

5-Aug-24

Objective: Complete **iGCSE questions** on
working with **circle theorems**.

8/5/2024

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9	(a)	65	1	
	(b)	115	1FT	FT 180 – their (a)

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12	(a)	18	2	M1 for $4x + 6x = 180$
	(b)	18	2	M1 for $180 - 6x - 3x$
	(c)	90	3	M2 for $180 - 3x - x - x$ or B1 for $CED = x$ or $DCE = 4x$

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5	(a)	Any 2 of the following Angle $ADX = \text{Angle } BCX$ and same segment oe Angle $DAX = \text{Angle } CBX$ and same segment oe Angle $AXD = \text{Angle } BXC$ and vertically opp oe	2	B1 for one of the three pairs or two pairs of angles without reasons with incorrect reasons
	(b)	7.5 oe	2	M1 for $\frac{2}{3} = \frac{5}{BX}$ oe
	(c)	67.2 or 67.20 to 67.21 nfw	3	M2 for $[\cos =] \frac{2^2 + 5^2 - 4.61^2}{2 \times 2 \times 5}$ or M1 for $4.61^2 = 2^2 + 5^2 - 2 \times 2 \times 5 \cos$

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9	$[p =] 75$ $[q =] 105$	2	B1 for each
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12(a)	35	1	
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Question	Answer	Marks	Partial Marks
12(b)	130	1	FT 165 – <i>their</i> (a)
			8/5/2024
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			8/5/2024
5(a)	[Angle between] tangent [and] radius / diameter [=90] oe	1	
5(b)(i)	134	2	M1 for $360 - 90 - 90 - 46$ oe
5(b)(ii)	23	2	M1 for $(180 - \text{their (i)}) \div 2$ oe
5(b)(iii)	67	2	FT (<i>their</i> (i)) $\div 2$ M1 for (<i>their</i> (i)) $\div 2$ oe
5(b)(iv)	113	2	FT $180 - \text{their (iii)}$ or $(360 - \text{their (i)}) \div 2$ M1 for $180 - \text{their (iii)}$ or $(360 - \text{their (i)}) \div 2$ oe
5(c)	44	3	M2 for $180 - 67 - 23 - 23 - 23$ oe or $360 - 226 - 67 - 23$ oe or B1 for angle $OBC = 23$ or 226 seen

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7	$[x =] 70$ $[y =] 110$	2	B1 for each If 0 scored SC1 for <i>their x + their y</i>
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11(a)(i)	Angle X is common oe $\angle XCB = \angle XAD$ (angles in same segment) oe	2	B1 for each If 0 scored SC1 for 2 pairs of angles reasons
11(a)(ii)	$\frac{XA}{XC} = \frac{XD}{XB}$ oe	1	
11(b)	8	2	M1 for $12 \times 7 = XA \times 6$ soi (implied)
11(c)(i)	$\frac{49}{36}$ oe	1	
11(c)(ii)	$\frac{64}{25}$ oe	1	

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16	$[y =] 135 + 0.5x$	3	M2 for $180 - y = 45 - 0.5x$ or M1 for $90 - x$ as angle at centre
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15	$[a =] 25$ $[b =] 100$	2	B1 for each
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9(a)	82 Opposite angles of a cyclic quadrilateral [add up to 180] oe	2	B1 for each
9(b)	No and any mention of Alternate Segment Theorem oe	1	

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9	55	2	B1 for angle $C = 70$ or M1 for $\frac{1}{2}(180 - \text{their } C)$
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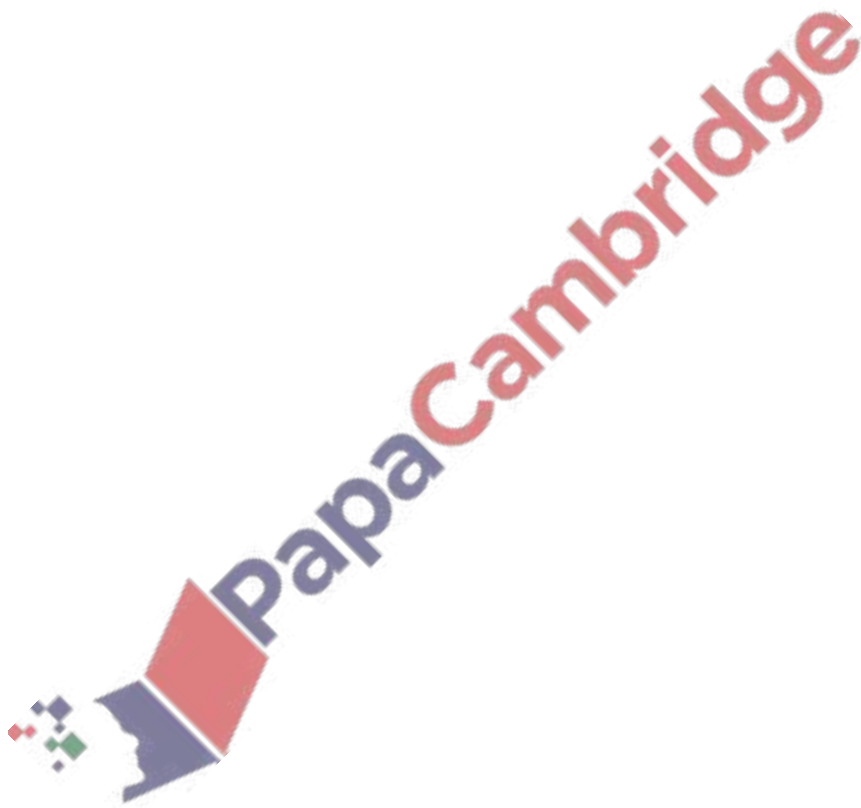
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15	110
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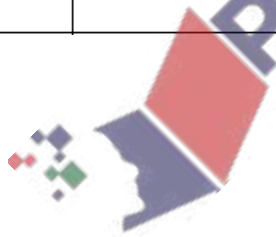
2	B1 for angle $RST = 70$ or angle $RTA = 110$
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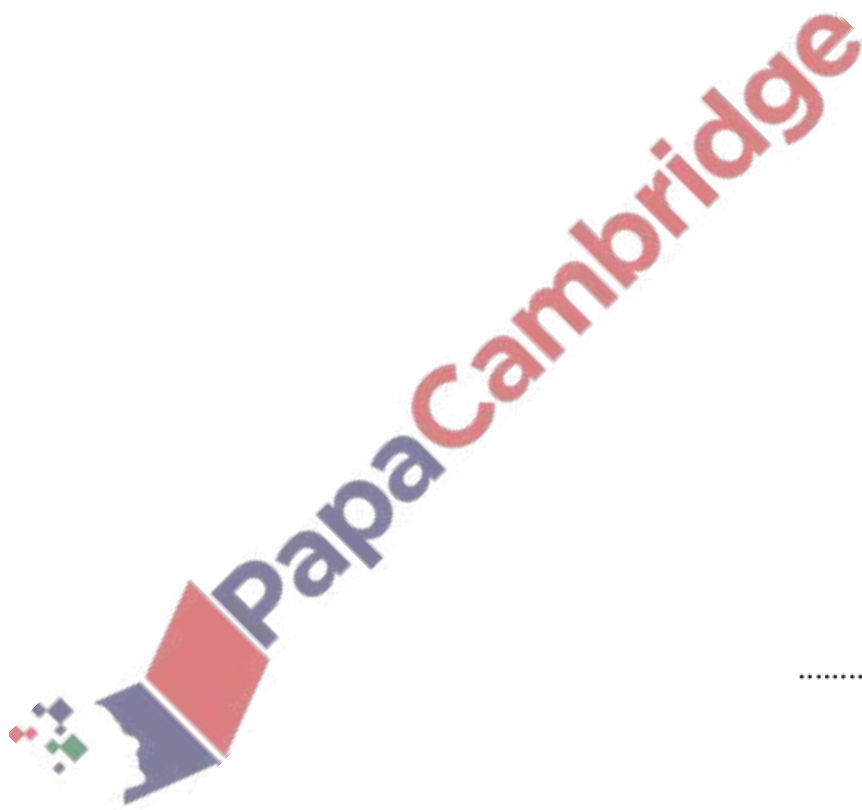


Question	Answer	Marks	Partial Marks
10(a)(i)	42	1	
10(a)(ii)	71	1	
10(a)(iii)	109	1	FT 180 – their(ii)
10(a)(iv)	29	1	
10(a)(v)	38	1	
10(b)	74.2 or 74.21 to 74.25...	5	<p>M1 for $[AB =] 2 \times 11 \cos 19$ oe</p> <p>M2 for $[AD =] \frac{\text{their} AB \times \sin(\text{their} 42)}{\sin(\text{their} 109)}$</p> <p>or $[BD =] \frac{\text{their} AB \times \sin(\text{their} 29)}{\sin(\text{their} 109)}$</p> <p>or M1 for $\frac{AD}{\sin \text{their} 42} = \frac{\text{their} AB}{\sin \text{their} 109}$</p> <p>or $\frac{BD}{\sin \text{their} 29} = \frac{\text{their} AB}{\sin \text{their} 109}$</p> <p>and M1 for $[\text{Area} =] 0.5 \times \text{their} AB \times \text{their} AD \times \sin(\text{their} 29)$</p> <p>or $[\text{Area} =] 0.5 \times \text{their} AB \times \text{their} BD \times \sin(\text{their} 42)$</p> <p>or $[\text{Area} =] 0.5 \times \text{their} AD \times \text{their} BD \times \sin(\text{their} 109)$</p>

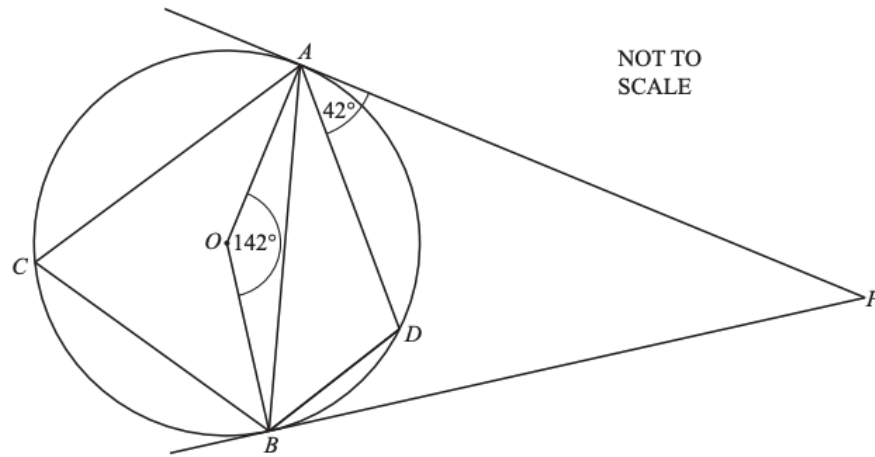


(b) The radius of the circle is 11 cm.

Find the area of triangle ABD .



..... cm^2 [



A, D, B and C lie on a circle, centre O .
 AP is a tangent to the circle at A and BP is a tangent to the circle at B .
 Angle $AOB = 142^\circ$ and angle $DAP = 42^\circ$.

(a) Find the value of

(i) angle ABD ,

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

(ii) angle ACB ,

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

(iii) angle ADB ,

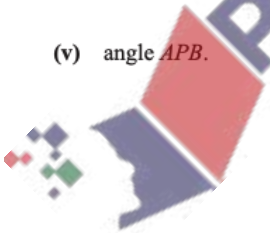
Angle $ADB = \dots\dots\dots$ [1]

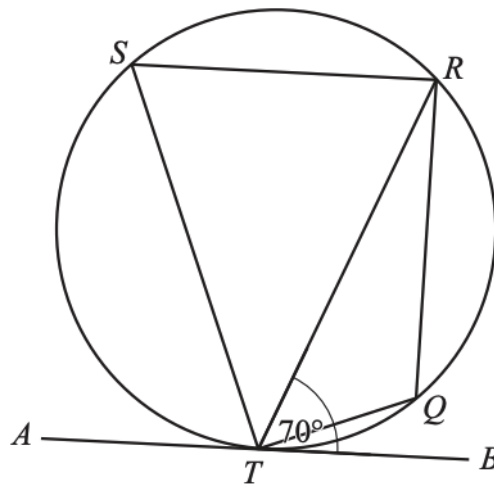
(iv) angle BAD ,

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

(v) angle APB .

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



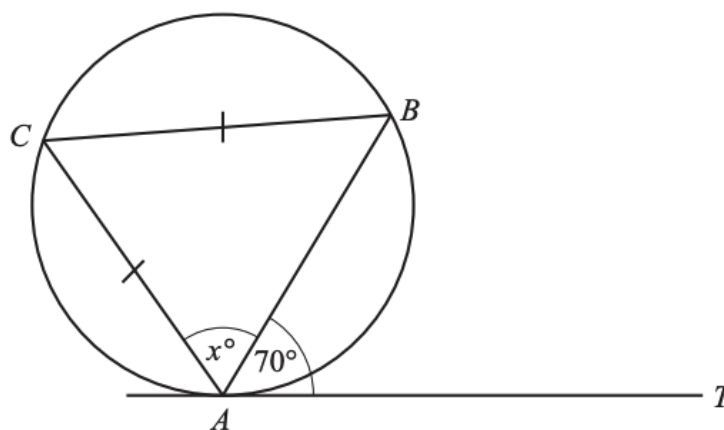
NOT TO
SCALE

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 $RQT = \dots\dots\dots$



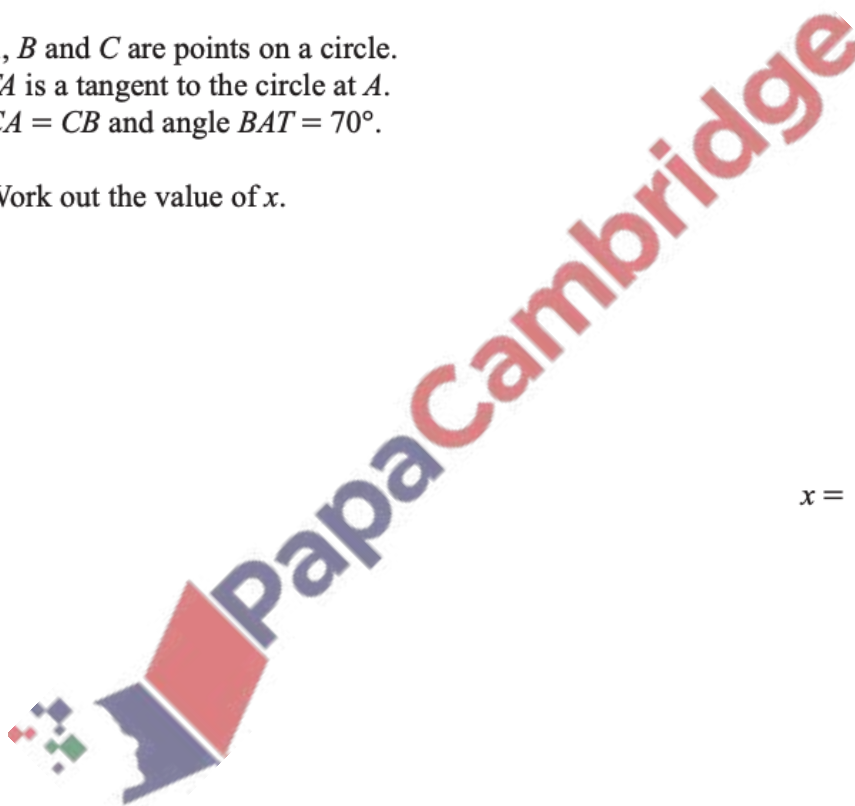


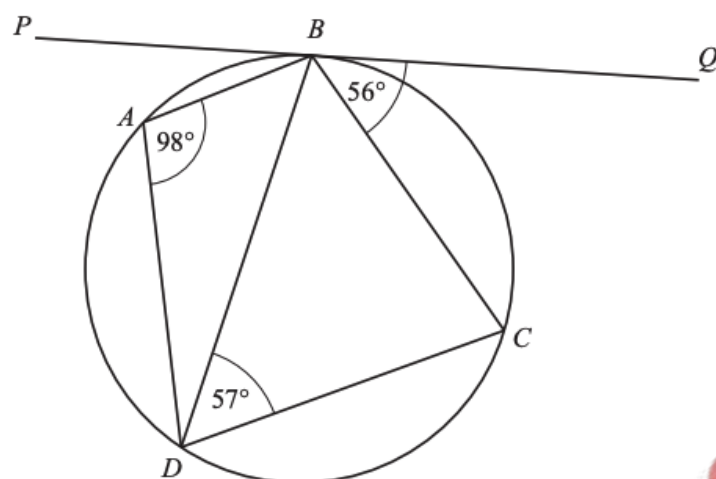
NOT TO
SCALE

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 .

$x =$





NOT TO
SCALE

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.

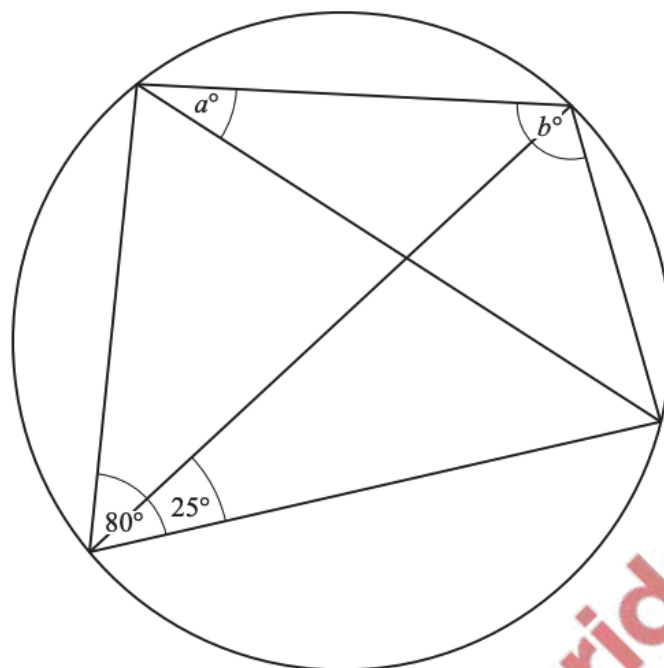
Angle DCB = because

..... [2]

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

..... because

..... [1]



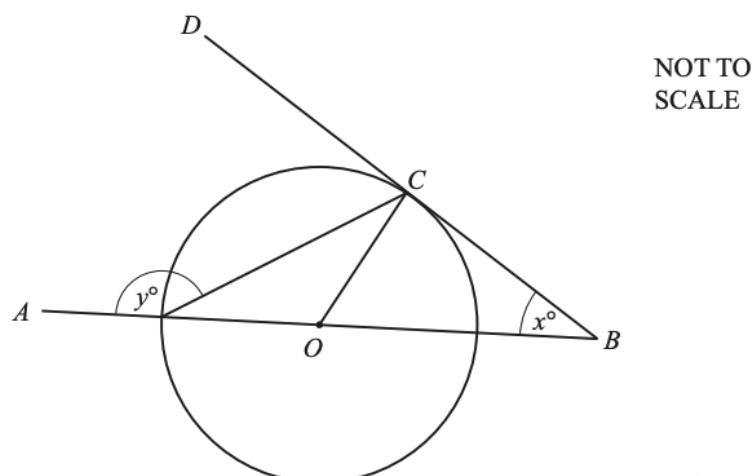
NOT TO
SCALE

The diagram shows a cyclic quadrilateral.

Find the value of a and the value of b .

$a =$

$b =$ [2]



The diagram shows a circle, centre O .
 AOB is a straight line.
 BCD is a tangent to the circle at C .

Find y in terms of x .

$y = \dots\dots\dots$ [3]

8(a)	[Angle between] tangent and radius/diameter	1	
8(b)(i)	108	2	M1 for $ADO = 36$ soi

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Question	Answer	Marks	Partial Marks
8(b)(ii)	54	2	M1 for $\frac{their(b)(i)}{2}$ or $90 - 36$ or $\frac{180 -}{2}$
8(b)(iii)	90	1	
8(b)(iv)	18	1	
8(b)(v)	48	1	



(iii) angle ABC ,

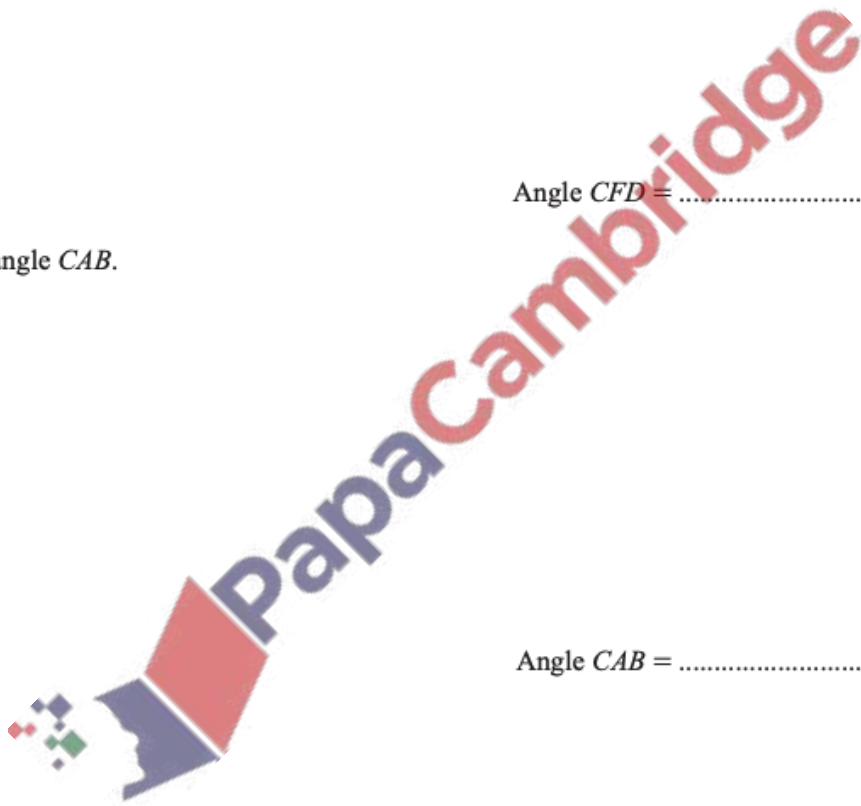
Angle $ABC = \dots\dots\dots$ [1]

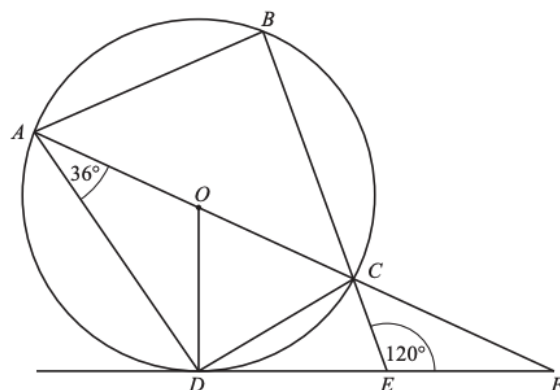
(iv) angle CFD ,

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

(v) angle CAB .

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





NOT TO
SCALE

A, B, C and D lie on a circle, centre O .
 DEF is a tangent to the circle at D .
 $AOCF$ and BCE are straight lines.

(a) Complete the statement.

Angle $ODE = 90^\circ$ because [1]

(b) Find the value of

(i) angle AOD ,

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

(ii) angle ODC ,

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

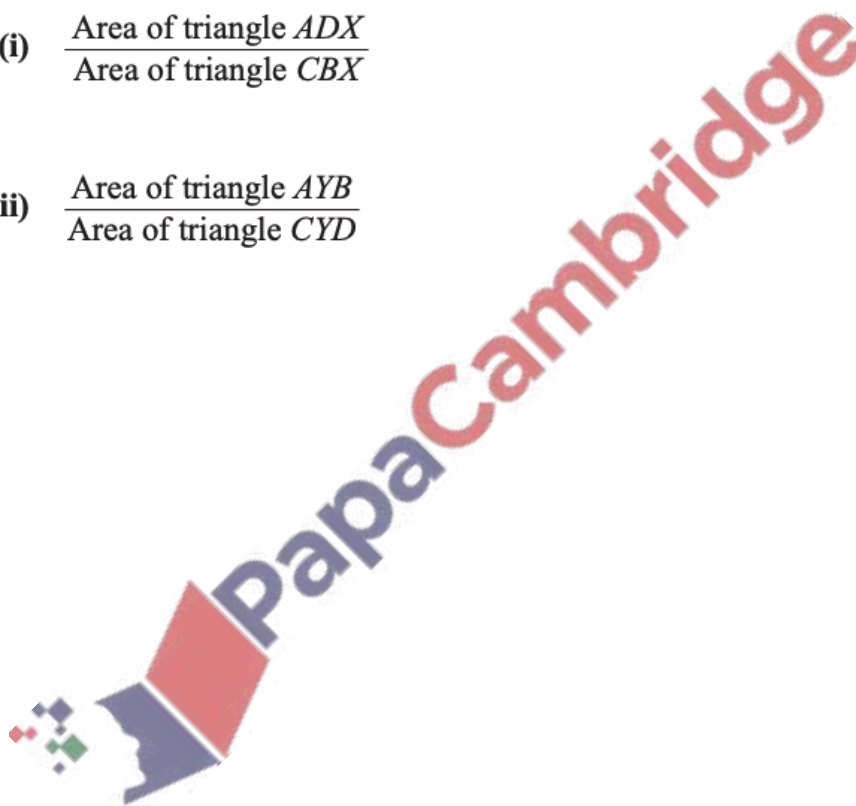
- (b) $XB = 6$ cm, $DC = 5$ cm and $XD = 7$ cm.

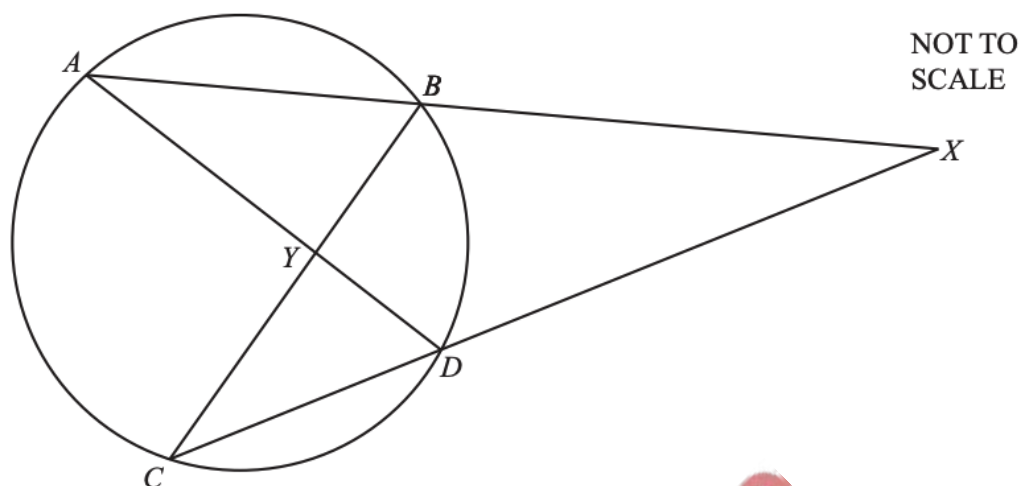
Calculate the length AB .

- (c) Find the value of these fractions.

(i) $\frac{\text{Area of triangle } ADX}{\text{Area of triangle } CBX}$

(ii) $\frac{\text{Area of triangle } AYB}{\text{Area of triangle } CYD}$





A , B , C and D are points on the circle.
 ABX , CDX , AYD and BYC are straight lines.

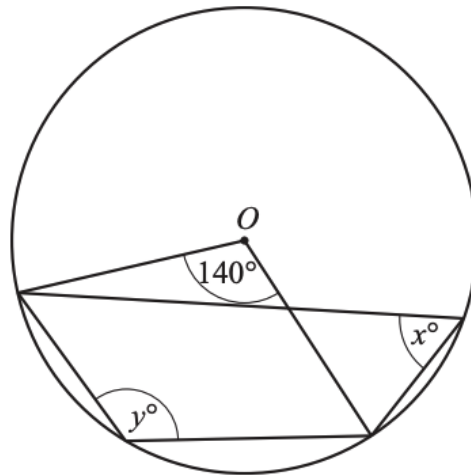
- (a) (i) Explain why triangle ADX is similar to triangle CBX .

.....

 [2]

- (ii) Use **part (a)(i)** to show that $XA \times XB = XC \times XD$





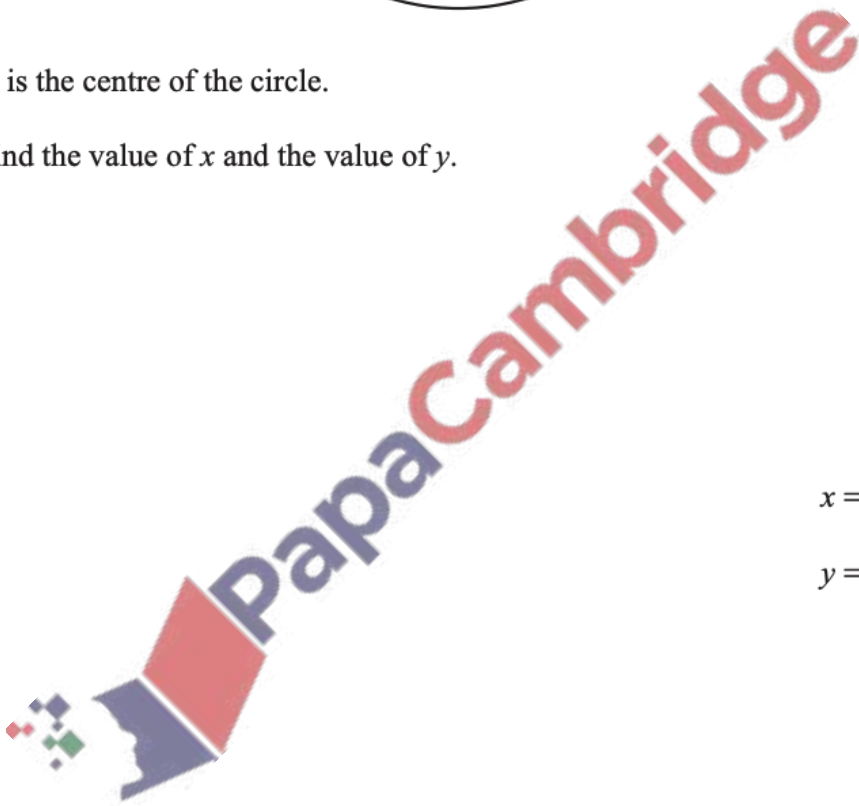
NOT TO
SCALE

O is the centre of the circle.

Find the value of x and the value of y .

$x =$

$y =$



(iii) angle ACB ,

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

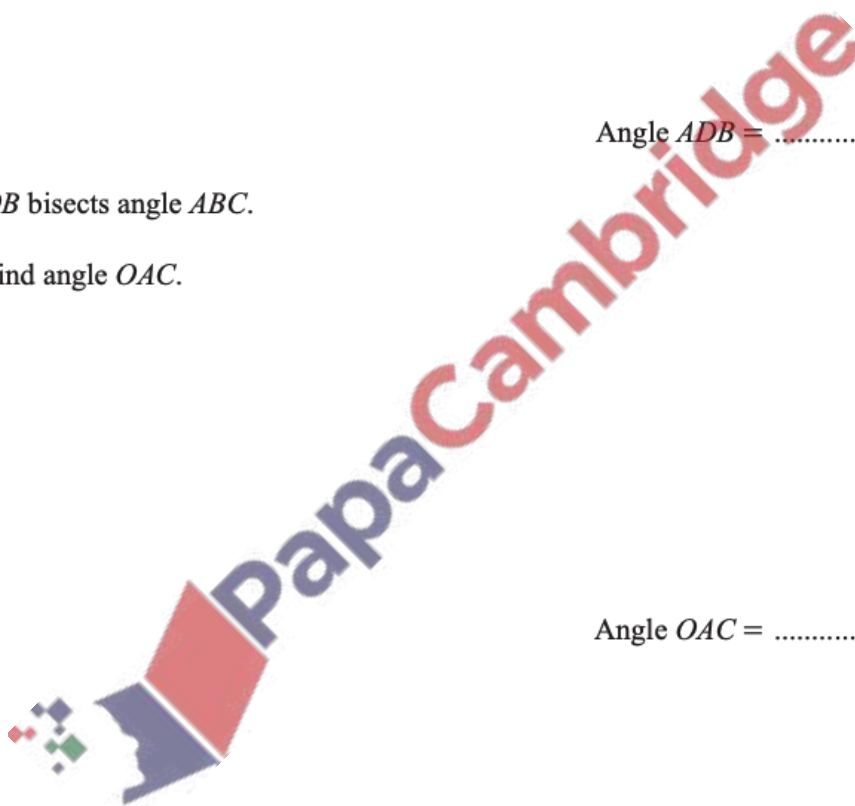
(iv) angle ADB .

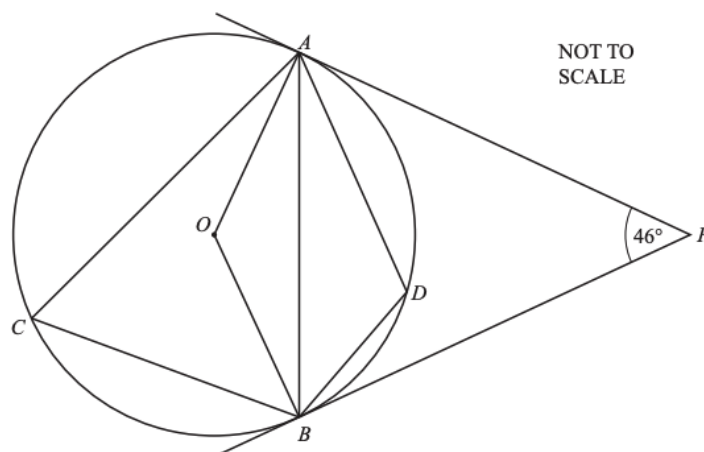
Angle $ADB = \dots\dots\dots$ [2]

(c) OB bisects angle ABC .

Find angle OAC .

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





A, B, C and D lie on a circle, centre O .
 AP and BP are tangents to the circle.
 Angle $APB = 46^\circ$.

- (a) Complete the statement.

Angle $OAP = 90^\circ$ because
 [1]

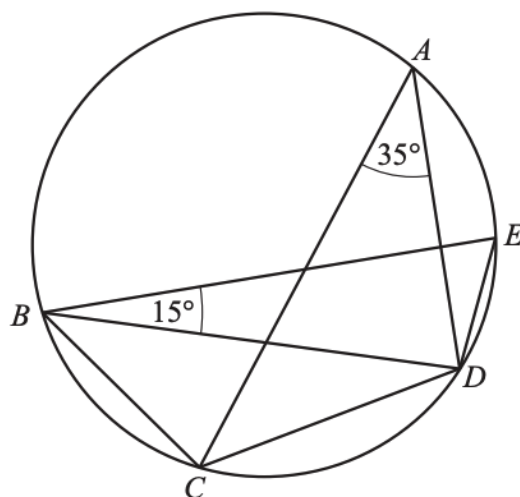
- (b) Find the value of

- (i) angle AOB ,

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

- (ii) angle OAB ,

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



NOT TO
SCALE

A, B, C, D and E are points on the circle.
Angle $CAD = 35^\circ$ and angle $EBD = 15^\circ$.

Find

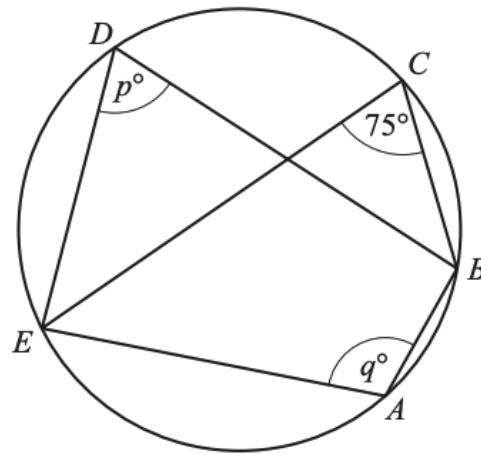
(a) angle CBD ,

(b) angle CDE .

Angle $CBD = \dots\dots\dots$

Angle $CDE = \dots\dots\dots$





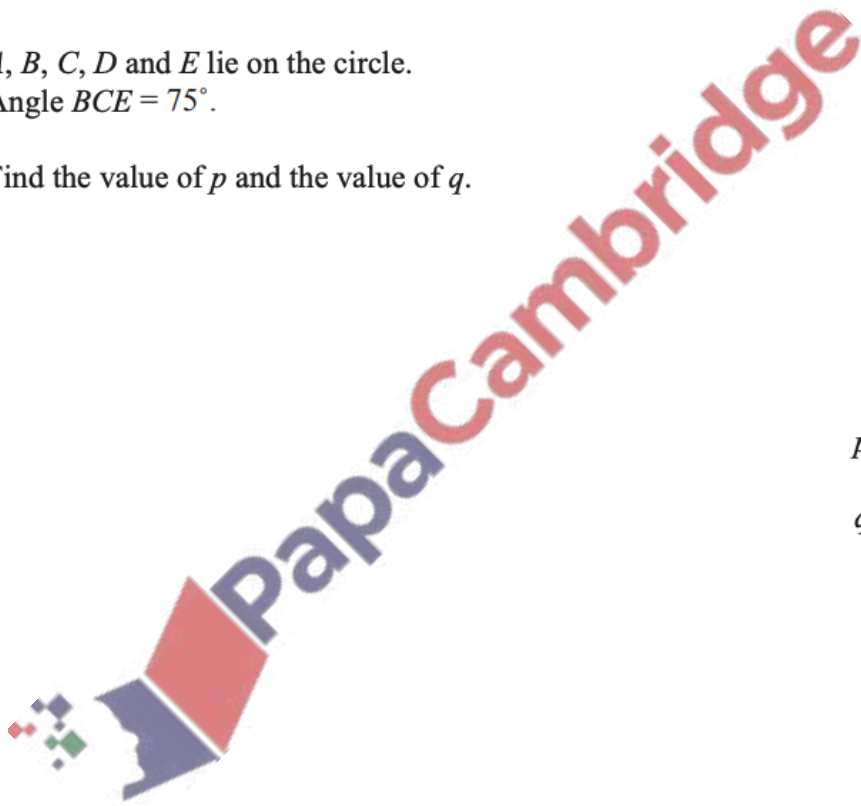
NOT TO
SCALE

A, B, C, D and E lie on the circle.
Angle $BCE = 75^\circ$.

Find the value of p and the value of q .

$p = \dots\dots\dots$

$q = \dots\dots\dots$



- (b) $AX = 5$ cm, $DX = 2$ cm and $CX = 3$ cm.

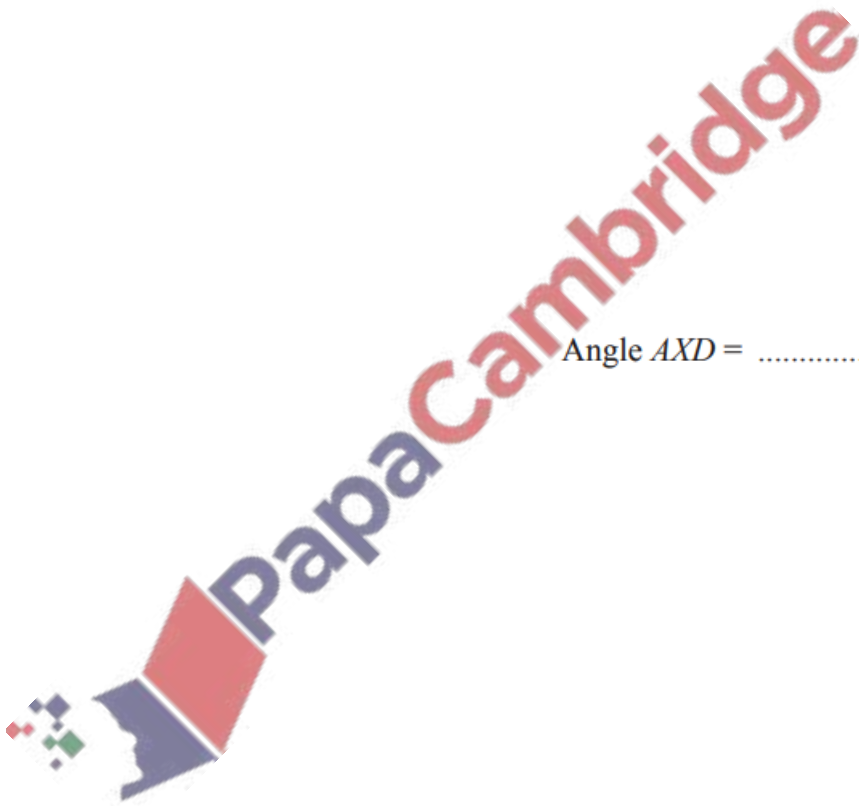
Calculate BX .

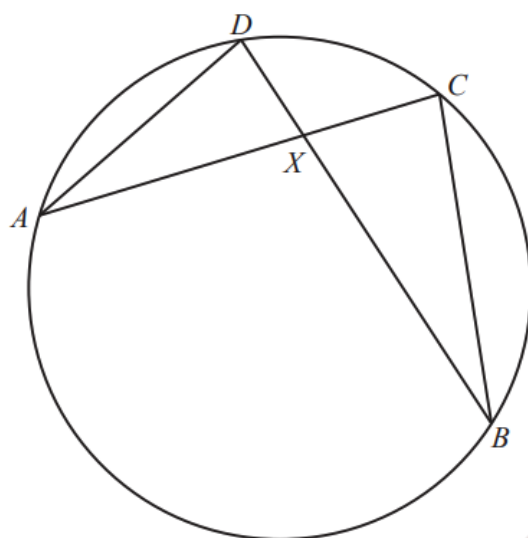
$BX =$

- (c) $AD = 4.61$ cm.

Calculate angle AXD .

Angle $AXD =$

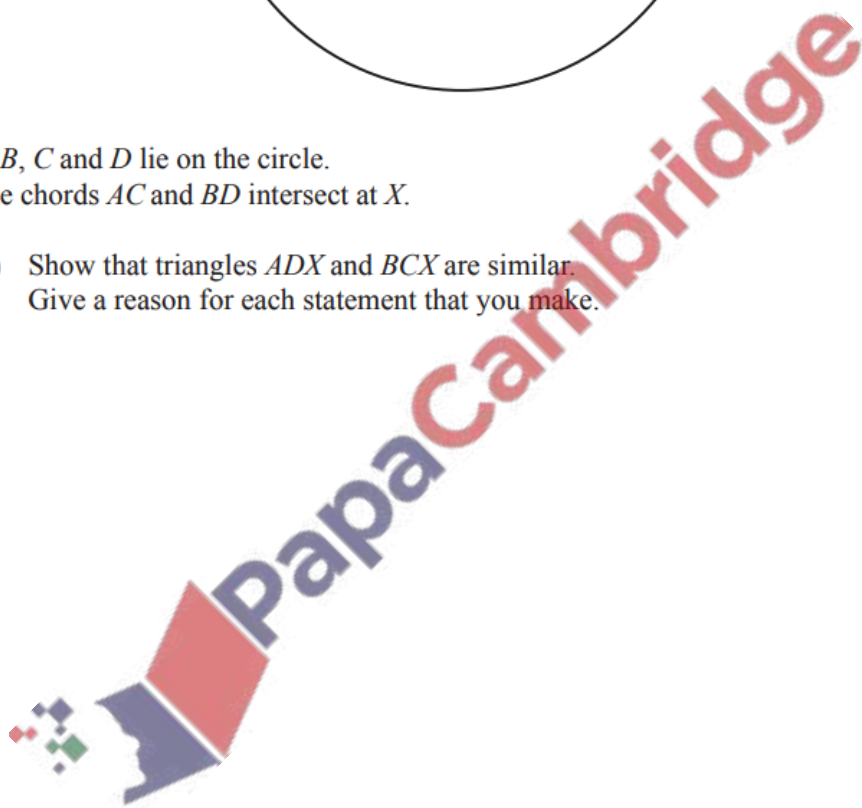


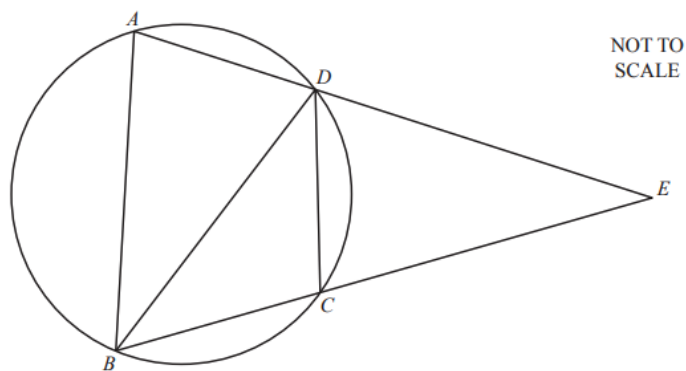


NOT TO
SCALE

A , B , C and D lie on the circle.
The chords AC and BD intersect at X .

- (a) Show that triangles ADX and BCX are similar.
Give a reason for each statement that you make.





A, B, C and D lie on a circle.
 ADE and BCE are straight lines that intersect at E .
 $BD = DE$, angle $BAD = 4x$, angle $BCD = 6x$ and angle $BDC = 3x$.

Find

(a) x ,

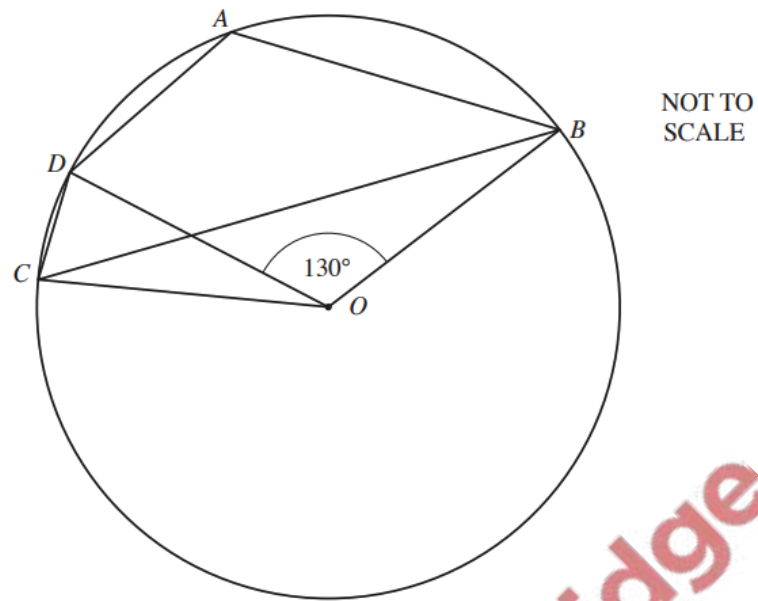
$x = \dots\dots\dots$ [2]

(b) angle CBD ,

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

(c) angle CDE .

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



A, B, C and D are points on the circle centre O .
Angle $BOD = 130^\circ$.

(a) Find angle DCB .

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

(b) Find angle BAD .

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

