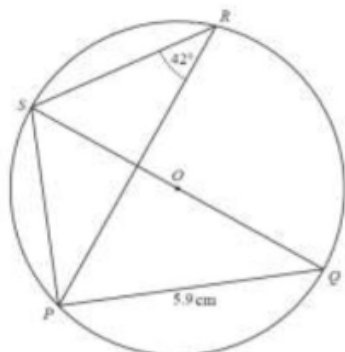
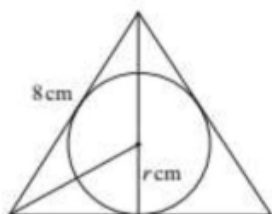


1.  $P, Q, R$  and  $S$  are points on a circle, centre  $O$ .  $QS$  is a diameter.  
Angle  $PRS = 42^\circ$  and  $PQ = 5.9$  cm.  
Calculate the circumference of the circle. [5]



0580/41/O/N/21 Q5)(b)

2. The three sides of an equilateral triangle are tangents to a circle of radius  $r$  cm.



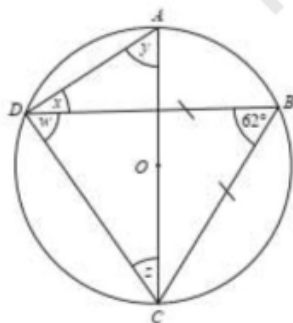
The sides of the triangle are 8cm long.

Calculate the value of  $r$ .

Show that it rounds to 2.3, correct to 1 decimal place. [3]

0580/43/M/J/14 Q10(a)

3.  $AC$  is a diameter.



$BD = BC$  and angle  $DBC = 62^\circ$ .



Work out the values of  $w$ ,  $x$ ,  $y$  and  $z$ .

Give a reason for each of your answers.

$w = \dots\dots$  because..... [2]

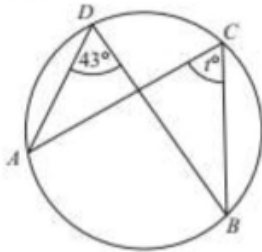
$x = \dots\dots$  because..... [2]

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

$z = \dots\dots$  because..... [2]

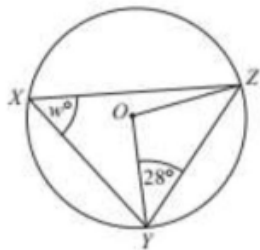
**0580/41/O/N/10 Q7 (a)**

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



Find the value of  $t$ . [1]

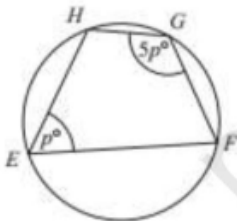
- (ii) X, Y and Z lie on the circumference of the circle, centre O.



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.

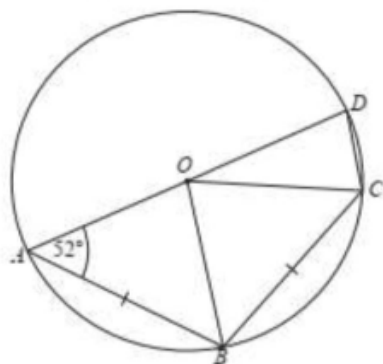


Find the value of  $p$ , giving a reason for your answer. [3]

**0580/42/O/N/15 Q6**



5. (a) The diagram shows points A, B, C and D on the circumference of a circle, centre O.

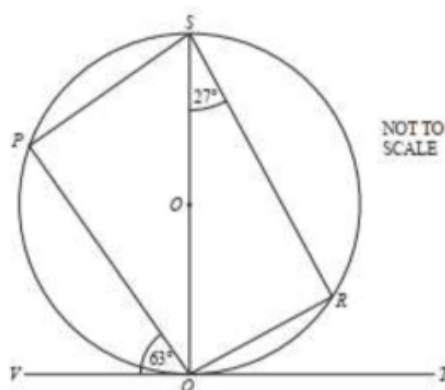


AD is a straight line,  $AB = BC$  and angle  $OAB = 52^\circ$ .

Find angle ADC. [3]

- (b) 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 = .....  $^\circ$  because

.....  
 ..... [2]

- (ii) Angle SQP = .....  $^\circ$  because

.....  
 ..... [2]

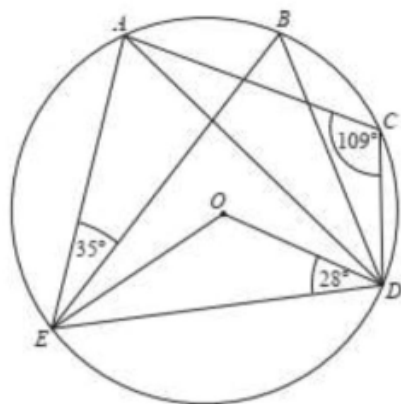
- (iii) Part (c)(i) and part (c)(ii) show that

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

**0580/42/F/M/17 Q6)**



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



Angle  $AEB = 35^\circ$ , angle  $ODE = 28^\circ$  and angle  $ACD = 109^\circ$ .

(i) Work out the following angles, giving reasons for your answers.

(a) Angle  $EBD = \dots\dots\dots$  because

$\dots\dots\dots$  [3]

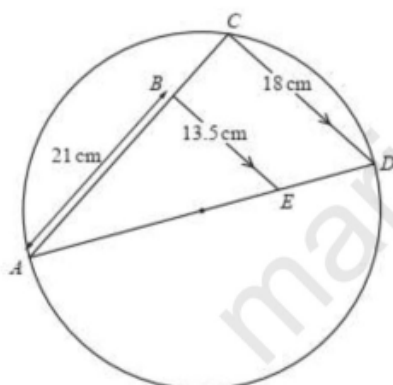
(b) Angle  $EAD = \dots\dots\dots$  because

$\dots\dots\dots$  [2]

(ii) Work out angle  $BEO$ . [3]

**0580/42/M/J/18 Q9**

7. C lies on a circle with diameter AD.



NOT TO  
SCALE

B lies on AC and E lies on AD such that BE is parallel to CD.

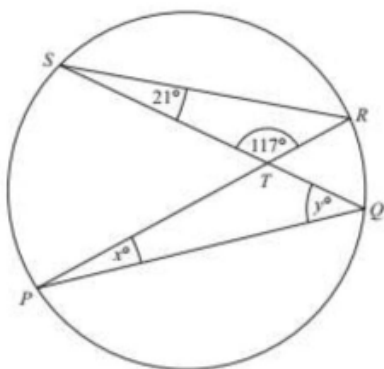
$AB = 21\text{cm}$ ,  $CD = 18\text{cm}$  and  $BE = 13.5\text{cm}$ .

Work out the radius of the circle [5]

**0580/21/M/J/20 Q13)**



8. a) The chords PR and SQ of the circle intersect at T.



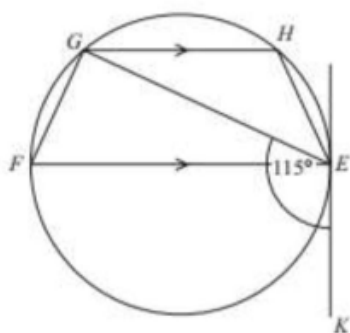
Angle RST =  $21^\circ$  and angle STR =  $117^\circ$ .

(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.



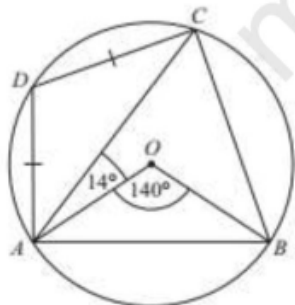
EF is a diameter of the circle.

KE is the tangent to the circle at E.

GH is parallel to FE and angle KEG =  $115^\circ$

Calculate angle GEH [4]

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



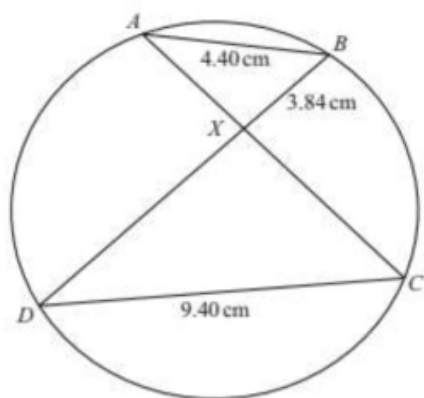
Angle AOB =  $140^\circ$  and angle OAC =  $14^\circ$ .

AD = DC. Calculate angle ACD. [5]

0580/42/M/J/14 Q6



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



AC and BD intersect at X.

(a) Give a reason why angle BAX is equal to angle CDX. [1]

(b)  $AB = 4.40$  cm,  $CD = 9.40$  cm and  $BX = 3.84$  cm.

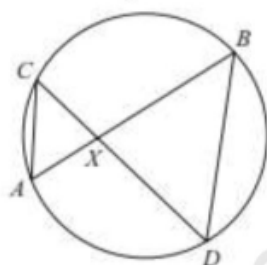
(i) Calculate the length of CX. [2]

(ii) The area of triangle ABX is  $5.41 \text{ cm}^2$ .

Calculate the area of triangle CDX. [2]

**0580/23/O/N/11 Q22)**

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



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

[2]

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

(a) Find DX. [2]

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

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

**0580/41/O/N/14 Q7**



11. (a) Points A, C and D lie on a circle centre O.

BA and BC are tangents to the circle.

Angle  $ABC = 32^\circ$  and angle  $DAB = 143^\circ$ .

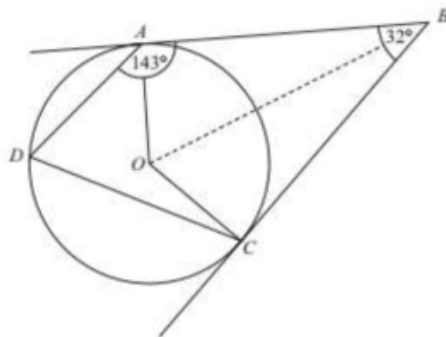
(i) Calculate angle AOC in quadrilateral AOCB. [2]

(ii) Calculate angle ADC. [1]

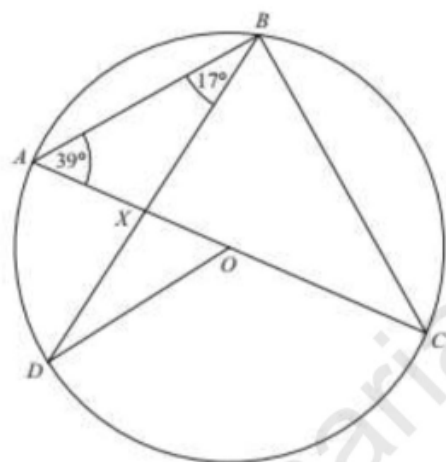
(iii) Calculate angle OCD. [2]

(iv)  $OA = 6$  cm.

Calculate the length of AB. [3]



(b) A, B, C and D are on the circumference of the circle centre O.



AC is a diameter.

Angle  $CAB = 39^\circ$  and angle  $ABD = 17^\circ$ .

(i) Calculate angle ACB. [2]

(ii) Calculate angle BXC. [2]

(iii) Give the reason why angle DOA is  $34^\circ$ . [1]

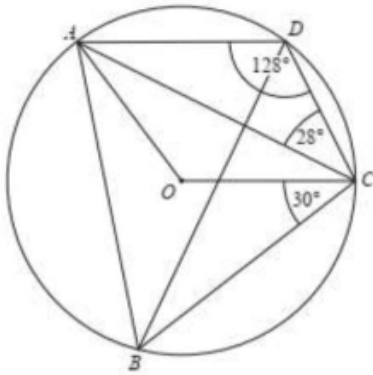
(iv) Calculate angle BDO. [1]

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

0580/42/O/N/12 Q4)



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



Angle  $ADC = 128^\circ$ , angle  $ACD = 28^\circ$  and angle  $BCO = 30^\circ$ .

(i) Show that obtuse angle  $AOC = 104^\circ$ .

Give a reason for each step of your working. [3]

(ii) Find angle  $BAO$ . [2]

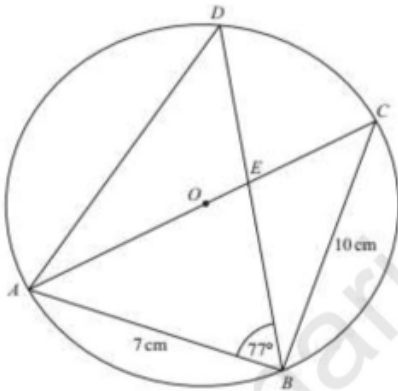
(iii) Find angle  $ABD$ . [1]

(iv) The radius,  $OC$ , of the circle is 9.6 cm.

Calculate the total perimeter of the sector  $OADC$ . [3]

**0580/43/O/N/19 Q6**

13. A, B, C and D lie on a circle, centre O.



$AB = 7$  cm,  $BC = 10$  cm and angle  $ABD = 77^\circ$ .

$AOC$  is a diameter of the circle.

(a) Find angle  $ABC$ . [1]

(b) Calculate angle  $ACB$  and show that it rounds to  $35^\circ$  correct to the nearest degree. [2]

(c) Explain why angle  $ADB =$  angle  $ACB$ . [1]

(d) (i) Calculate the length of  $AD$  [3]

(ii) Calculate the area of triangle  $ABD$ . [2]

(e) The area of triangle  $AED = 12.3$  cm<sup>2</sup>, correct to 3 significant figures.

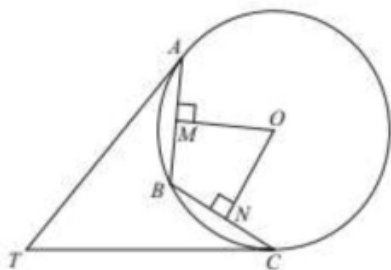
Use similar triangles to calculate the area of triangle  $BEC$ . [3]

**0580/41/M/J/12 Q4)**





14. A, B and C lie on the circle centre O, radius 8.5cm.



$$AB = BC = 10.7\text{cm.}$$

OM is perpendicular to AB and ON is perpendicular to BC.

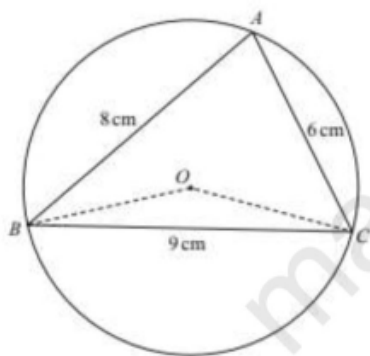
- (a) Calculate the area of the circle. [2]
- (b) Write down the length of MB. [1]
- (c) Calculate angle MOB and show that it rounds to  $39^\circ$  correct to the nearest degree. [2]
- (d) Using angle MOB =  $39^\circ$ , calculate the length of the major arc AC. [3]

0580/42/M/J/13 Q4)

15. The circle, centre O, passes through the points A, B and C.

In the triangle ABC, AB = 8 cm, BC = 9 cm and CA = 6 cm.

- (a) Calculate angle BAC and show that it rounds to  $78.6^\circ$ , correct to 1 decimal place. [4]



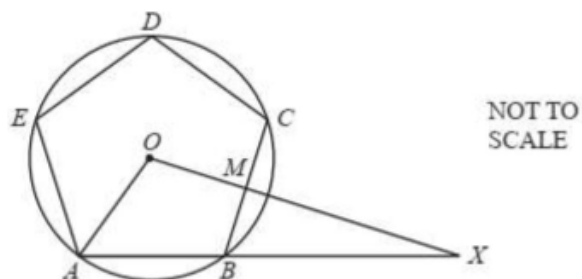
- (b) M is the midpoint of BC.

- (i) Find angle BOM. [1]
- (ii) Calculate the radius of the circle and show that it rounds to 4.59 cm, correct to 3 significant figures. [3]
- (c) Calculate the area of the triangle ABC as a percentage of the area of the circle. [4]

0580/43/M/J/11 Q4



16. (a) Show that each interior angle of a regular pentagon is  $108^\circ$ .



(b) The diagram shows a regular pentagon ABCDE.

The vertices of the pentagon lie on a circle, centre O, radius 12cm.

M is the midpoint of BC.

(i) Find BM. [3]

(ii) OMX and ABX are straight lines.

(a) Find BX. [3]

(b) Calculate the area of triangle AOX. [3]

0580/42/M/J/19 Q7)

## Answers

1) 24.94 to 24.95	9) (a) Angles in same segment (b)(i)8.2 (ii)24.7
2) 2.30	10) (a) (i) Angle ACD = angle ABD Angle CAB = angle CDB Angle AXC = angle DXB all angles are equal (a) 10 (b) 5.92 (c) 58.7
3) $w = 59$ (angle in) isosceles (triangle) , $x = 31$ (angle in) semicircle (= 90) oe , $y = 62$ (angles in) same segment or (on) same arc (arc =) , $z = 28$ (angles in) triangle (= 180)	11) (a) (i) 148 (ii) 74 (iii)21 (iv) 20.9 (b) (i) 51 (ii) 56 (iii) Angle at centre twice oe angle at circumference (iv) 22 (v) 68.3
4) (a)(i)43 (ii)62 Isosceles triangle or OYZ is isosceles Angle at centre is twice angle at circumference (iii) 30 [Opposite angles of a]cyclic quadrilateral [add up to 180°]	12) (a) (i)52 x 2 (Opposite angles in cyclic quad oe Angles in opposite segments) and Angle at centre=2 x angle at circumference (ii) 22 (iii)28 (iv) 36.6
5) (b)76 (c)(i) 90 angle in semicircle (ii) 27 tangent [perpendicular to] radius (iii)rectangle	13) (a) 90 (c) same segment (d) (i) 11.9 (ii) 38.6 (e) 8.69
6) (a)(i)(a) 62 and Isosceles [triangle] and Angle at centre is twice angle at circumference oe (i)(b) 62 and [Angles in] same segment oe or angle at centre is twice angle at circumference oe (a)(ii) 8	14) (a) 227 or 226.95 to 227.01 (b) 5.35 (c) 39.0 (d) 30.2 or 30.3
7) 16.6	15) )(a) 78.58 (b) (i) 78.6 (ii) 4.590 (c) 35.5
8) (a) (i) [ $x =$ ] 21, [ $y =$ ] 42 (ii) 3.79 (b) 40 (c) 38	16) (b)(i) 7.05 (b)(ii)(a) 22.8 (b)(ii)(b) 179