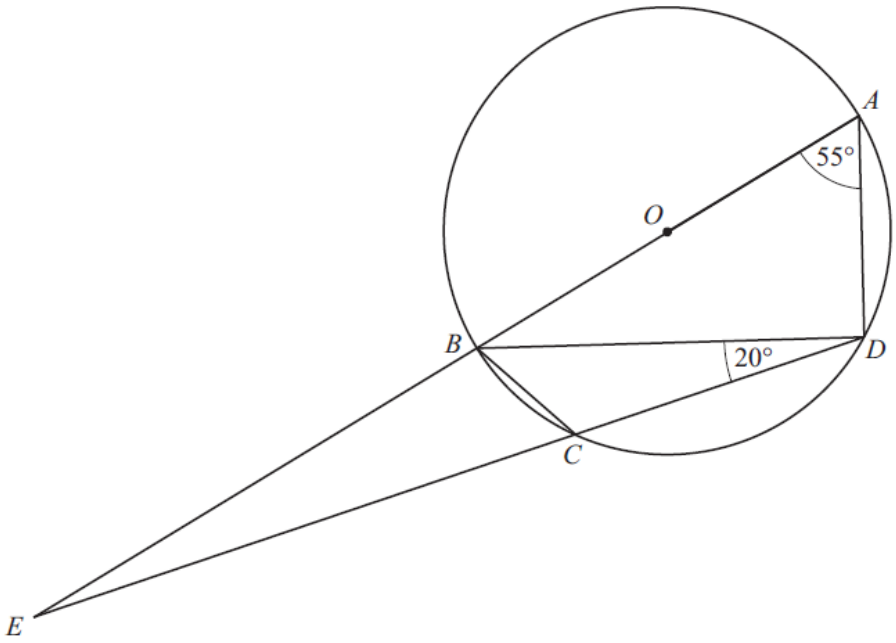
5.7 – Properties of circles

Student name: Answers Score: _____

1.



The points A, B, C and D lie on a circle, centre O.
AB is a diameter, angle $BAD = 55°$ and angle $BDC = 20°$.
ABE and DCE are straight lines.

Find

(a) angle ABD,

35° ..... [1]

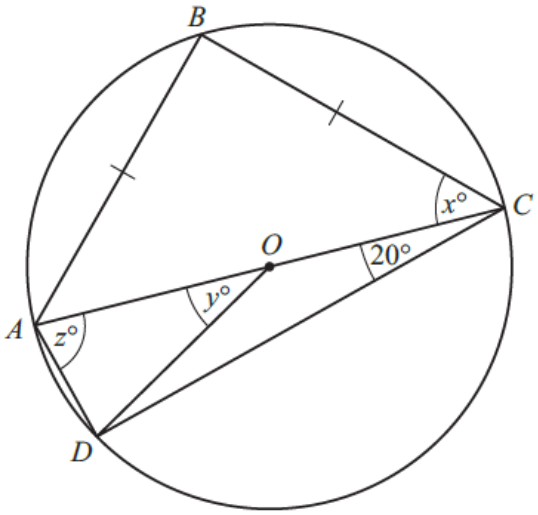
(b) angle BCD,

125° ..... [1]

(c) angle AED.

15° ..... [1]

2.

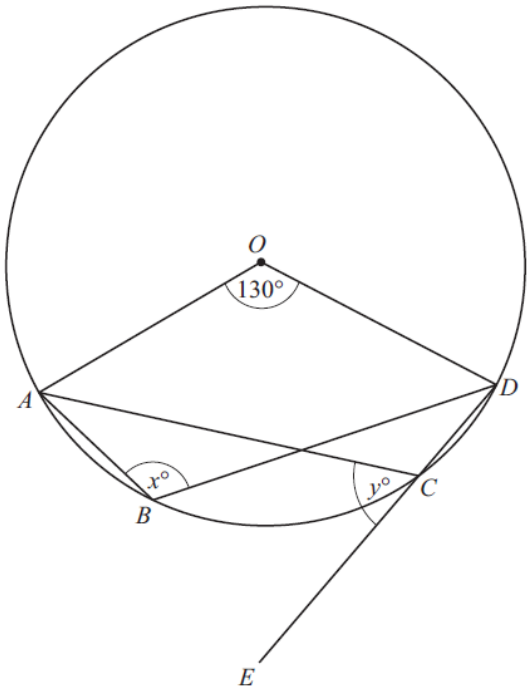


NOT TO SCALE

A, B, C and D lie on a circle, centre O.
AC is a diameter and angle $ACD = 20°$. $AB = BC$.
Find the values of x, y and z.

$x =$ 45° [1]
$y =$ 40° [1]
$z =$ 70° [1]

3.



NOT TO SCALE

A, B, C and D are points on the circle centre O.
DCE is a straight line.
Angle $AOD = 130°$.

Find the value of

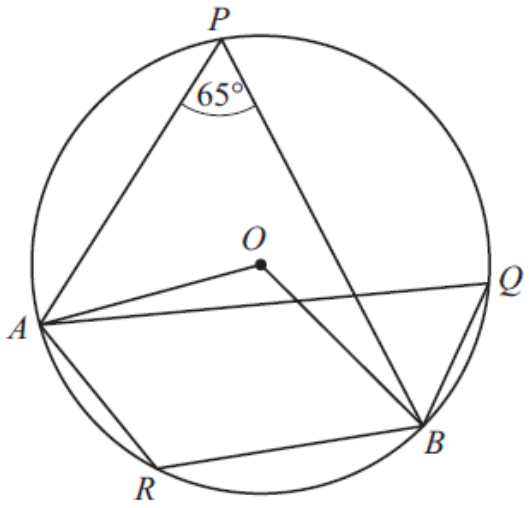
(a) x,

$x =$ 115° [2]

(b) y.

$y =$ 65° [2]

4.



NOT TO SCALE

A, P, Q, B and R lie on a circle, centre O.
Angle $APB = 65°$.

Find

(a) angle AQB,

Answer(a) Angle AQB = 65° [1]

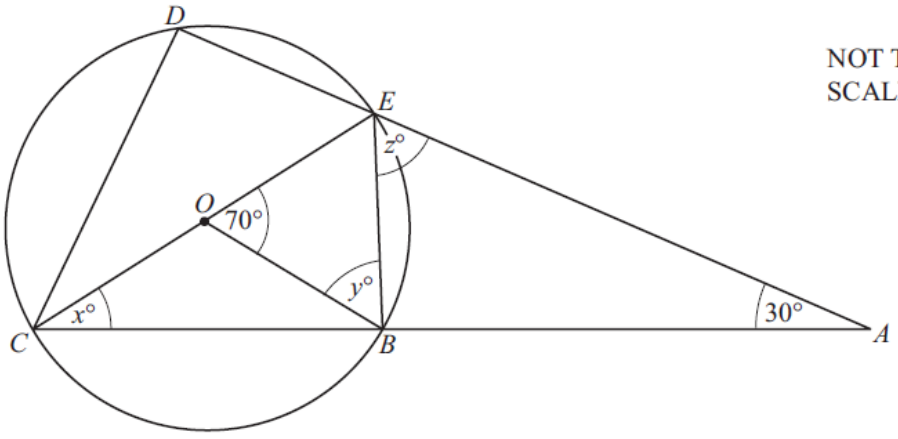
(b) angle AOB,

Answer(b) Angle AOB = 130° [1]

(c) angle ARB.

Answer(c) Angle ARB = 115° [1]

5.



NOT TO SCALE

B, C, D and E lie on a circle, centre O.
CE is a diameter, angle $DAC = 30°$ and angle $BOE = 70°$.

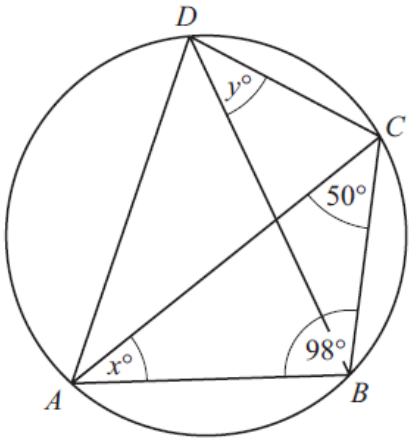
Find the values of x, y and z.

x = 35°

y = 55°

z = 60° [3]

6. **(a)**



NOT TO SCALE

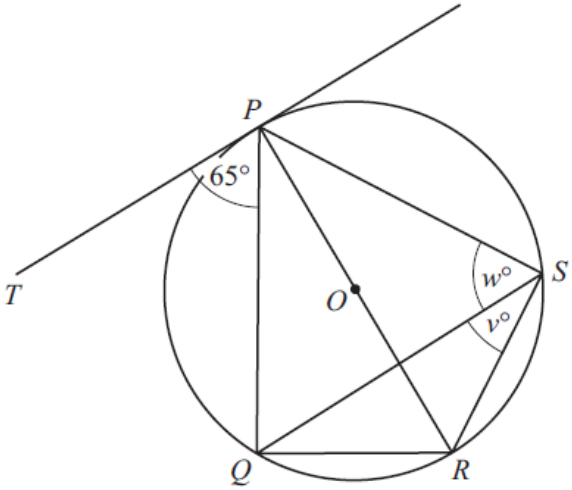
A, B, C and D lie on the circumference of a circle.
Angle $ABC = 98°$ and angle $ACB = 50°$.

Find the value of x and the value of y.

Answer(a) $x =$ 32° [1]

$y =$ 32° [1]

(b)



NOT TO SCALE

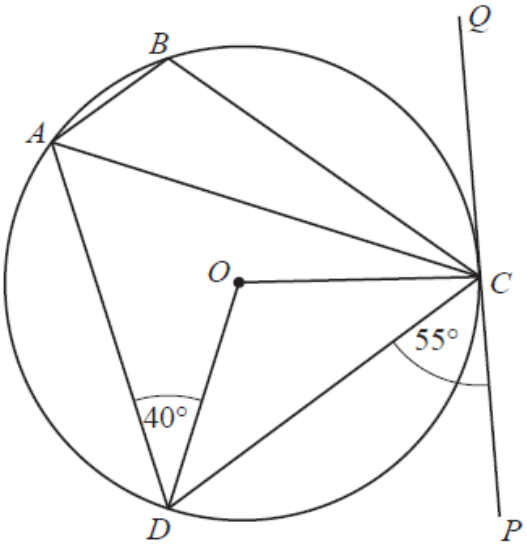
P, Q, R and S lie on the circumference of a circle, centre O.
TP is a tangent to the circle at P and PR is a diameter.

Find the value of v and the value of w.

Answer(b) $v =$ 25° [1]

$w =$ 65° [1]

7. A, B, C and D are points on the circle, centre O.
PQ is a tangent to the circle at the point C.
Angle $PCD = 55°$ and angle $ADO = 40°$.



NOT TO SCALE

Find

(a) angle COD,

110° ..... [2]

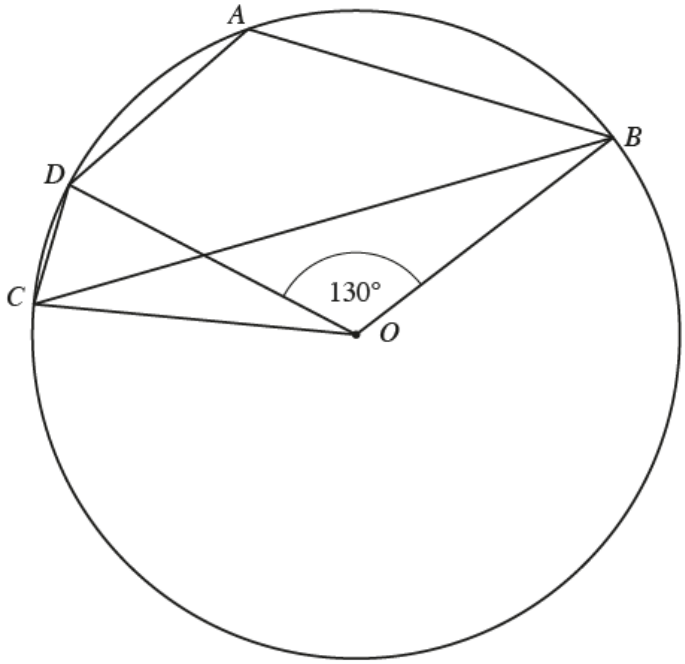
(b) angle DAC,

55° ..... [1]

(c) angle ABC.

105° ..... [1]

8.



NOT TO SCALE

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

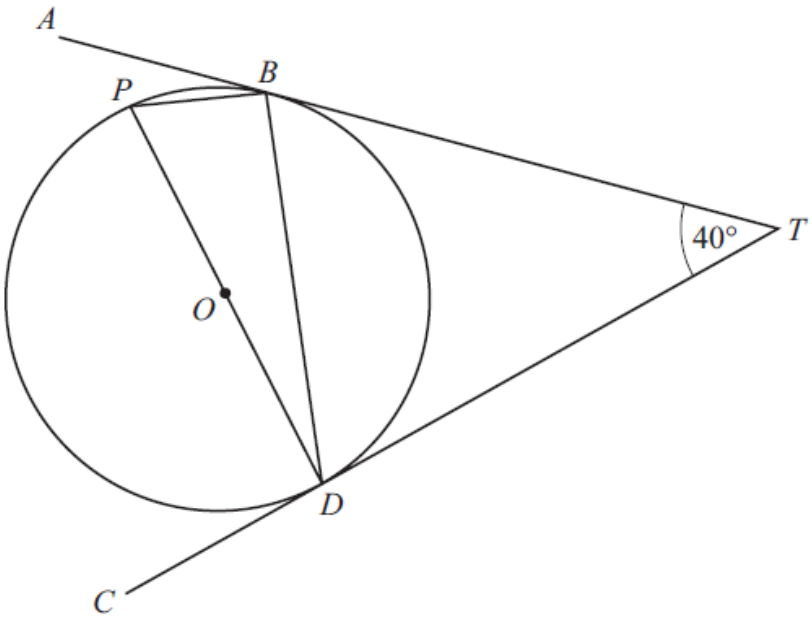
(a) Find angle DCB.

Angle DCB = 65° ..... [1]

(b) Find angle BAD.

Angle BAD = 115° ..... [1]

9.



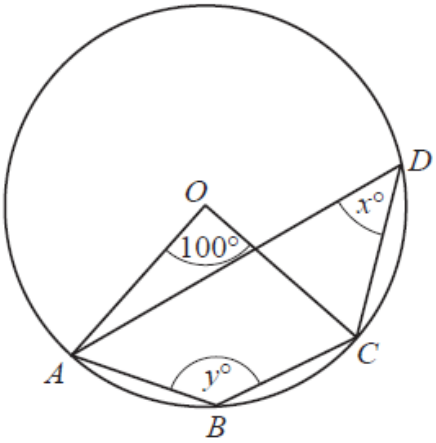
NOT TO SCALE

B, *D* and *P* are points on the circumference of a circle, centre *O*.
TBA and *TDC* are tangents to the circle.
DP is a diameter and angle *BTD* = 40°.

Find the size of angle *ABP*.

20º [2]

10.



NOT TO SCALE

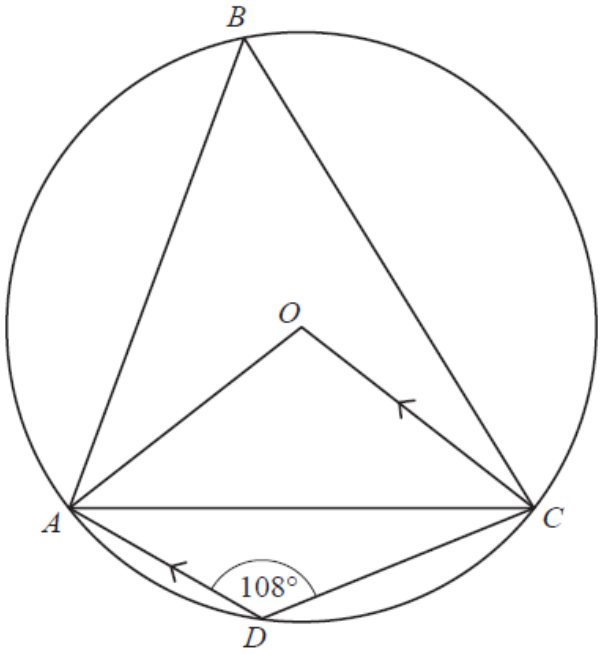
A, *B*, *C* and *D* lie on a circle, centre *O*.

Find the value of *x* and the value of *y*.

x = 50º

y = 130º [2]

11.



NOT TO SCALE

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

AD is parallel to OC and angle $ADC = 108°$.

Find

(a) angle ABC,

Answer(a) 72° [1]

(b) angle AOC,

Answer(b) 144° [1]

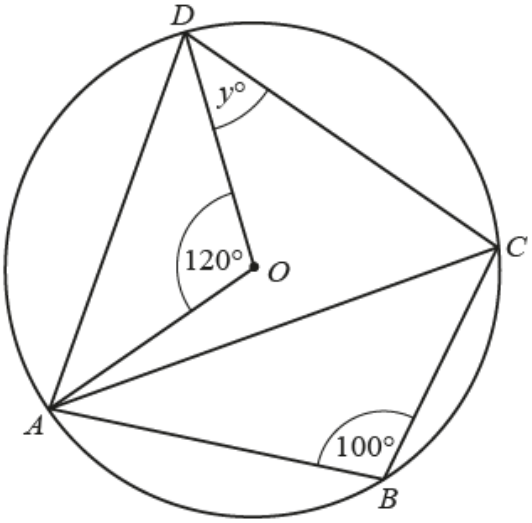
(c) angle OCA,

Answer(c) 18° [1]

(d) angle DAC.

Answer(d) 18° [1]

12.



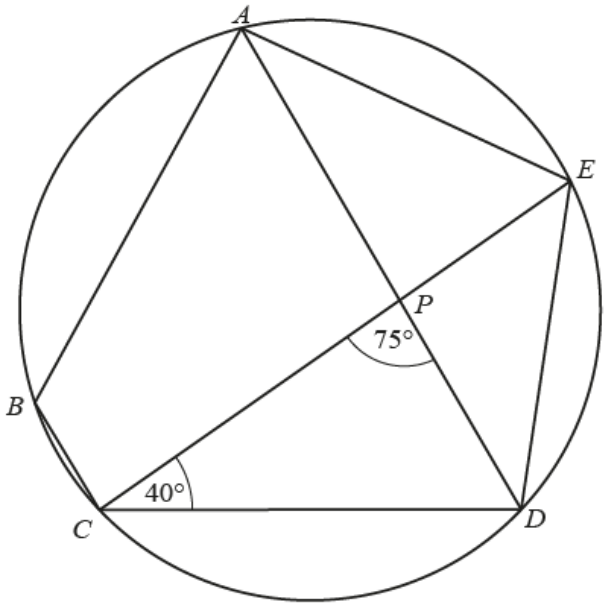
NOT TO SCALE

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

Work out the value of y.

$y =$ 50° [3]

13.



NOT TO SCALE

A, B, C, D and E are points on a circle.
CE and AD intersect at P.
Angle $DCP = 40°$ and angle $CPD = 75°$.

Find

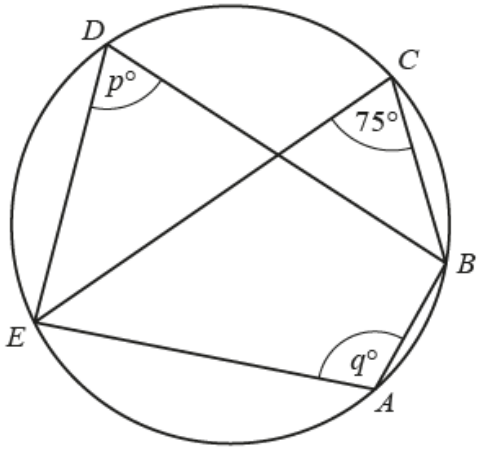
(a) angle DAE,

Angle $DAE =$ 40° [1]

(b) angle ABC.

Angle $ABC =$ 115° [2]

14.



NOT TO SCALE

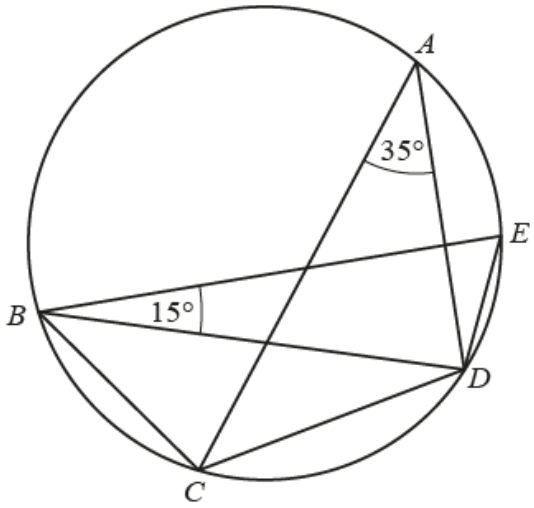
A, B, C, D and E lie on the circle.
Angle $BCE = 75°$.

Find the value of p and the value of q.

p = 75° .....

q = 105° ..... [2]

15.



NOT TO SCALE

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

Find

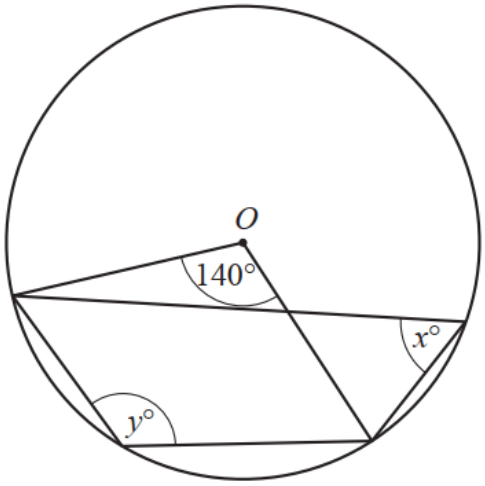
(a) angle CBD,

Angle CBD = 35° ..... [1]

(b) angle CDE.

Angle CDE = 130° ..... [1]

16.



NOT TO SCALE

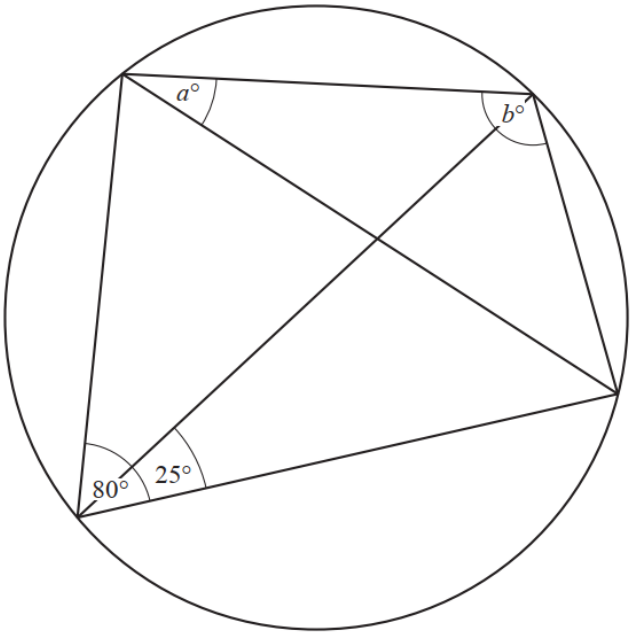
O is the centre of the circle.

Find the value of x and the value of y.

$x =$ 70° .....

$y =$ 110° ..... [2]

17.



NOT TO SCALE

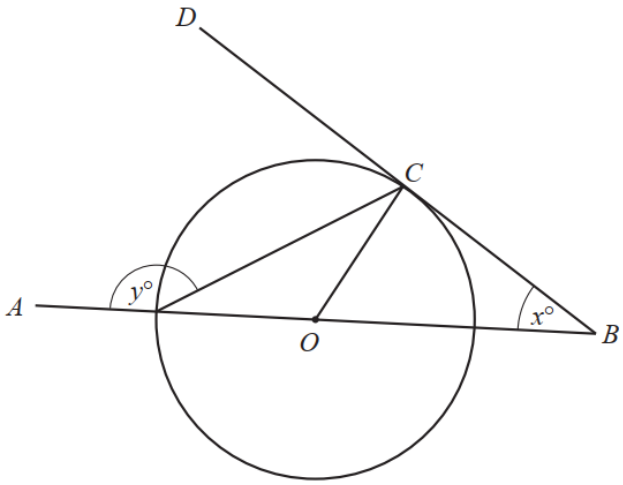
The diagram shows a cyclic quadrilateral.

Find the value of a and the value of b.

$a =$ 25° .....

$b =$ 100° ..... [2]

18.



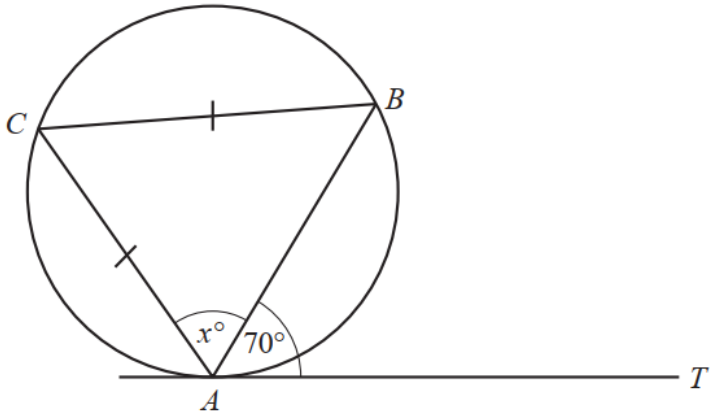
NOT TO SCALE

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.

$y =$ 135 + 0.5x ..... [3]

19.



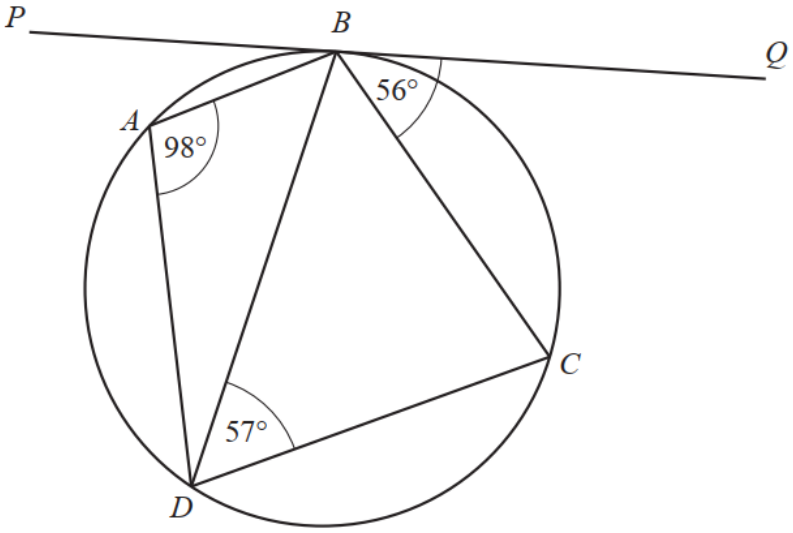
NOT TO SCALE

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

Work out the value of x.

$x =$ 55° ..... [2]

20.



NOT TO SCALE

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

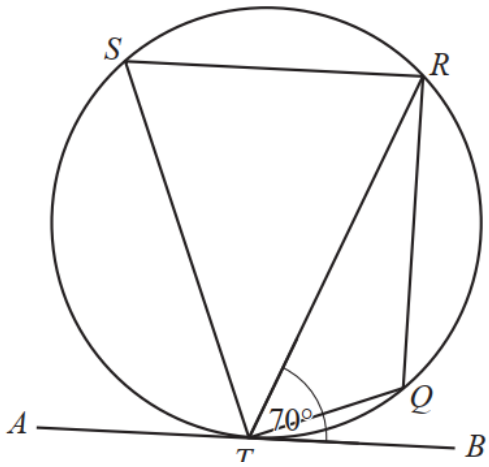
(a) Find angle DCB, giving a reason for your answer.

Angle DCB = 82° because Opposite angles of a cyclic quadrilateral add up to 180°. [2]

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

No because any mention of Alternate Segment Theorem [1]

21.



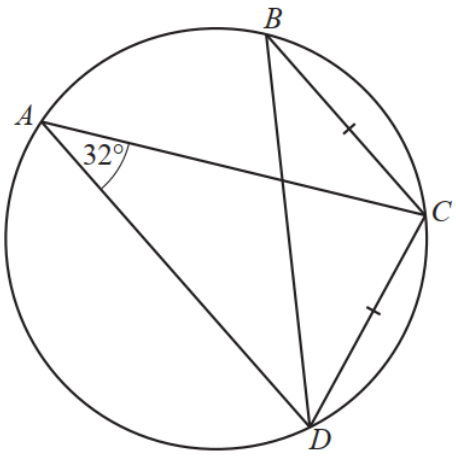
NOT TO SCALE

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

Find angle RQT.

Angle RQT = 110° [2]

22. (a)



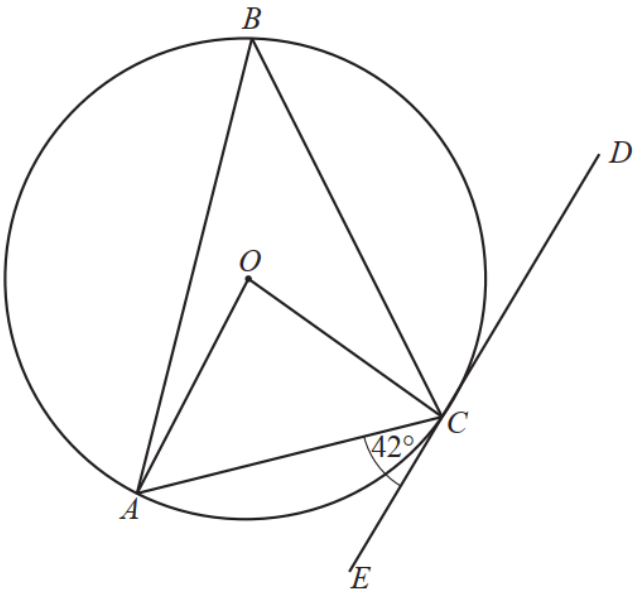
NOT TO SCALE

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

Find angle BCD.

Angle BCD = 116° [2]

(b)

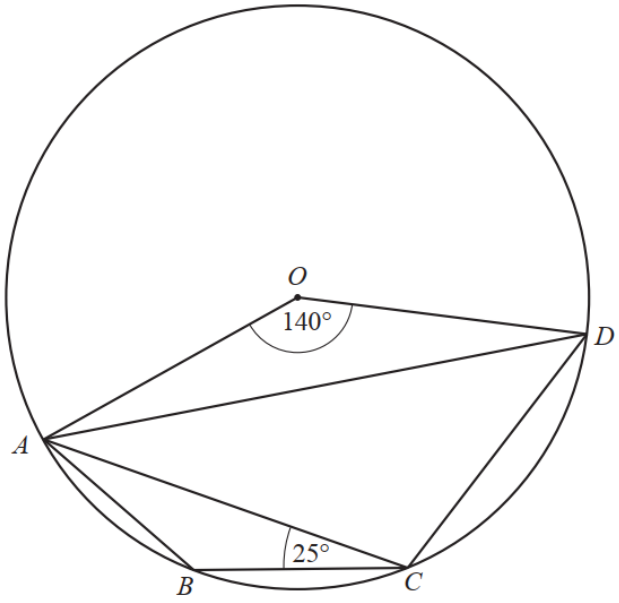


NOT TO SCALE

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

Find angle AOC.

Angle AOC = 84° [2]



NOT TO SCALE

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

Find

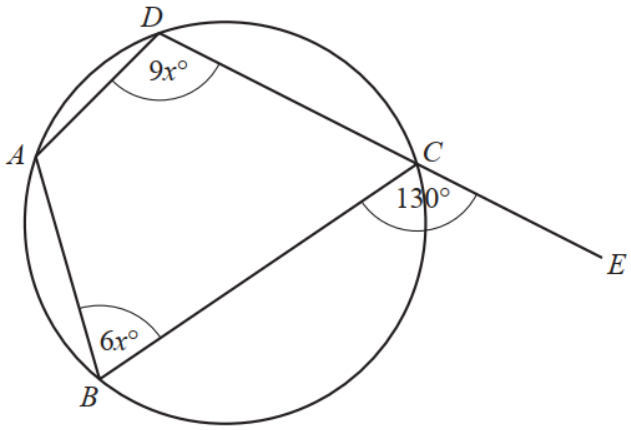
(a) angle ACD,

Angle ACD = 110° [2]

(b) angle BAD.

Angle BAD = 45° [2]

24.



NOT TO SCALE

$ABCD$ is a cyclic quadrilateral.
DC is extended to E.
Angle $BCE = 130°$, angle $ABC = 6x°$ and angle $ADC = 9x°$.

Find the value of

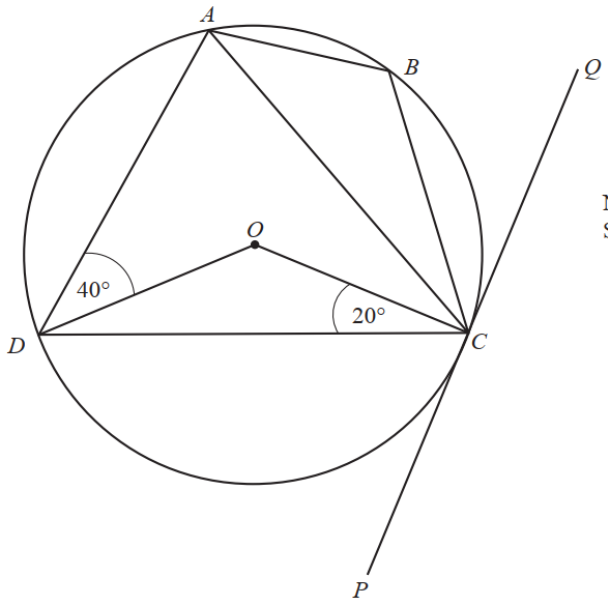
(a) angle BAD,

Angle BAD = 130° [1]

(b) angle ABC.

Angle ABC = 72° [2]

25.



NOT TO SCALE

A, B, C and D are points on the circle centre O.
PQ is a tangent to the circle at C.

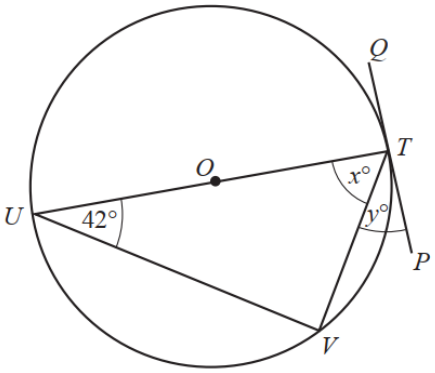
Find these angles.

(a) Angle DAC 70° [2]

(b) Angle ABC 120° [1]

(c) Angle ACQ 60° [2]

26. (a)



NOT TO SCALE

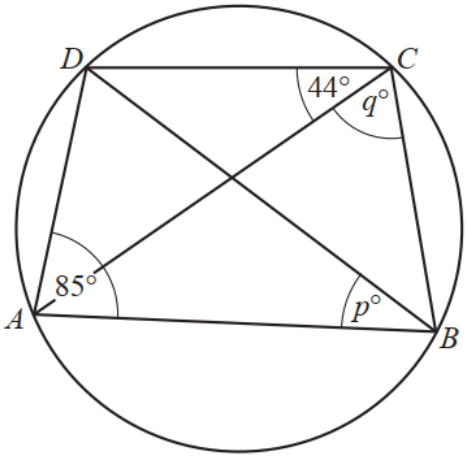
T, U and V lie on a circle, centre O.
PQ is a tangent to the circle at T.
TU is a diameter.

Find the value of x and the value of y.

$x =$ 48° .....

$y =$ 42° ..... [2]

(b)



NOT TO SCALE

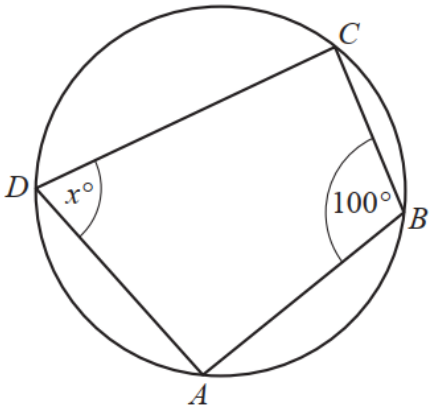
$ABCD$ is a cyclic quadrilateral.

Find the value of p and the value of q.

$p =$ 44° .....

$q =$ 51° ..... [2]

27. (a)



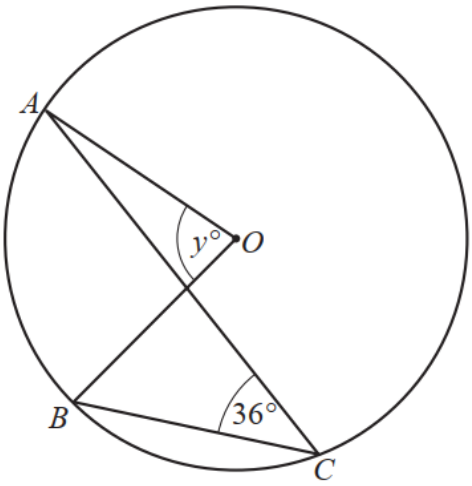
NOT TO SCALE

The points A, B, C and D lie on the circle.

Find the value of x.

$x =$ 80° [1]

(b)



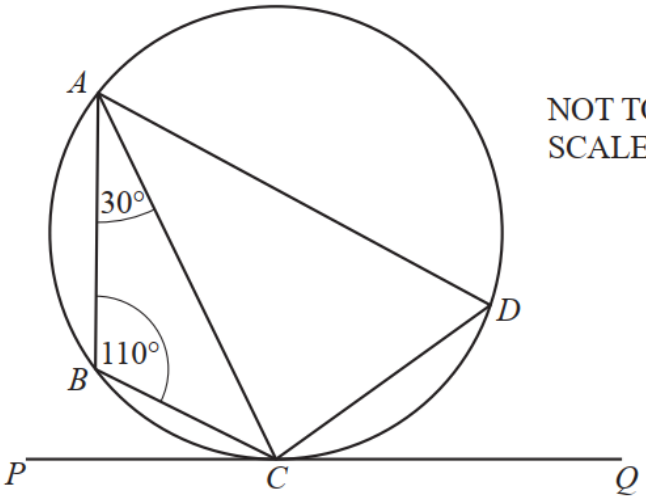
NOT TO SCALE

The points A, B and C lie on the circle, centre O.

Find the value of y.

$y =$ 72° [1]

28.



NOT TO SCALE

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

Find

(a) angle ADC,

Angle $ADC =$ 70° [1]

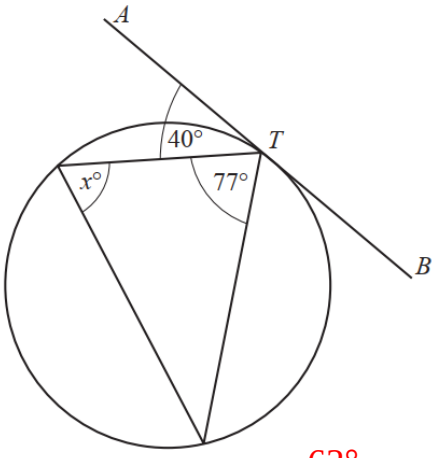
(b) angle ACP,

Angle $ACP =$ 70° [1]

(c) angle PCB.

Angle $PCB =$ 30° [1]

29.



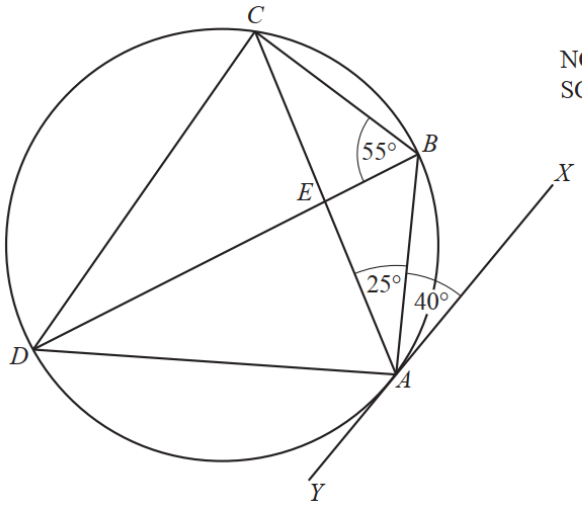
NOT TO SCALE

AB is a tangent to the circle at T.

Find the value of x.

$x =$ 63° [2]

30.



NOT TO SCALE

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 $CDB =$ 25° [1]

(b) angle ACB,

Angle $ACB =$ 40° [1]

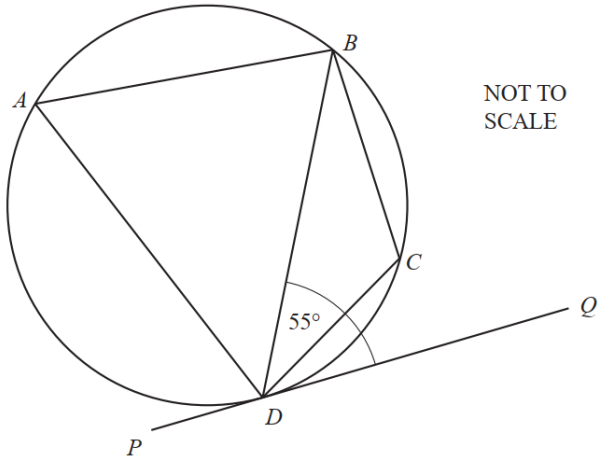
(c) angle DCE,

Angle $DCE =$ 60° [1]

(d) angle YAD.

Angle $YAD =$ 60° [1]

31.



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

Complete these statements giving a reason for each answer.

(a) Angle BAD = ...55°..... because ..Alternate segments.....

..... [2]

(b) Angle BCD = ...125°..... because .....Opposite angles in a cyclic quadrilateral.....

..... [2]