1 *A*, *B*, *C* and *D* are points on the circumference of a circle with centre *O*.

Angle *ABD* = 81°
Angle *BDC* = 42°

(a) Work out the size of angle *CAB*.

42 °
(1)

(b) Work out the size of angle *ACD*.

81 °
(1)

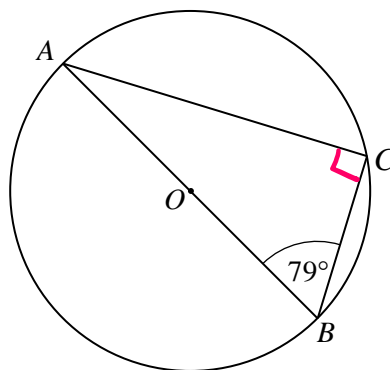(c) Work out the size of angle *AEB*.

57 °
(1)

(d) Work out the size of angle *BEC*.

123 °
(1)

(Total for Question 1 is 4 marks)

1

2 A, B and C are points on the circumference of a circle with centre O.

Angle ABC = 79°
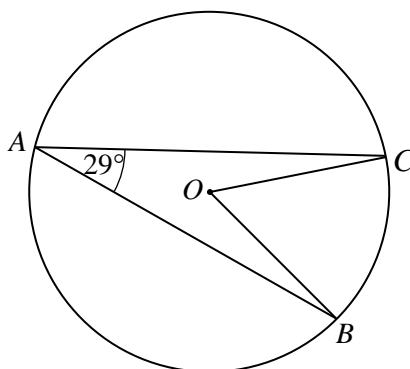
(a) Work out the size of angle CAB.

_____11_____ °
(1)

(b) Give a reason for your answer to part (a)

The angle in a semicircle is 90°
Angles in a triangle add to 180°
(1)

(Total for Question 2 is 2 marks)

3 A, B and C are points on the circumference of a circle with centre O.

Angle CAB = 29°

(a) Work out the size of angle COB.

_____58_____ °
(1)

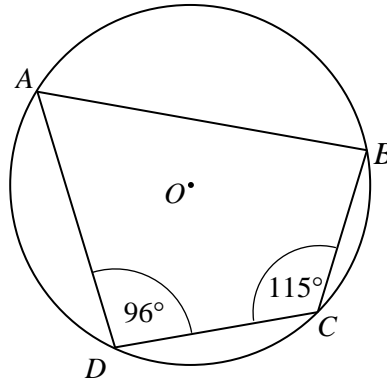(b) Give a reason for your answer to part (a)

The angle at the centre is twice the
angle at the circumference.
(1)

(Total for Question 3 is 2 marks)

2

4 *A*, *B*, *C* and *D* are points on the circumference of a circle with centre *O*.

Angle *ADC* = 96°
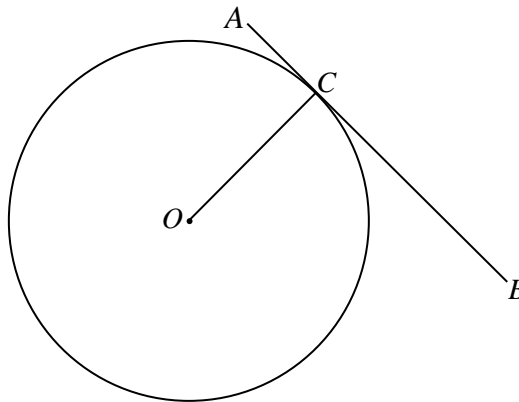Angle *BCD* = 115°

(a) Work out the size of angle *ABC*.

84 °
(1)

(b) Give a reason for your answer to part (a)

Opposite angles in a cyclic quadrilateral add to 180°
(1)

(Total for Question 4 is 2 marks)

5 *A*, *B*, and *C* are points on the circumference of a circle with centre *O*.
AB is the tangent to the circle at point *C*.

(a) Write down the size of angle *OCB*.

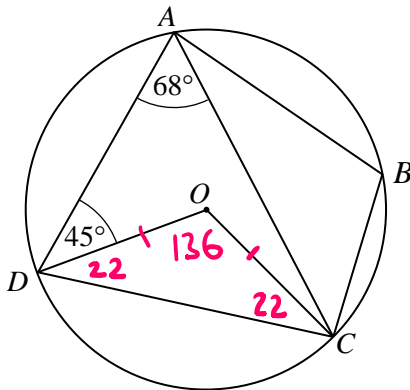**90** °
(1)

(b) Give a reason for your answer to part (a)

A tangent meets a radius at 90°
(1)

(Total for Question 5 is 2 marks)

1st

3

6 *A, B, C* and *D* are points on the circumference of a circle with centre *O*.

Angle *DAC* = 68°
Angle *ADO* = 45°

Work out the size of angle *ABC*.
Give reasons for each stage of your working.

Angle DOC = 136°
The angle at the centre is twice the angle at the circumference.

Angle ODC = Angle OCD = 22°
Base angles in an isosceles triangle are equal

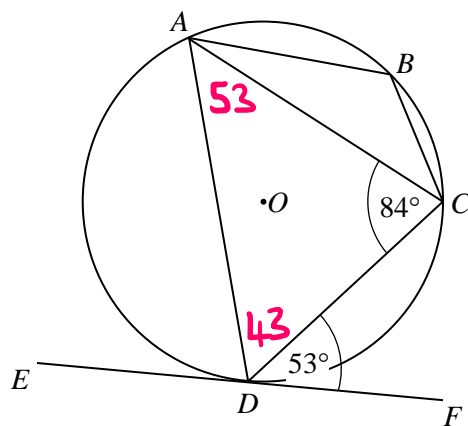Angle ADC = 22 + 45
        = 67

Angle ABC = 180 − 67
        = 113
Opposite angles in a cyclic quadrilateral add to 180°

113 °

(Total for Question 6 is 4 marks)

7 *A, B, C* and *D* are points on the circumference of a circle with centre *O*.
EF is the tangent to the circle at point *D*.

Angle *ACD* = 84°
Angle *CDF* = 53°

Work out the size of angle *ABC*.
Give reasons for each stage of your working.

Angle DAC = 53°

Alternate segment theorem

Angle ADC = 43°
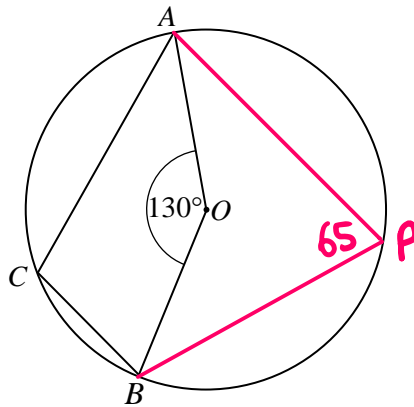Angles in a triangle add to 180°

Angle ABC = 180 − 43
         = 137°
Opposite angles in a cyclic quadrilateral
add to 180°

137 °

(Total for Question 7 is 4 marks)

5

8 *A*, *B*, and *C* are points on the circumference of a circle with centre *O*.

Angle *AOB* = 130°

Work out the size of angle *ACB*.
Give reasons for each stage of your working.

Angle APB = 65°
The angle at the centre is twice the
an le at the circumference.

Angle ABC = 180 - 65
        = 115
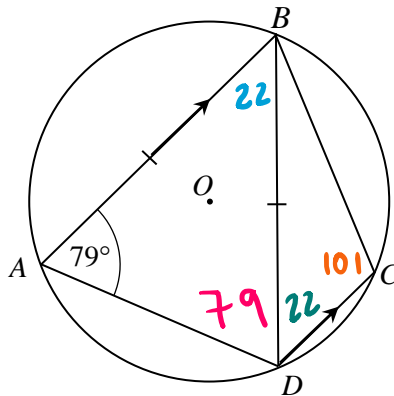Opposite angles in a cyclic quadrilateral
add to 180°

115 °

(Total for Question 8 is 3 marks)

9   *A*, *B*, *C* and *D* are points on the circumference of a circle with centre *O*.

Angle *BAD* = 79°
BA = *BD*
Lines *AB* and *DC* are parallel.

Work out the size of angle *DBC*.
Give reasons for each stage of your working.

Angle BAD = Angle BDA = 79°

Base angles in an isosceles triangle are equal

Angle ABD = 22°
Angles in a triangle add to 180°

Angle BDC = Angle ABD
Alternate angles are equal

Angle ABC = 180 − 43
              = 137°
Opposite angles in a cyclic quadrilateral
add to 180°

Angle DBC = 57°
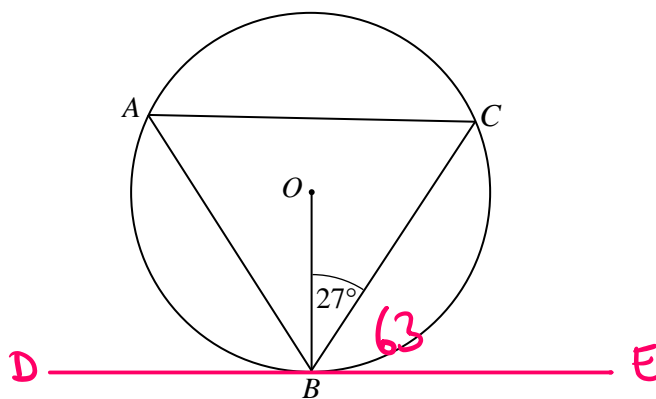Angles in a triangle add to 180°

.... 57 ....°

(Total for Question 9 is 5 marks)

1st

7

10 *A*, *B* and *C* are points on the circumference of a circle with centre *O*.

Angle *CBO* = 27°

Work out the size of angle *BAC*.
Give reasons for each stage of your working.

Angle CBE = 90 - 27
= 63°

A tangent meets a radius at 90°

Angle BAC = 63°
Alternate segment theorem

63

(Total for Question 10 is 3 marks)

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11 *C* and *E* are points on the circumference of a circle with centre *O*.
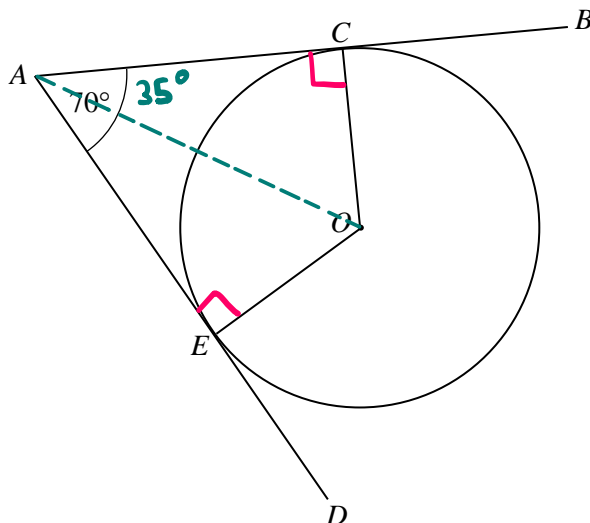
AB and *AD* are tangents to the circle at *C* and *E*.
Angle *EAC* = 70°

(a) Work out the size of angle *COE*.

Angle AEO = Angle ACO = 90°

A tangent meets a radius at 90°

Angle COE = 110° Angles in a quadrilateral add to 360°

OC = 5 cm

_____110_____ °
(2)

(b) Work out the length of *CA*.
     Give your answer to 1 decimal place.

Angle CAO = 35°
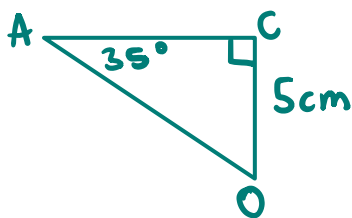
$\tan(35) = \dfrac{5}{CA}$

$CA = \dfrac{5}{\tan(35)}$
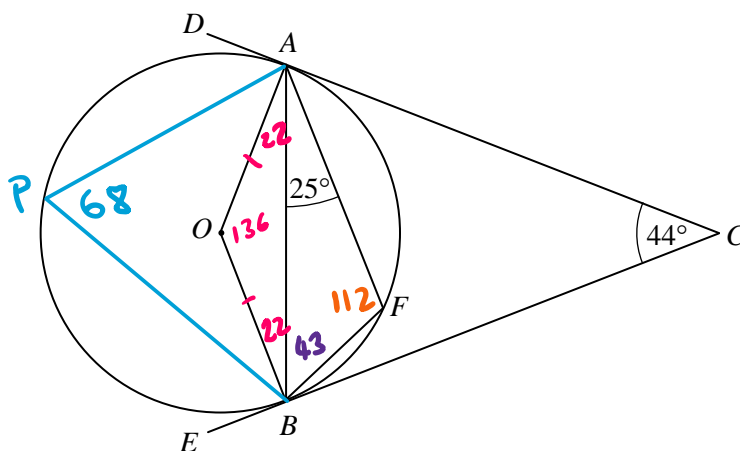
CA = 7.1407..   ____7.1____ cm
(2)

(Total for Question 11 is 4 marks)

12 *A* and *B* are points on the circumference of a circle with centre *O*.

DC and *EC* are tangents to the circle at *A* and *B*.
Angle *ACB* = 44°
Angle *BAF* = 25°

[Reasons not required in this Q]

Work out the size of angle *FBC*.

Angle AOB = 136° A tangent meets a radius at 90°
and angles in a quadrilateral add to 360°
Angle ABO = Angle BAO = 22°
Base angles in an isosceles triangle are equal
Angle APB = 68°
The angle at the centre is twice the angle at the circumference.
Angle AFB = 112°
Opposite angles in a cyclic quadrilateral add to 180°
Angle ABF = 43° Angles in a triangle add to 180°
Angle FBC = 25°
A tangent meets a radius at 90°
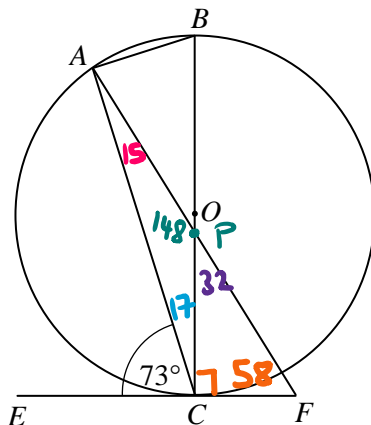
25

(Total for Question 12 is 4 marks)

10

13 *A*, *B* and *C* are points on the circumference of a circle with centre *O*.

EF is the tangent to the circle at *C*.
Angle *ACE* = 73°
Angle *FAB* = 5 × Angle *CAF*

Work out the size of angle *AFC*.

[Reasons not required in this Q]

Angle ACB = 90°   The angle in a semicircle is 90°

90 ÷ 6 = 15

Angle CAF = 15°

Angle ECB = 90°   Angle ACB = 17°

A tangent meets a radius at 90°

Angle APC = 148°   Angles in a triangle add to 180°

Angle CPF = 32°   Angles on a straight line add to 180°

Angle AFC = 58°   Angles in a triangle add to 180°

58 °

(Total for Question 13 is 4 marks)

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14 *A*, *B* and *C* are points on the circumference of a circle with centre *O*.
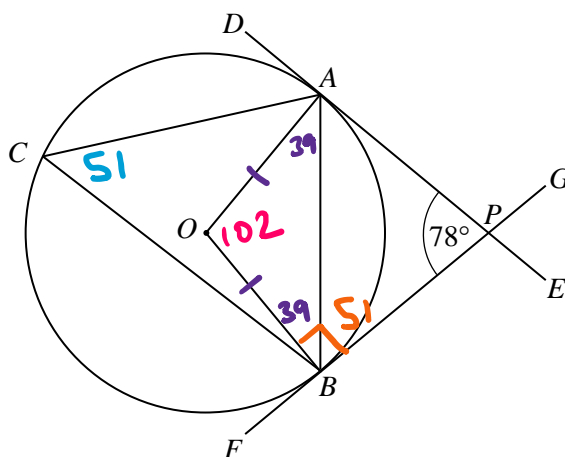
DE and *FG* are tangents to the circle at *A* and *B* that intersect at the point *P*.
Angle *APB* = 78°

[Reasons not required in this Q]

(a) Work out the size of angle *ACB*.

Angle AOB = 102° A tangent meets a radius at 90°
and angles in a quadrilateral add to 360°
Angle ACB = 51° Angle at the circumference is
half the angle at the centre

51 °

(2)

(b) Work out the size of angle *ABP*.

Angle ABO = Angle BAO = 39°
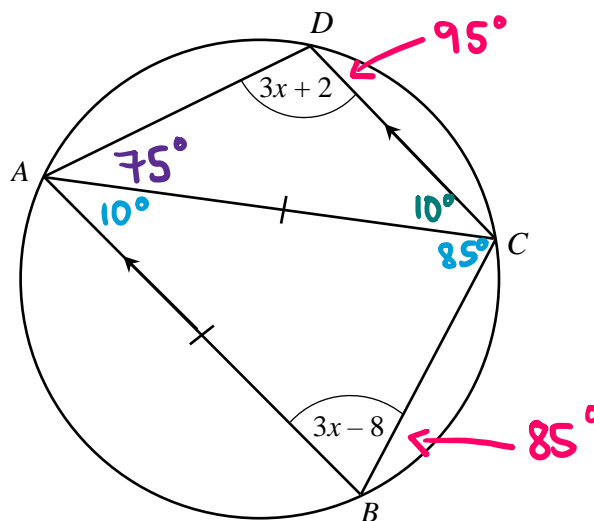Base angles in an isosceles triangle are equal

Angle ABP = 90 - 39
= 51

A tangent meets a radius at 90°

51 °

(2)

(Total for Question 14 is 4 marks)

15

D

→ 95°

$3x + 2$

A

75°

10°

10°

85°

C

$3x - 8$

← 85°

B

A, B, C and D are points on the circumference of a circle.
$ABCD$ is a trapezium with AB parallel to DC.

$AB = AC$

[Reasons not required in this Q]

Work out the size of angle DAC.
You must show all your working.

$3x + 2 + 3x - 8 = 180°$
Opposite angles in a cyclic quadrilateral
add to 180°

$6x - 6 = 180$ $3(31) + 2 = 95$
$6x = 186$ $3(31) - 8 = 85$
$x = 31°$

Angle ACB = Angle ABC = 85

Angle CAB = 10° Angles in a triangle add to 180°
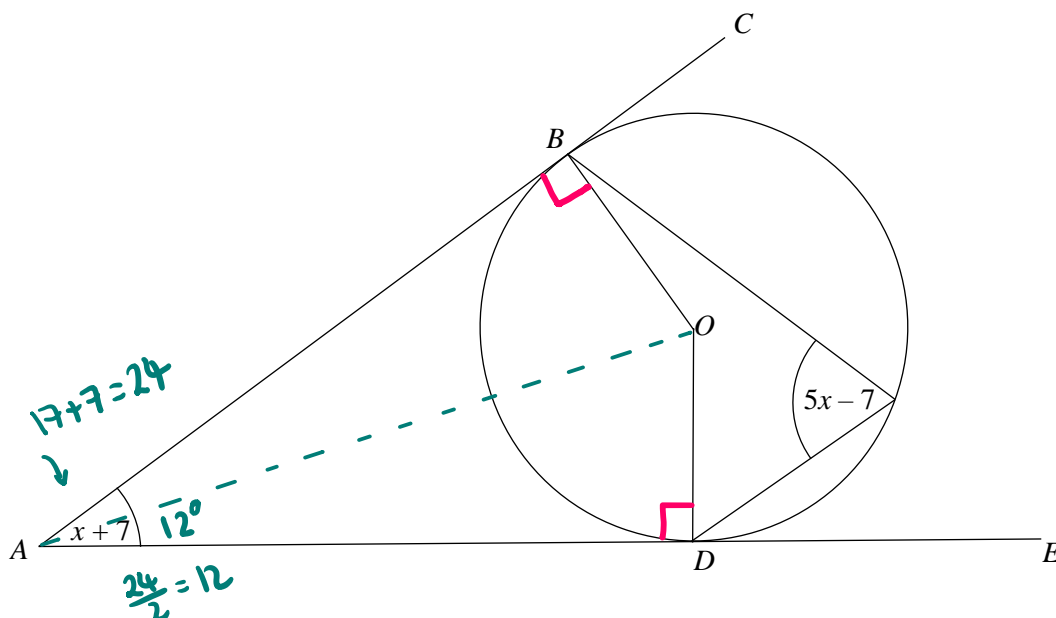
Angle DCA = Angle CAB alternate angles are equal

Angle DAC = 75° Angles in a triangle add to 180°

75 °

(Total for Question 15 is 5 marks)

1st

13

16

$17 + 7 = 24$

$\frac{24}{2} = 12$

B and *D* are points on the circumference of a circle, centre *O*.
ABC and *ADE* are tangents to the circle.

[Reasons not required in this Q]

(a) Work out value of *x*.
You must show all your working.

Angle BOD = 2(5x − 7)
(twice angle at circumference)

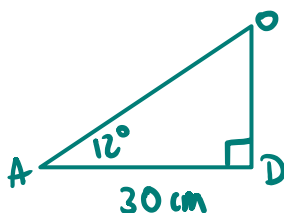Angle BOD = 180 − (x + 7)
(angles in quadrilateral add to 360°)

$10x − 14 = 180 − x − 7$
$10x − 14 = 173 − x$
$11x = 187$
$x = 17$

$x =$ ....**17**........ °

(3)

AD = 30 cm

(b) Work out the radius of the circle.
Give your answer to three significant figures.

$\hat{BAD} = 24°$
$\hat{OAD} = 12°$

$\tan(12) = \frac{OD}{30}$

$OD = 30\tan(12)$

........**3·38**........ cm

(3)

(Total for Question 17 is 6 marks)

10

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