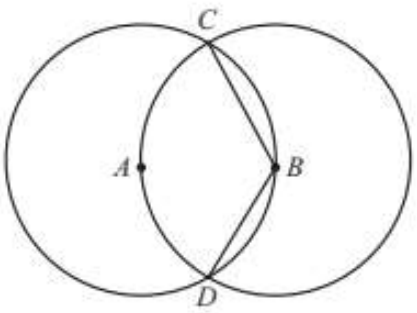
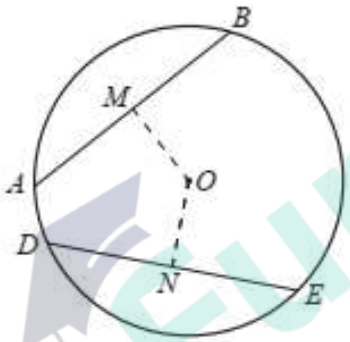


1. Two circles, centres A and B, are each of radius 8cm and intersect at C and D. Each circle passes through the centre of the other circle.
   (a) Explain why angle CBD is 120°. [1]



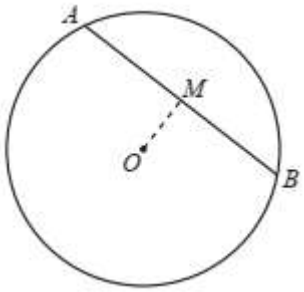

**0580/21/O/N/14 Q19(a)**

2. The diagram shows a circle, centre O.




AB and DE are chords of the circle.
M is the mid-point of AB and N is the mid-point of DE.
AB = DE = 9cm and OM = 5cm. Find ON. [1]
**0580/22/O/N/18 Q2)**

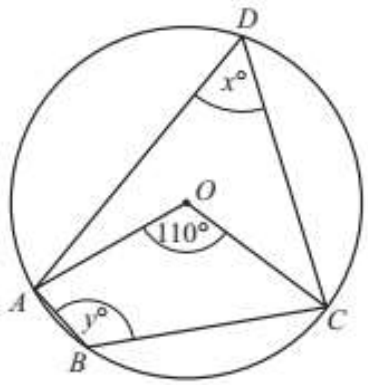
3. The diagram shows a circle, centre O.




AB is a chord of length 24cm.
M is the mid-point of AB and OM = 5cm.
Calculate the radius of the circle. [3]
**0580/22/M/J/18 Q16)**

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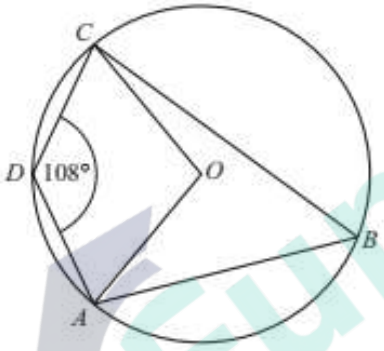
4. A, B, C and D lie on the circle, centre O.




Find the value of $x$ and the value of $y$ [2]

**0580/21/O/N/16 Q9)**

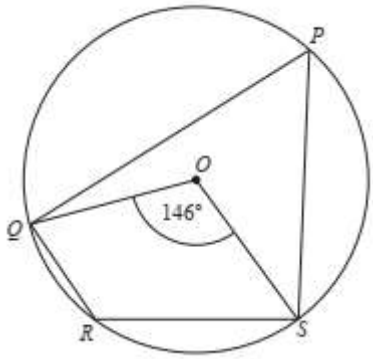
5. A, B, C and D lie on a circle centre O. Angle ADC = 108°.




Work out the obtuse angle AOC [2]

**0580/21/O/N/12 Q6)**

6. The points P, Q, R and S lie on the circircumference of the circle, centre O.



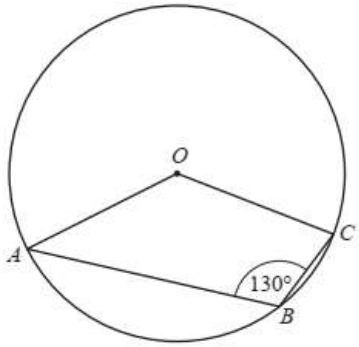

Angle QOS =146°. Find angle QRS. [2]

**0580/43/M/J/17 Q2)(c)**

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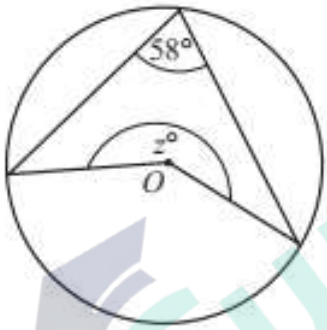
7. A, B and C are points on the circle, centre O.




Find the obtuse angle AOC [2]

**0580/21/M/J/19 Q8)**

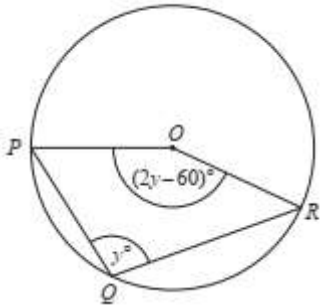
8. The diagram shows a circle, centre O.




Find the value of z. [2]

**0580/22/F/M/16 Q18 (c)**

9. P, Q and R lie on a circle, centre O.



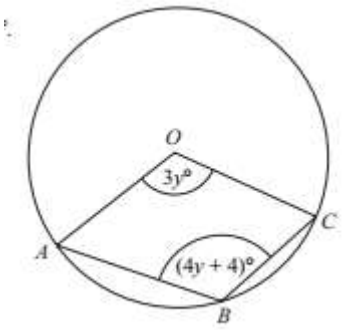

Angle PQR = $y$° and angle POR = $(2y - 60)$°.

Find the value of $y$. [4]

**0580/41/O/N/17 Q2(b)**

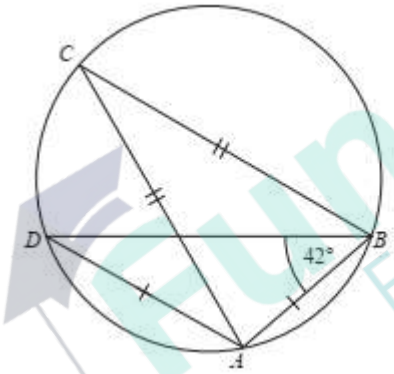
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10. A, B and C lie on a circle centre O.



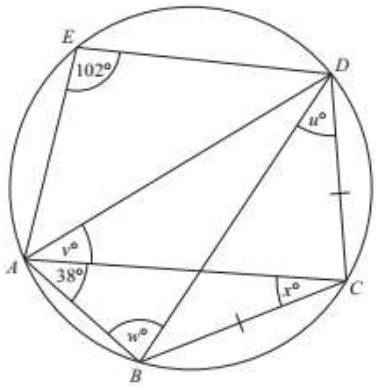

Angle AOC = $3y°$ and angle ABC = $(4y + 4)°$.
Find the value of $y$ [4]
**0580/41/M/J/13 Q8(b)**

11. (a) 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]
**0580/43/M/J/17 Q2)(b)**

12. (a) A, B, C, D and E lie on the circle.




Angle AED = 102° and angle BAC = 38°.

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BC = CD.

Find the value of

(i) u, [1]

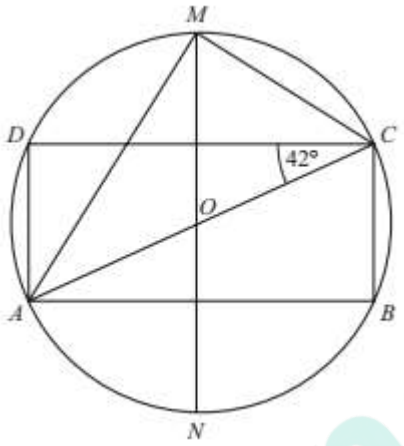
(ii) v, [1]

(iii) w, [1]

(iv) $x$. [1]

**0580/43/O/N/15 Q8 (b)**

13. The vertices of the rectangle ABCD lie on a circle centre O.




MN is a line of symmetry of the rectangle.

AC is a diameter of the circle and angle ACD = 42°.

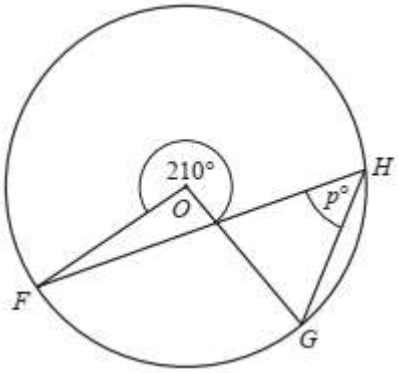
Calculate

(a) angle CAM, [2]

(b) angle DCM. [2]

**0580/23/O/N/13 Q13)**

14. F, G and H are points on the circle, centre O.

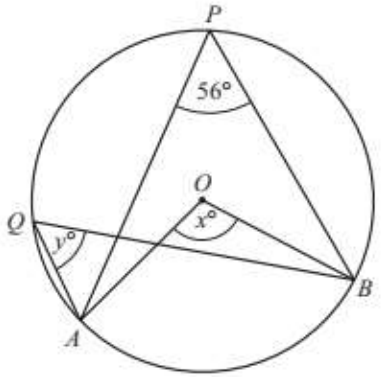



Find the value of p. [2]

**0580/21/M/J/17 Q21 (b)**

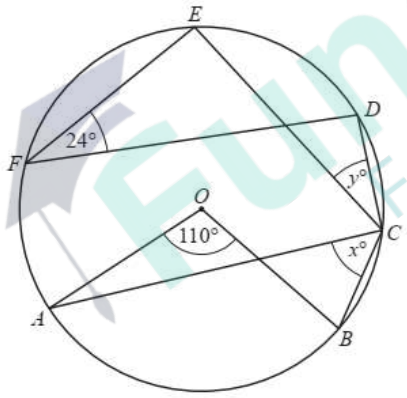
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15. A, B, P and Q lie on the circle, centre O.



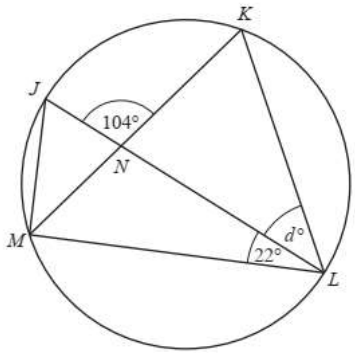

Angle APB = 56°.
Find the value of
(a) $x$, [1]
(b) $y$. [1]
**0580/21/M/J/16 Q11)**

16. Points A, B, C, D, E and F lie on the circle, centre O.
Find the value of $x$ and the value of $y$.




**0580/21/M/J/20 Q10**

17. J, K, L and M are points on the circumference of a circle with diameter JL.

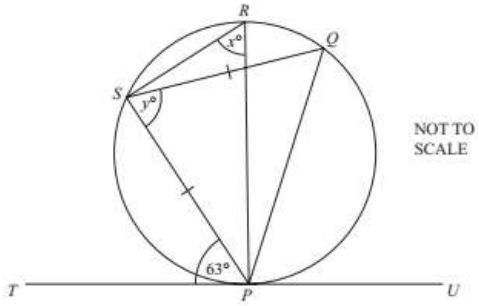



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JL and KM intersect at N. Angle JNK = 104° and angle MLJ = 22°. Work out the value of d. [4]

**0580/23/M/J/19 Q19)**

18. 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°.

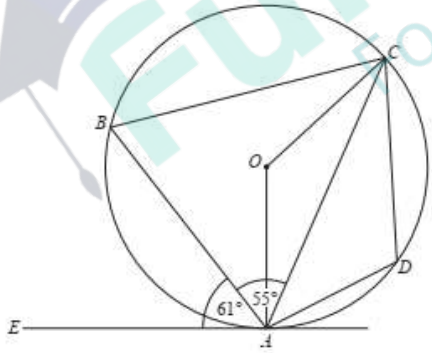
Find the value of

(i) $x$, [2]

(ii) $y$. [2]

**0580/43/M/J/14 Q7(b)**

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




EA is a tangent to the circle at A.

Angle EAB = 61° and angle BAC = 55°.

(a) Find angle BAO. [1]

(b) Find angle AOC. [2]

(c) Find angle ABC. [1]

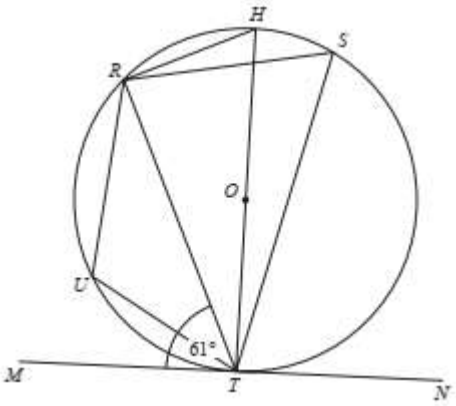
(d) Find angle CDA. [1]

**0580/42/O/N/18 Q7)**

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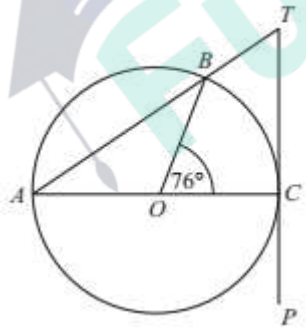


20. R, H, S, T and U lie on a circle, centre O.




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]
**0580/43/M/J/10 Q5(b)**

21. AOC is a diameter of the circle, centre O.

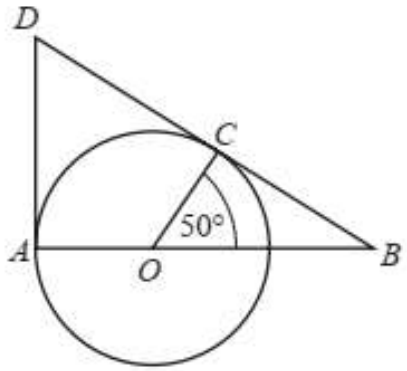



AT is a straight line that cuts the circle at B.
PT is the tangent to the circle at C.
Angle COB = 76°.
(a) Calculate angle ATC. [2]
(b) T is due north of C.
Calculate the bearing of B from C [2]
**0580/22/O/N/11 Q13)**

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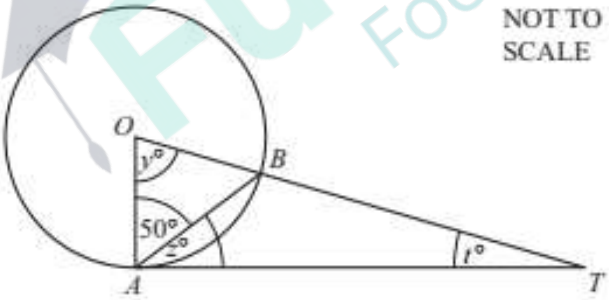


22. O is the centre of the circle.




DA is the tangent to the circle at A and DB is the tangent to the circle at C.
AOB is a straight line. Angle COB = 50°.
Calculate
(a) angle CBO, [1]
(b) angle DOC. [1]
**0580/22/O/N/10 Q4)**

23. TA is a tangent at A to the circle, centre O.

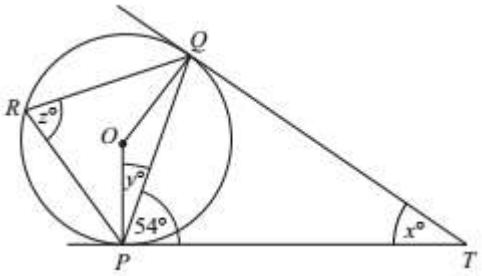



Angle OAB = 50°.
Find the value of
(a) $y$, [1]
(b) z, [1]
(c) t. [1]
**0580/21/O/N/11 Q7)**

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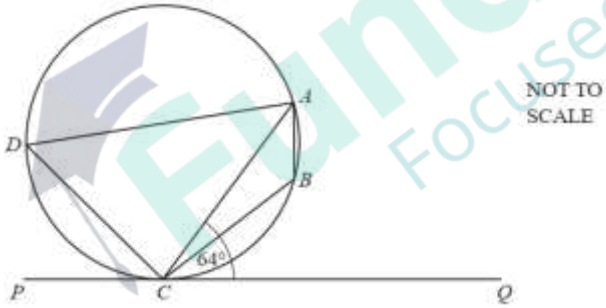


24. The points P, Q and R lie on a circle, centre O.




TP and TQ are tangents to the circle.
Angle TPQ = 54°.
Calculate the value of
(a) $x$, [1]
(b) $y$, [1]
(c) $z$. [2]
**0580/22/M/J/11 Q13)**

25. A, B, C and D lie on the circle.

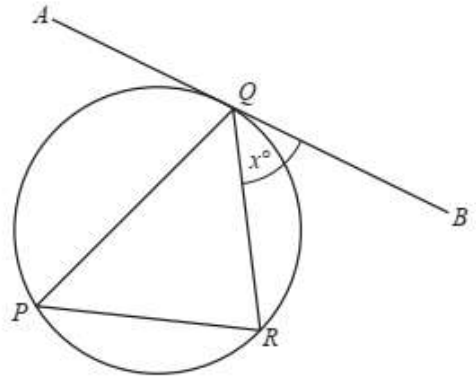



PCQ is a tangent to the circle at C.
Angle ACQ = 64°.
Work out angle ABC, giving reasons for your answer.
Angle ABC = ..... because
.....
.....
.....
..... [3]
**0580/22/F/M/20 Q15)**

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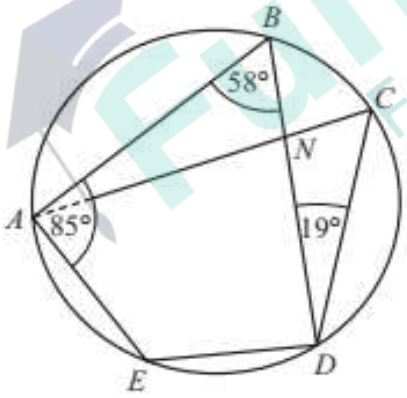


26. P, R and Q are points on the circle.




AB is a tangent to the circle at Q.
QR bisects angle PQB.
Angle BQR = $x$° 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]
**0580/21/M/J/20 Q15)**

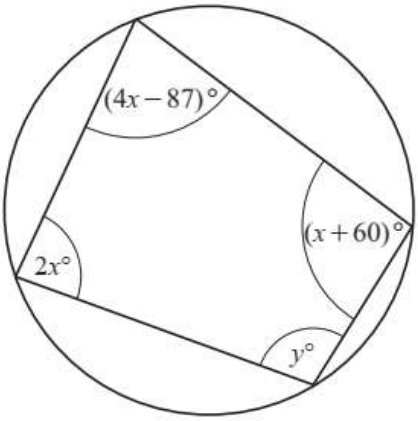
27. A, B, C, D and E are points on a circle.




Angle ABD = 58°, angle BAE = 85° and
angle BDC = 19°.
BD and CA intersect at N.
Calculate
(a) angle BDE, [1]
(b) angle AND. [2]
**0580/22/M/J/13 Q10)**

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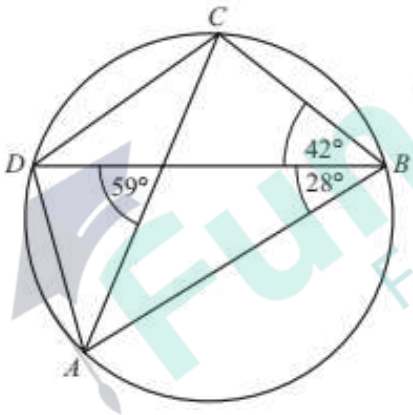
28. The diagram shows a cyclic quadrilateral.




Find the value of $y$ [4]

**0580/21/O/N/20 Q20**

29. A, B, C and D lie on the circle.
Find

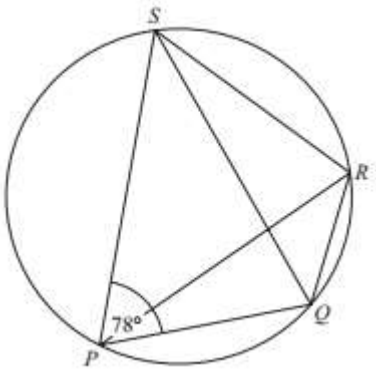



(a) angle ADC, [1]

(b) angle ADB. [2]

**0580/21/O/N/13 Q12)**

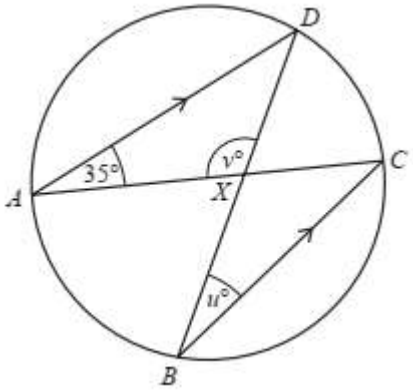
30. In the cyclic quadrilateral PQRS, angle SPQ = 78°.




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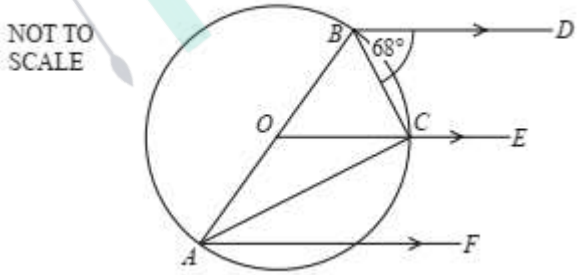
(i) Write down the geometrical reason why angle QRS = 102°.
[1]
(ii) Angle PRQ : Angle PRS = 1 :2.
Calculate angle PQS. [3]
**0580/41/M/J/13 8(c)**

31. (a) A, B, C and D are points on the circle.




AD is parallel to BC.
The chords AC and BD intersect at X.
Find the value of u and the value of v. [2]
**0580/21/M/J/17 Q21**

32. Points A, B and C lie on a circle, centre O, with diameter AB.

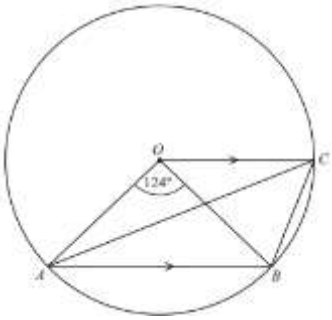



BD, OCE and AF are parallel lines.
Angle CBD = 68°.
Calculate
(a) angle BOC, [2]
(b) angle ACE. [2]
**0580/21/O/N/09 Q19)**

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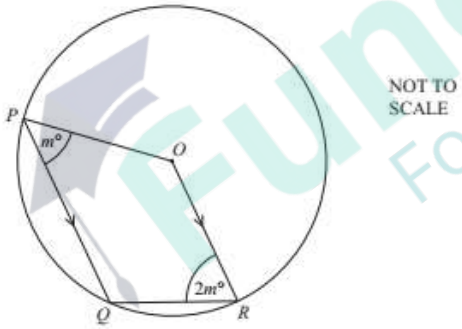


33. In the diagram, O is the centre of the circle which passes through A, B and C.




OC is parallel to AB.
Angle AOB = 124°.
Find
(a) angle BOC, [2]
(b) angle OBC, [1]
(c) angle CAB. [1]
**0580/27/M/J/14 Q18)**

34. In the diagram, P, Q and R lie on the circle, centre O

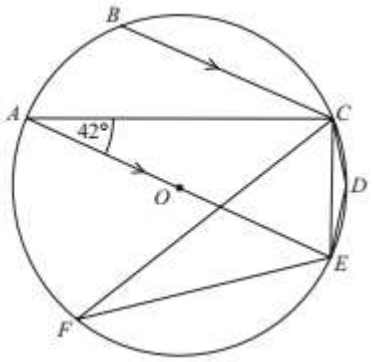



PQ is parallel to OR.
Angle QPO = m° and angle QRO = 2m°.
Find the value of m. [5]
**0580/43/O/N/15 Q8 (c)**

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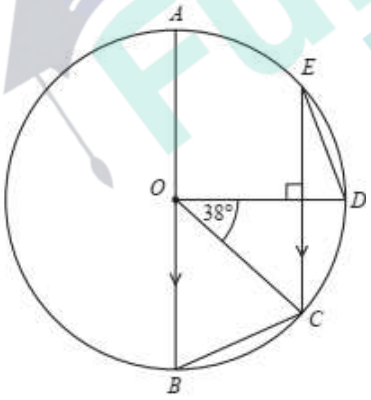


35. A, B, C, D, E and F are points on the circumference of a circle centre O .




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]
**0580/42/M/J/12 Q4(a)**

36. AB is the diameter of a circle, centre O. C, D and E lie on the circle.

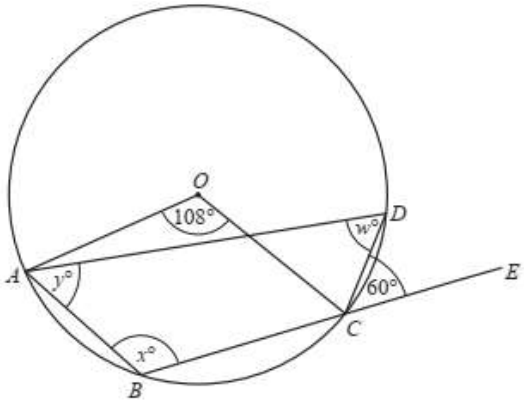



EC is parallel to AB and perpendicular to OD. Angle DOC is 38°.
Work out
(a) angle BOC , [1]
(b) angle CBO, [1]
(c) angle EDO [2]
**0580/21/M/J/10 Q17)**

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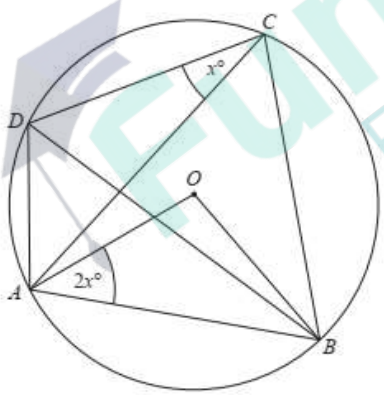


37. A, B, C and D are points on the circle, centre O.




BCE is a straight line.
Angle AOC = 108° and angle DCE = 60°.
Calculate the values of w, $x$ and $y$. [3]
**0580/22/O/N/17 Q22)**

38. In the diagram, A, B, C and D lie on the circumference of a circle, centre O.

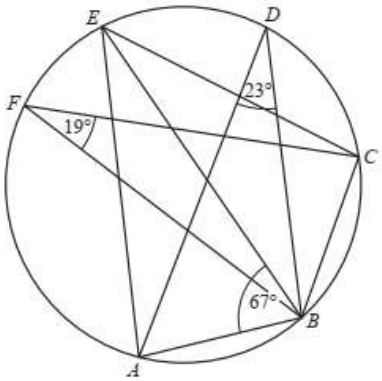



Angle ACD = $x$° and angle OAB = $2x$°.
Find an expression, in terms of $x$, in its simplest form for
(a) angle AOB, [1]
(b) angle ACB, . [1]
(c) angle DAB. [2]
**0580/22/O/N/19 Q19)**

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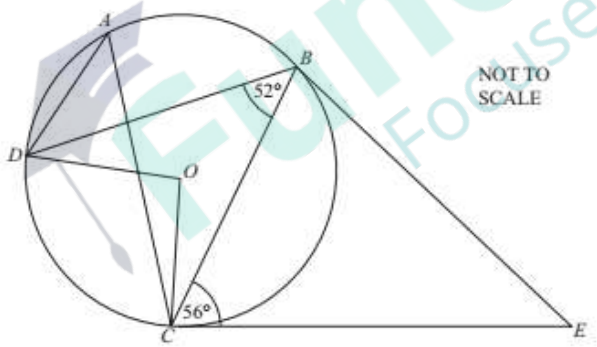


39. In the diagram, points A, B, C, D, E and F lie on the circumference of the circle.




Angle BFC = 19°, angle ADB = 23° and angle ABE = 67°.
Work out
(a) angle BEC, [1]
(b) angle ABC, [3]
(c) angle BCE. [2]
**0580/23/O/N/17 Q22)**

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




CE is a tangent to the circle at C.
(a) Find the sizes of the following angles and give a reason for each answer.
(i) Angle DAC = .....
because.....
..... [2]
(ii) Angle DOC = ----------
because.....
..... [2]
(iii) Angle BCO = .....
because .....[2]
.....
..... [2]
**0580/43/O/N/14 Q3(a)**

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## Answers

| | | |
|---|---|---|
| 1) equilateral triangle | 15) $x$ = 112° , $y$ = 56° | 29) (a)110° (b) 79° |
| 2) 5 | 16) $x$ = 55° , $y$ = 24° | 30) (i) Opposite angles [cyclic quad] add to 180 (ii)68 |
| 3) 13 | 17) 36° | 31) (a)u = 35 ° , v = 110 ° |
| 4) $x$ = 55°, $y$ = 125° | 18) (i) 63(ii)54 | 32) (a) 44° (b)158° |
| 5) 144° | 19) (a)29 (b)128 (c)64 (d) 116 | 33) (a)28° (b)76° (c)14° |
| 6) 107° | 20) (i) 29 (ii) 61 (iii) 61 (iv) 119 | 34) 36 |
| 7) 100° | 21) (a) 52° (b) 322° | 35) ) (i) 42 Alternate (ii) 90 semicircle (iii) 42 same segmen (iv) 138<br>cyclic quad |
| 8) 244° | 22) (a)40° (b)65 | 36) (a) 52° (b) 64° (c)71° |
| 9) 105° | 23) ° (a) 80° (b) 40° (c)10° | 37) 54°, 126°, 60° |
| 10) 32 | 24) (a)72° (b) 36° (c) 54° | 38) (a) $180 - 4x$ (b)$90 - 2x$ (c)$90 + x$ |
| 11) 69 | 25) 116° , alternate segment theorem, angles in opposite segments are supplementary or cyclic quadrilateral or angles at a point on a straight line | 39) 19° , 138° , 90° |
| 12) (i) 38 (ii) 38 (iii) 78 (iv) 26 | 26) RQP = $x$° QR bisects angle PQB , RPQ = $x$° alternate segment theorem, triangle PQR has two equal angles both less than 60 (so can't be equilateral) so must be Isosceles | 40) (i) 52 Angles in same segment (ii) 104 Angle at centre is twice angle at Circumference (iii) 34 Angle between tangent and radius = 90 |
| 13) (a) 24° (b) 24° | 27) (a) 95 ° (b)77 ° | |
| 14) 75° | 28) 107 | |

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