots$ [2]

4



NOT TO SCALE

In the diagram, A, B, C, D and E lie on the circle, centre O .
 $\hat{AOB} = 48^\circ$, $\hat{DEB} = 54^\circ$.

(a) Find x .

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

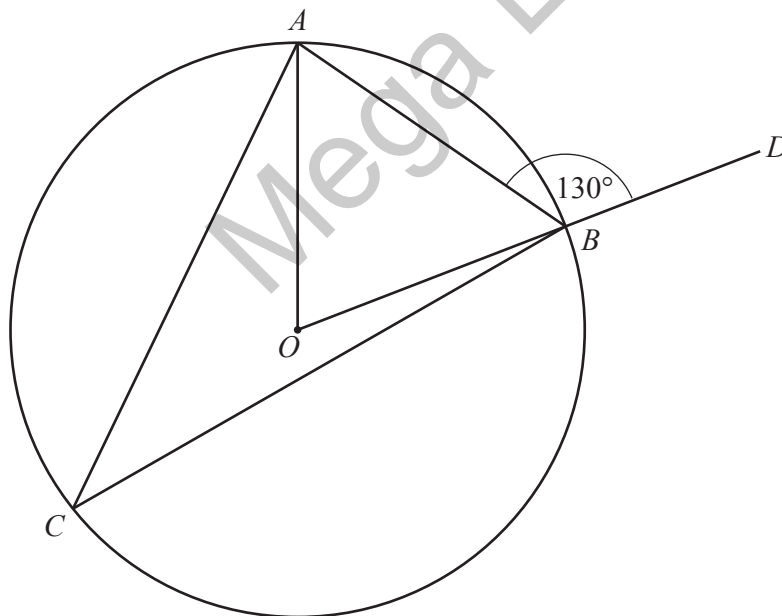
(b) Find y .

$y = \dots\dots\dots$ [1]

(c) Find z .

$z = \dots\dots\dots$ [1]

5 (a)



NOT TO SCALE

A , B and C are points on the circumference of a circle, centre O .
 OBD is a straight line and angle $ABD = 130^\circ$.

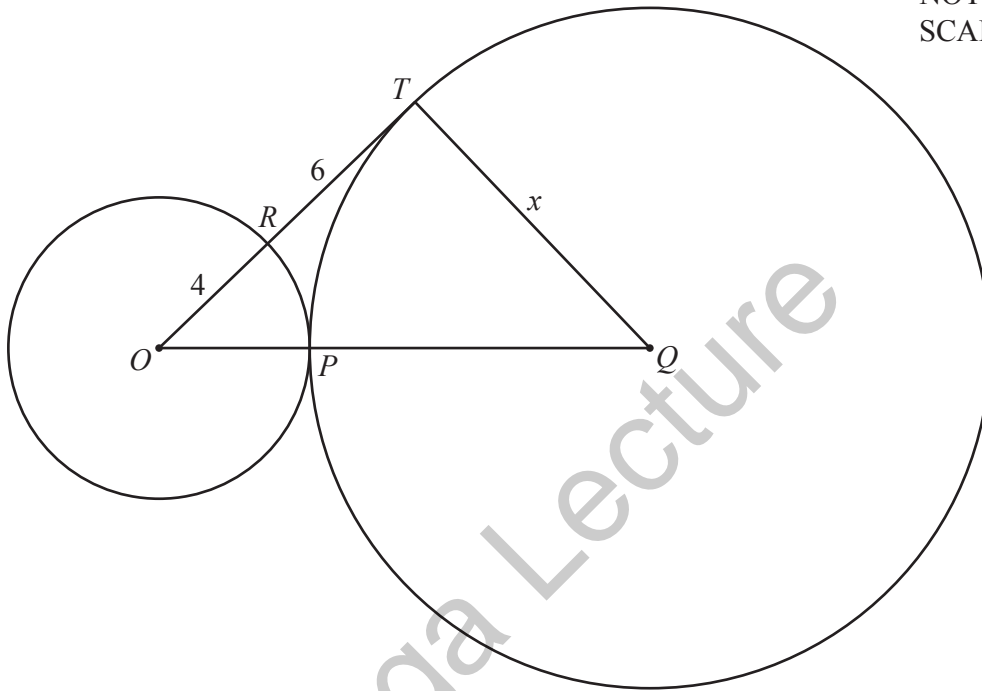
Find angle ACB , giving a reason for each step of your working.

.....
.....
.....

$ACB = \dots\dots\dots [3]$

6

NOT TO SCALE

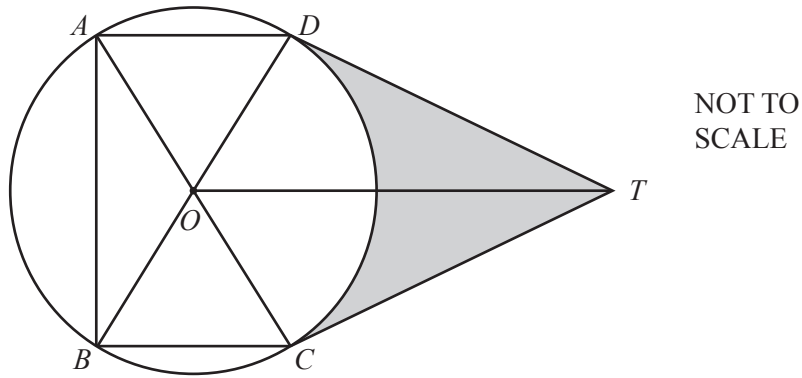


In the diagram, the circles with centres O and Q touch at P where OPQ is a straight line. The line ORT intersects the smaller circle at R and is a tangent to the larger circle at T .

$OR = 4$ cm and $RT = 6$ cm.
The radius of the larger circle is x cm.

Calculate the value of x .

7

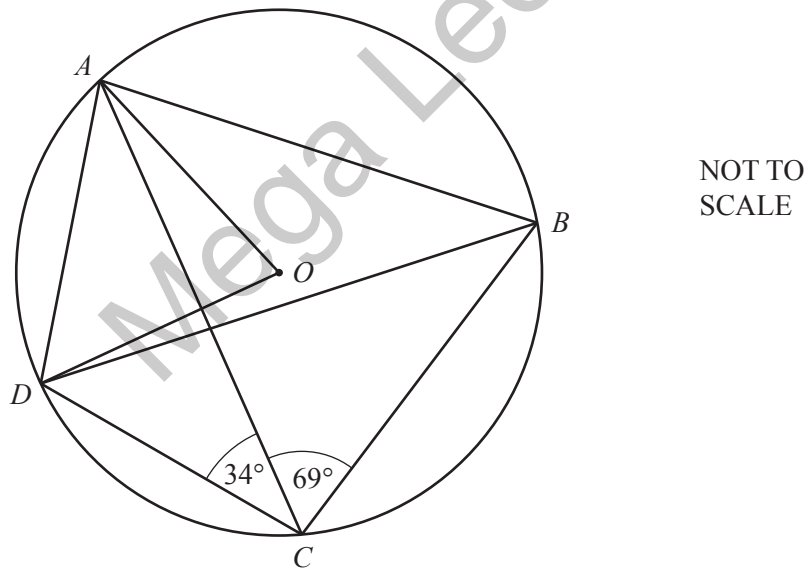


Two tangents, TC and TD , are drawn to the circle in **part (a)**.
The diameter of the circle is 8 cm and $\hat{ABD} = 28^\circ$.

(i) Find $\hat{C\hat{O}D}$.

$\hat{C\hat{O}D} = \dots\dots\dots$ [2]

8



In the diagram, the points A , B , C , and D lie on the circle, centre O .

$\hat{ACB} = 69^\circ$ and $\hat{DCA} = 34^\circ$.

(a) Find \hat{ABD} .

$\hat{ABD} = \dots\dots\dots$ [1]

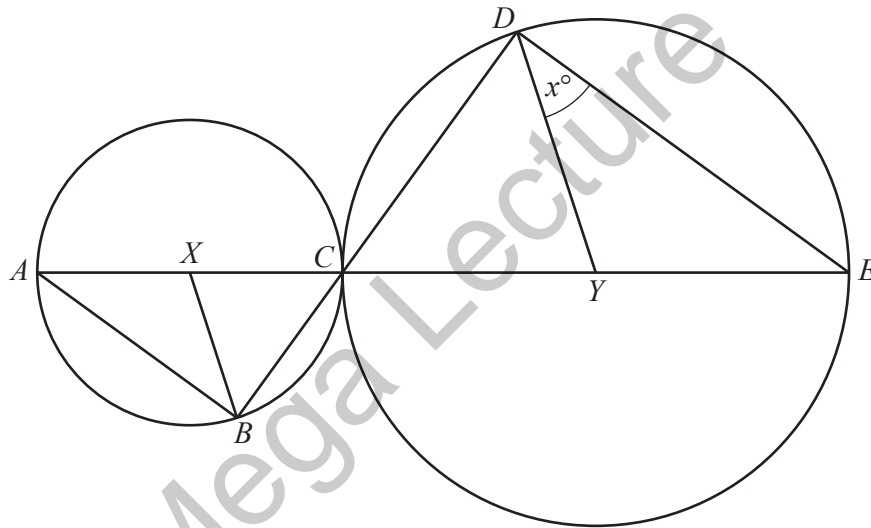
(b) Find \hat{AOD} .

$\hat{AOD} = \dots\dots\dots [1]$

(c) Find \hat{DAB} .

$\hat{DAB} = \dots\dots\dots [1]$

9



The diagram shows two circles that touch at C .
 A, B and C are points on the small circle, centre X .
 C, D and E are points on the large circle, centre Y .
 $AXCYE$ and BCD are straight lines and $\hat{YDE} = x^\circ$.

(a) Prove that triangle BCX is similar to triangle DCY .
 Give a reason for each statement you make.

[3]

(b) Find, in terms of x ,

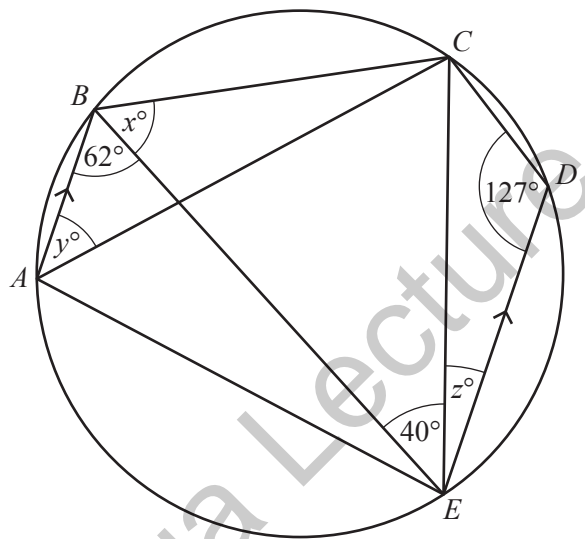
(i) \hat{DCY} ,

Answer $\hat{DCY} = \dots\dots\dots [1]$

(ii) \hat{BXA} .

Answer $\hat{BXA} = \dots\dots\dots [1]$

10



In the diagram, A, B, C, D and E lie on the circle.

AB is parallel to ED .

$\hat{ABE} = 62^\circ$, $\hat{CDE} = 127^\circ$ and $\hat{BEC} = 40^\circ$.

(a) Find x .

Answer $x = \dots\dots\dots [1]$

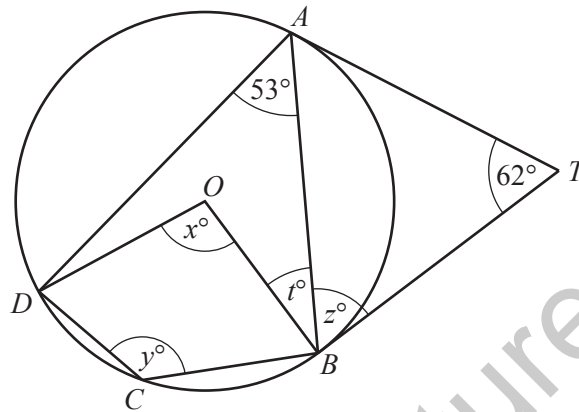
(b) Find y .

Answer $y = \dots\dots\dots [1]$

(c) Find z .

11

Answer $z = \dots\dots\dots$ [1]



The diagram shows a circle, centre O , that passes through A, B, C and D .
 The tangents at A and B meet at T .
 $\hat{ATB} = 62^\circ$ and $\hat{DAB} = 53^\circ$.

(a) Find x .

Answer $x = \dots\dots\dots$ [1]

(b) Find y .

Answer $y = \dots\dots\dots$ [1]

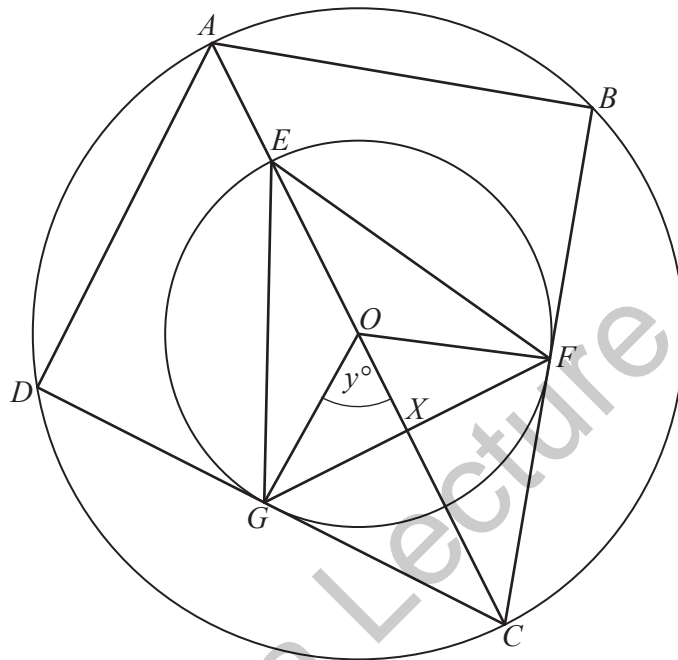
(c) Find z .

Answer $z = \dots\dots\dots$ [1]

(d) Find t .

Answer $t = \dots\dots\dots [1]$

12



The diagram shows two circles each with centre O .
 A, B, C and D are points on the circumference of the large circle.
 E, F and G are points on the circumference of the small circle.
 CGD and CFB are tangents to the small circle.
 Lines $AEOC$ and FG intersect at 90° at X .
 $\hat{GÔX} = y^\circ$.

(a) Find each of these angles, as simply as possible, in terms of y .
 Give reasons for your answers.

(i) $\hat{GÊO}$

Answer $\hat{GÊO} = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots [2]$

(ii) $\hat{GÔX}$

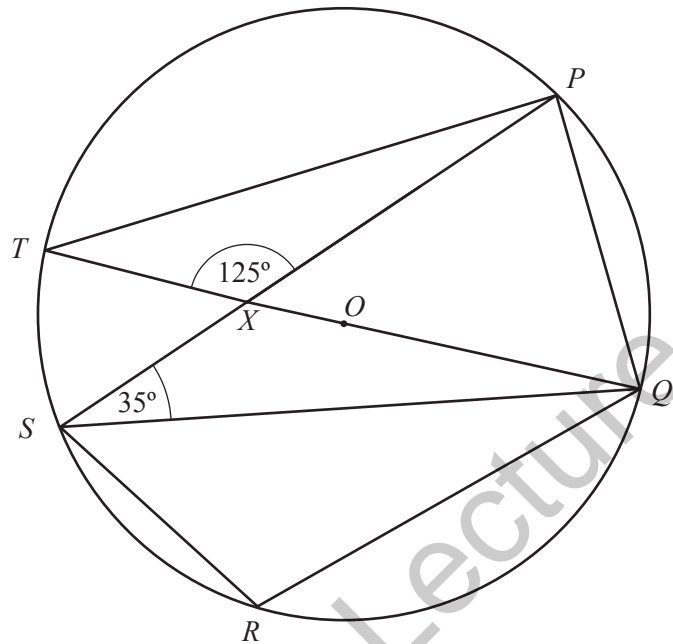
Answer $\hat{GÔX} = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots [2]$

(iii) \hat{DAB}

Answer $\hat{DAB} = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$ [2]

13



In the diagram, P, Q, R, S and T lie on the circle.

QT is a diameter of the circle, centre O .

X is the point of intersection of PS and QT .

$\hat{PXT} = 125^\circ$ and $\hat{PSQ} = 35^\circ$.

(a) Complete the following statement with a geometrical reason.

$\hat{PTQ} = 35^\circ$ because $\dots\dots\dots$ [1]

(b) Find \hat{PQT} .

Answer $\hat{PQT} = \dots\dots\dots$ [1]

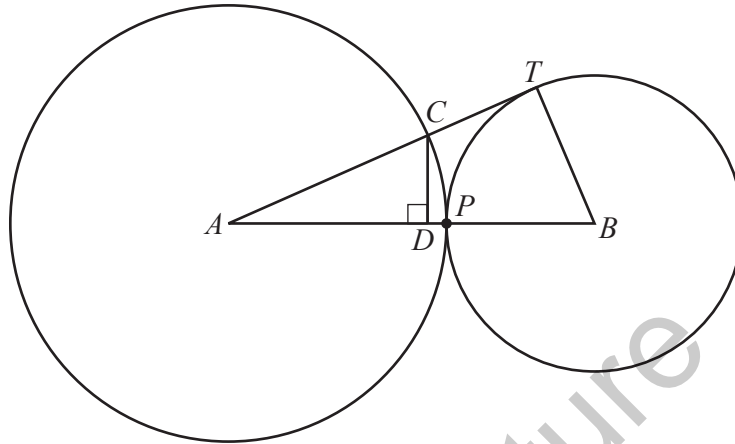
(c) Find \hat{SPQ} .

Answer $\hat{SPQ} = \dots\dots\dots$ [1]

(d) Find \hat{SRQ} .

Answer $\hat{SRQ} = \dots\dots\dots$ [1]

14



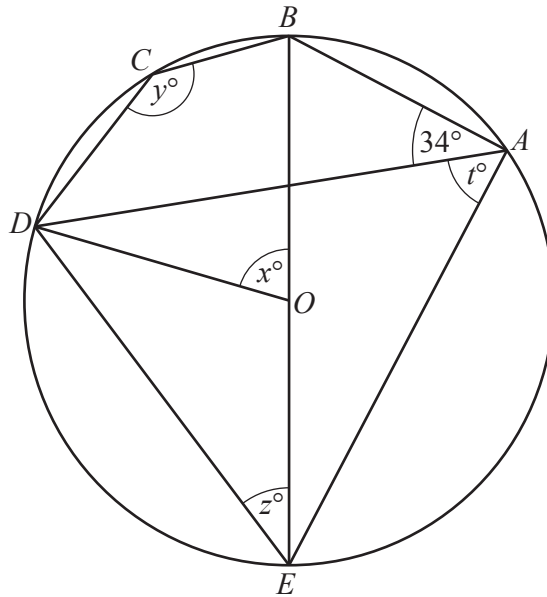
In the diagram, A and B are the centres of two circles that touch at P .
 The line ACT touches the small circle at T and intersects the large circle at C .
 D is the point on AB such that $\hat{CDA} = 90^\circ$.

(a) Complete the following, to show that triangle ACD is similar to triangle ABT .

In triangle ACD and triangle ABT

- angle DAC = angle (same angle)
- angle CDA = angle (.....)
- angle ACD = angle (two angles in a triangle are equal,
so the third angles are equal)

Because the three pairs of angles are equal, the triangles are similar. [2]



In the diagram, A, B, C, D and E lie on the circle, centre O .
 BOE is a straight line.
 $\hat{DAB} = 34^\circ$.

(a) Find x .

Answer $x = \dots\dots\dots$ [1]

(b) Find y .

Answer $y = \dots\dots\dots$ [1]

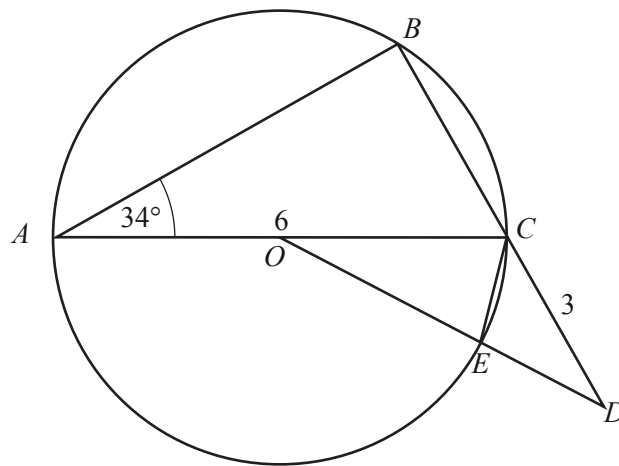
(c) Find z .

Answer $z = \dots\dots\dots$ [1]

(d) Find t .

Answer $t = \dots\dots\dots$ [1]

16 (a)



AC is a diameter of the circle, centre O .
 BCD and OED are straight lines.
 $AC = 6$ cm and $CD = 3$ cm.
 $\hat{BAC} = 34^\circ$.

(i) Explain why $\hat{BCA} = 56^\circ$.

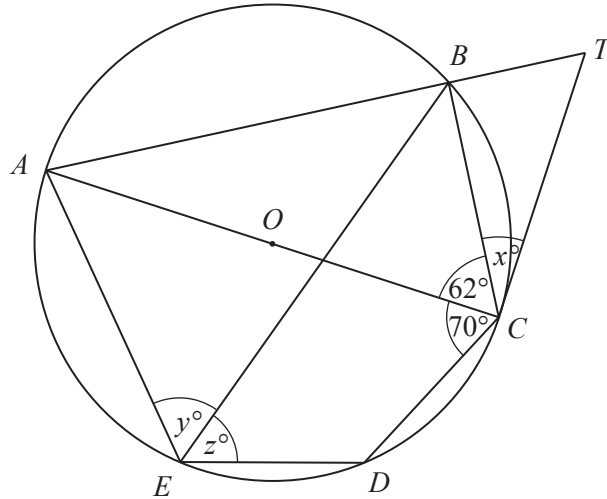
[1]

(ii) Find \hat{COD} .

Answer [2]

(iii) Find \hat{OCE} .

Answer [1]



In the diagram, A, B, C, D and E lie on the circle, centre O .
 AC is a diameter.
 The tangent to the circle at C meets the line AB produced at T .
 $\hat{ACB} = 62^\circ$ and $\hat{ACD} = 70^\circ$.

(a) Find x .

Answer $x = \dots\dots\dots$ [1]

(b) Find y .

Answer $y = \dots\dots\dots$ [1]

(c) Find z .

Answer $z = \dots\dots\dots$ [1]