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International Examinations Papers
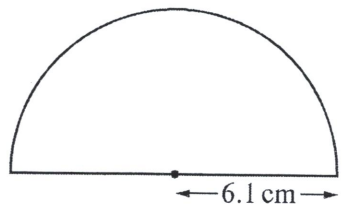
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MATHEMATICS -CORE

TOPIC- Circles

1'

NOT TO
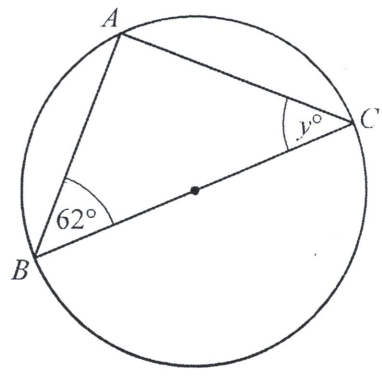SCALE

←—6.1 cm—→

A protractor is a semi-circle of radius 6.1 cm.

Calculate the **perimeter** of the protractor.

Answer .... cm [3]

0 2

NOT TO
SCALE

A, *B* and *C* lie on a circle with diameter *BC*.

(i) Find the value of *y*.

Answer(d)(i) $y =$ .... [2]

(ii) Write down the mathematical name for the straight line *AB*.

Answer(d)(ii) .... [1]

(a)
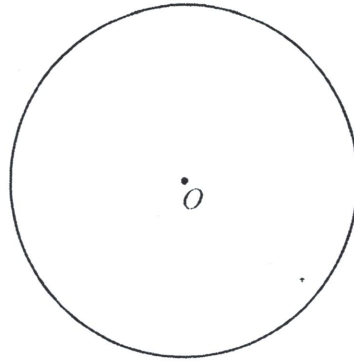
O is the centre of the circle.

Measure the diameter of this circle.
Give your answer in millimetres.

Answer(a) .... mm [1]

(b) A circular dinner plate has radius 12.7 cm.

Work out the area of the plate.
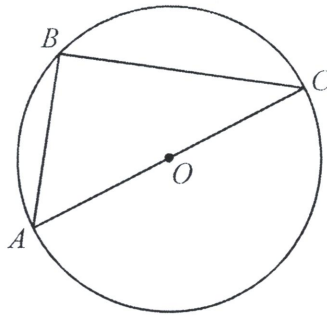
Answer(b) .... cm^2 [2]
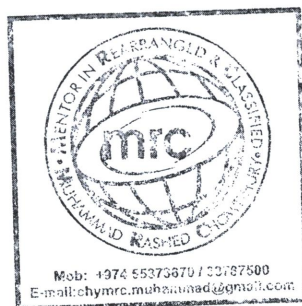
04

NOT TO SCALE

A, B and C are points on the circumference of a circle centre O.
AC is a straight line.

(a) Explain why angle ABC is 90°.

Answer(a) .... [1]

(b) The **diameter** of the circle is 3 cm.

Calculate the area of this circle.

Answer(b) .... cm^2 [2]

0 5
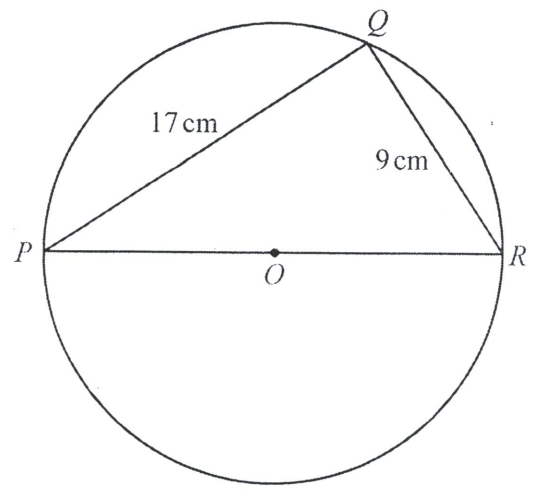
NOT TO SCALE

The diagram shows a circle, centre O.
P, Q and R are points on the circumference.
$PQ = 17$ cm and $QR = 9$ cm.
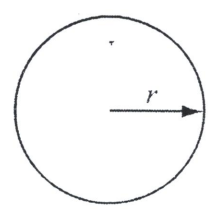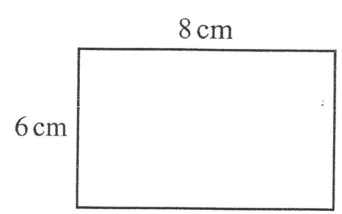
(a) Explain why angle PQR is 90°.

Answer(a) ....

.... [1]

(b) Calculate the length PR.

Answer(b) $PR = $ .... cm [2]

0 6

8 cm

6 cm

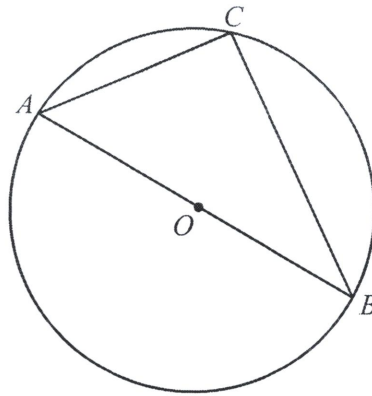NOT TO SCALE

The perimeter of the rectangle is the same length as the circumference of the circle.

Calculate the radius, r, of the circle.

Answer $r = $ .... cm [3]

07

NOT TO
SCALE

The diagram shows a circle with diameter *AB* and centre *O*.
C is a point on the circumference of the circle.

(a) Explain how you know that angle *ACB* is 90° without having to measure it.

Answer(a) .... [1]

(b) *AB* = 13 cm and *AC* = 5 cm.

Calculate the length *BC*.

Answer(b) BC = ... cm [3]

(c) Calculate angle *ABC*.

Answer(c) Angle *ABC* = ... [2]

08

A, B and C lie on a circle with diameter AB.
Angle $CAB = 32°$, $AC = 8$ cm and $BC = 5$ cm.

(a) Work out the size of angle CBA.

Answer(a) Angle CBA = ... [2]

(b) Work out the length of AB.

Answer(b) AB = ... cm [2]
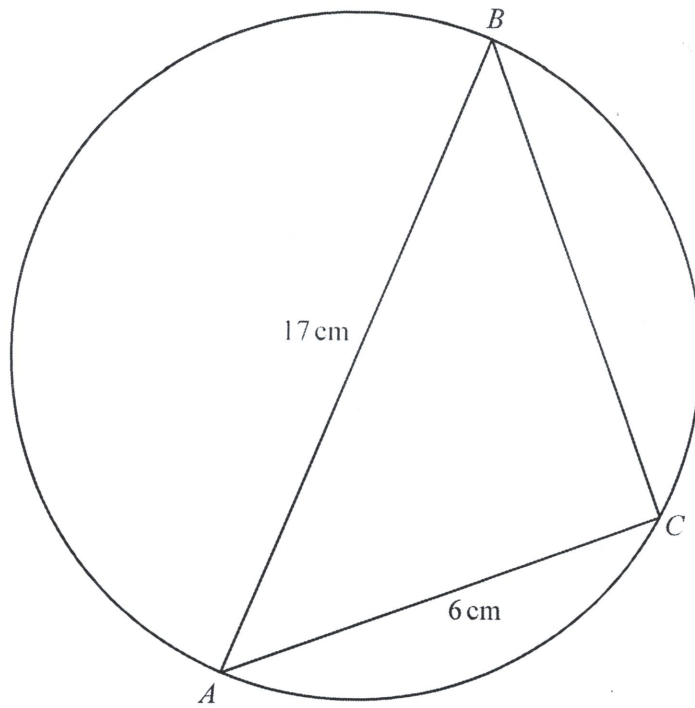
NOT TO
SCALE

In the diagram, *AB* is a diameter of the circle and *C* is a point on the circumference.
AB = 17 cm and *AC* = 6 cm.

(a) Calculate the area of the circle.

Answer(a) .... cm^2 [2]

(b) (i) Explain why angle *ACB* = 90°.

Answer(b)(i) .... [1]

(ii) Calculate *BC*.

Answer(b)(ii) *BC* = ... cm [3]

1 0
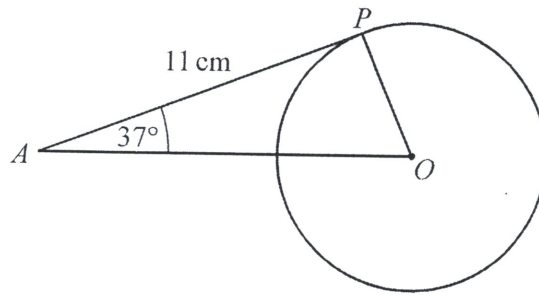
In the diagram, *AP* is a tangent to the circle at *P*.
O is the centre of the circle, angle *PAO* = 37° and *AP* = 11 cm.

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

Answer(a) Angle *OPA* = ... [1]

(b) Work out the radius of the circle.

Answer(b) .... cm [2]

11
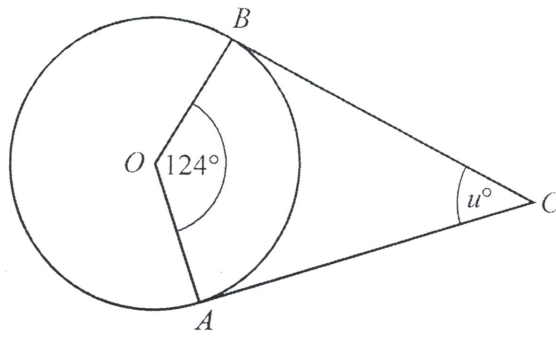
NOT TO
SCALE

A and *B* lie on a circle, centre *O*.
AC and *BC* are tangents to the circle.

Find the value of *u*.

Answer(e) u = ... [2]

12
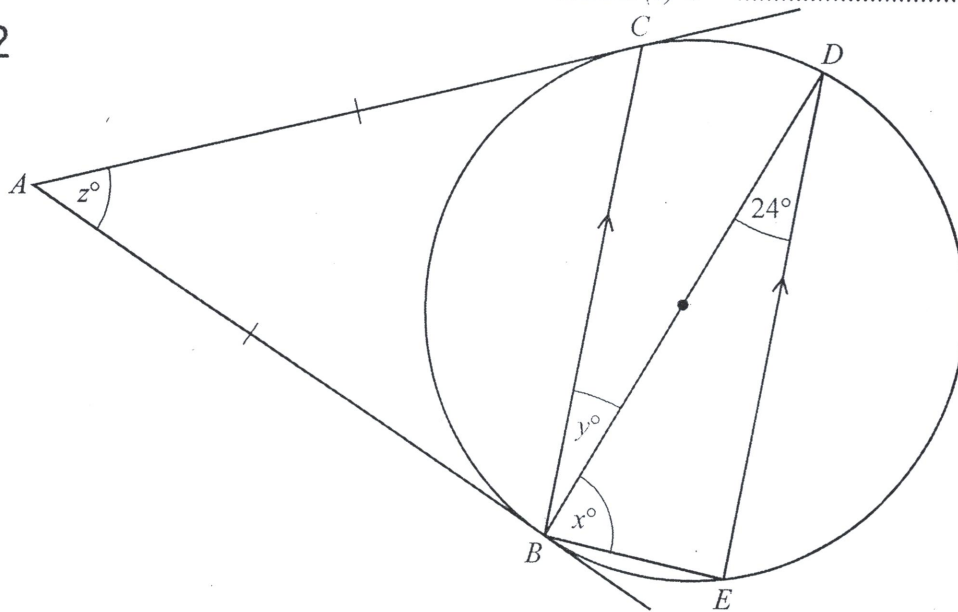
NOT TO
SCALE

The points *B*, *C*, *D* and *E* lie on a circle.
AB and *AC* are equal length tangents to the circle.
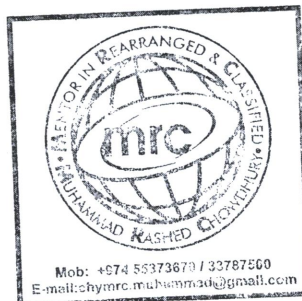*BD* is a diameter of the circle and *BC* is parallel to *ED*.
Angle *BDE* = 24°.

Calculate the value of

(a) *x*,

Answer(a) x = ... [2]

(b) *y*,

Answer(b) y = ... [1]

(c) *z*.

Answer(c) z = ... [2]

13 **(a)**

NOT TO SCALE
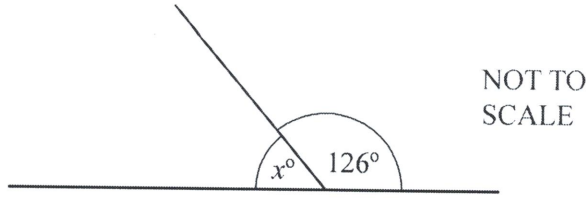
Work out the value of x.

$x =$ .... [1]

(b)

NOT TO SCALE
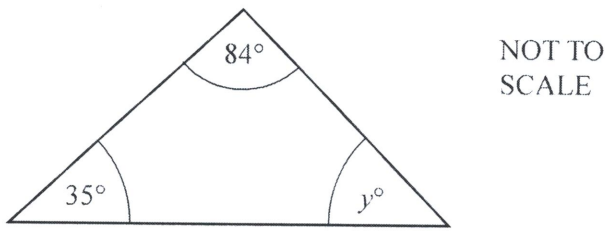
Work out the value of y, giving a reason for your answer.

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

(c)

NOT TO SCALE
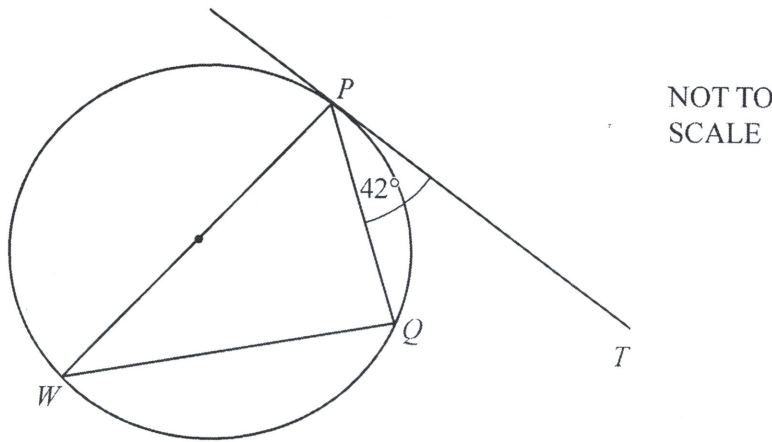
In the diagram, PT is a tangent to the circle at P.
PW is a diameter and angle $TPQ = 42°$.

Find

(i) angle WPQ,

Angle $WPQ =$ .... [1]

(ii) angle PWQ.

Angle $PWQ =$ .... [1]

B

NOT TO
SCALE

C

42°

A
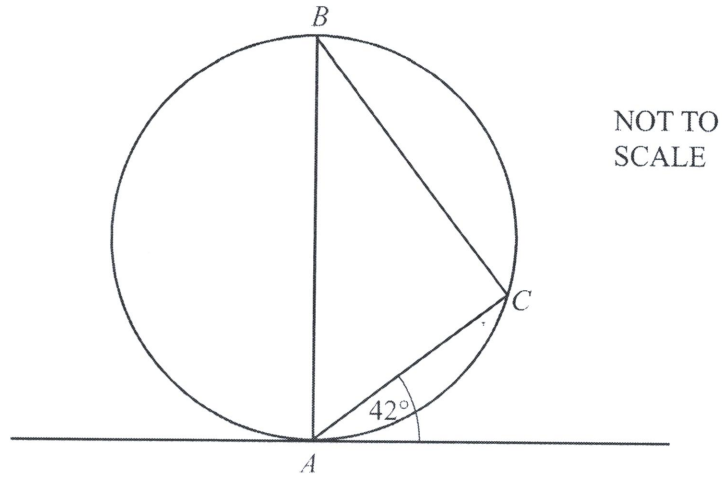
A, B and C are points on the circumference of a circle with diameter AB.
A tangent is drawn at A.

Find

(a) angle BAC,

Angle $BAC =$ .... [1]

(b) angle ABC.

Angle $ABC =$ .... [2]

15

NOT TO
SCALE
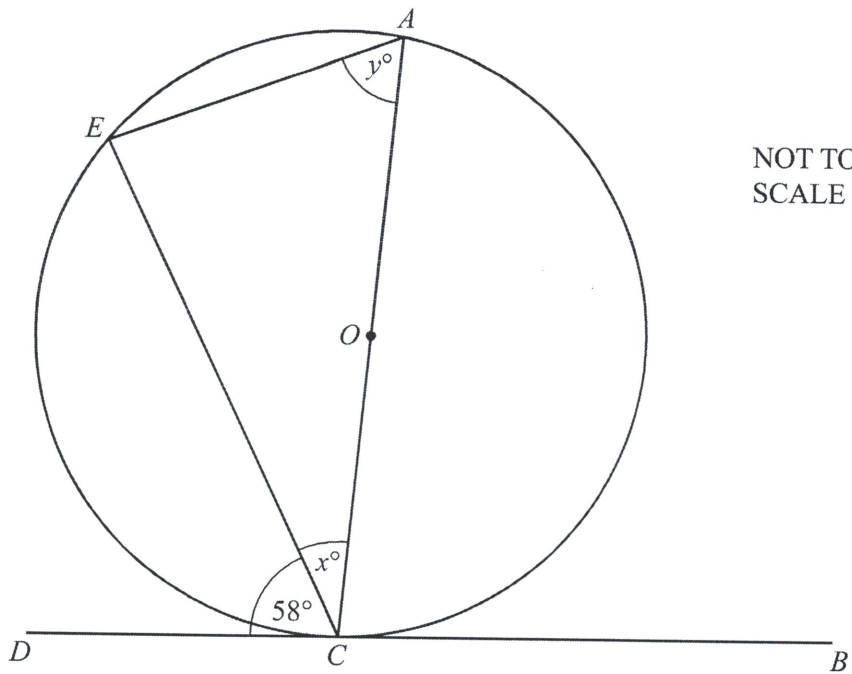
AC is a diameter of a circle, centre *O*.
BCD is a tangent to the circle and *E* is a point on the circumference.
Angle *ECD* = 58°.

Work out the value of

(a) *x*,

Answer(a) x = ... [2]

(b) *y*.

Answer(b) y = ... [2]

16 **(a)** A regular polygon has 9 sides.
For this polygon, calculate

    (i) the size of one exterior angle,

Answer(a)(i) .... [2]

    (ii) the size of one interior angle.

Answer(a)(ii) .... [1]

(b)

NOT TO
SCALE
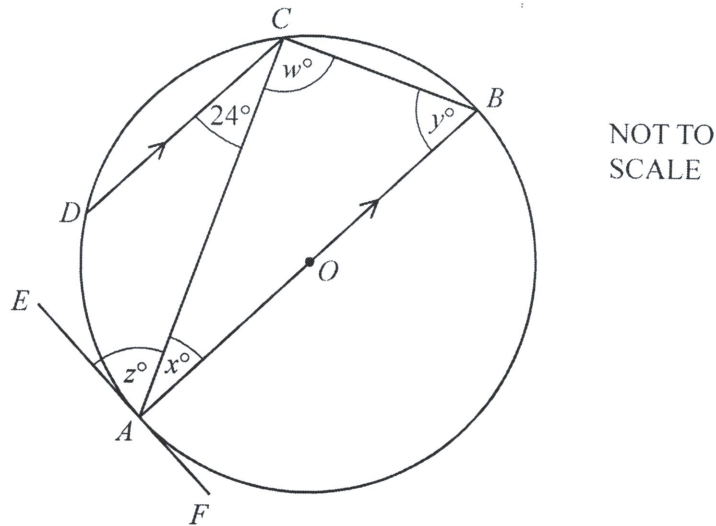
In the diagram, *A*, *B*, *C* and *D* are points on the circumference of a circle, centre *O*.
AB is the diameter and *EF* is a tangent to the circle at *A*.
AB is parallel to *DC* and angle *ACD* = 24°.

Find

    (i) *w*,

Answer(b)(i) *w* = ... [1]

    (ii) *x*,

Answer(b)(ii) *x* = ... [1]

    (iii) *y*.

Answer(b)(iii) *y* = ... [1]

(c) Complete the statement.

z = ... because ....

.... [2]

17
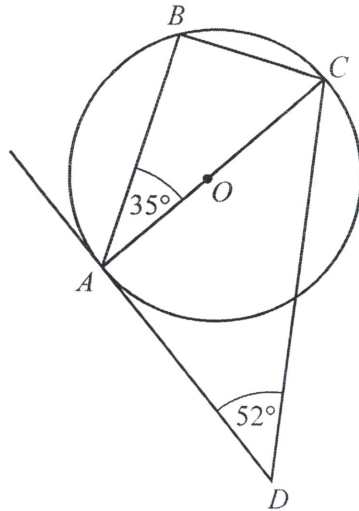
NOT TO SCALE

Points A, B and C lie on a circle with centre O.
DA is a tangent to the circle at A.
Angle $BAC = 35°$ and angle $ADC = 52°$.

(i) Write down the size of angle ABC giving a reason for your answer.

Answer(c)(i) Angle $ABC =$ .... because ....

.... [2]

(ii) Work out the size of angle BCA.

Answer(c)(ii) Angle $BCA =$ .... [1]

(iii) Work out the size of angle BCD.

Answer(c)(iii) Angle $BCD =$ .... [3]

18
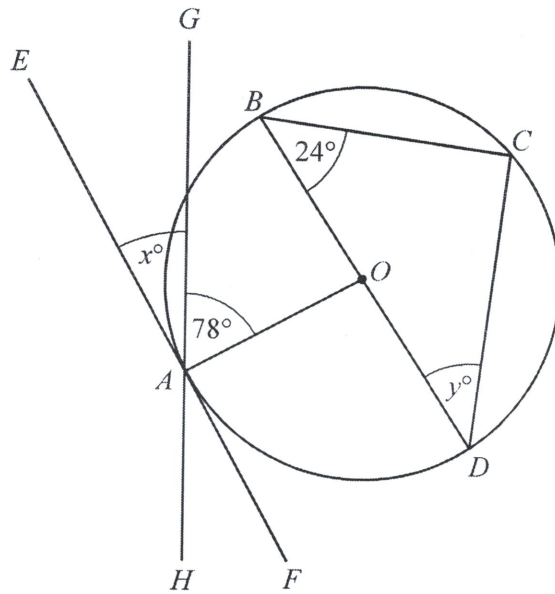
NOT TO SCALE

A, *B*, *C* and *D* are points on the circumference of a circle, centre *O*.
EF is a tangent to the circle at *A*.
GH is a straight line through the point *A*.
Angle *CBD* = 24° and angle *OAG* = 78°.

(a) (i) Write down the mathematical names of lines *BC* and *OA*.

Answer(a)(i) *BC* is a ....

OA is a .... [2]

(ii) Find the value of *x*, giving a reason for your answer.

Answer(a)(ii) *x* = ... because ....

.... [2]

(iii) Find the value of *y*, giving a reason for your answer.

Answer(a)(iii) *y* = ... because ....

.... [3]

NOT TO SCALE
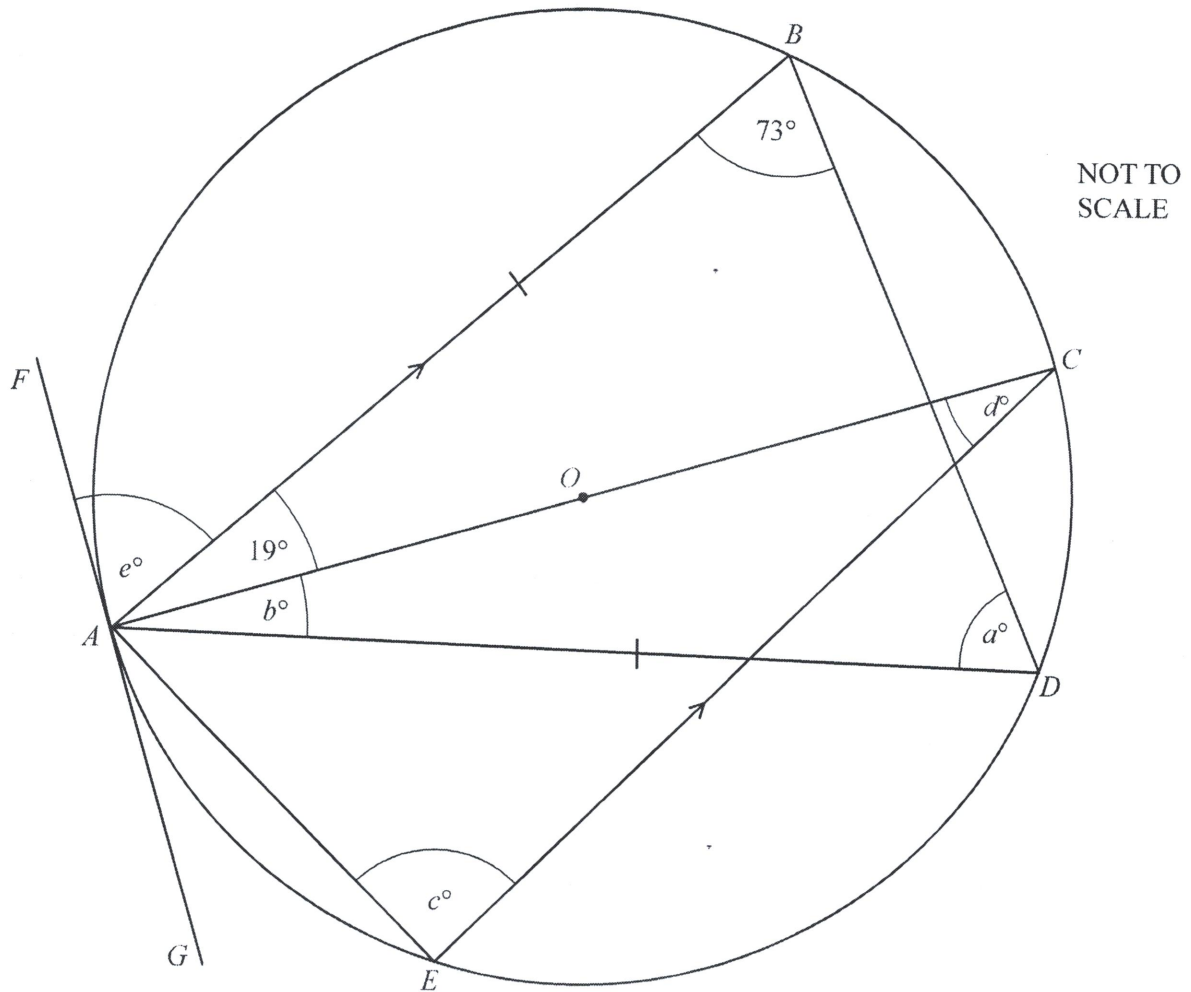
A, *B*, *C*, *D* and *E* are points on the circumference of a circle, centre *O*.
GAF is a tangent to the circle at *A*.
AB is parallel to *EC* and *AB* = *AD*.

(a) Write down the mathematical name of triangle *ABD*.

.... [1]

(b) Find the value of

(i) a,

$a =$ .... [1]

(ii) b,

$b =$ .... [1]

(iii) c,

$c =$ .... [1]

(iv) d,

$d =$ .... [1]

(v) e.

$e =$ .... [2]

(c) The diameter, AC, of the circle is 13 cm.

Calculate the circumference of the circle.
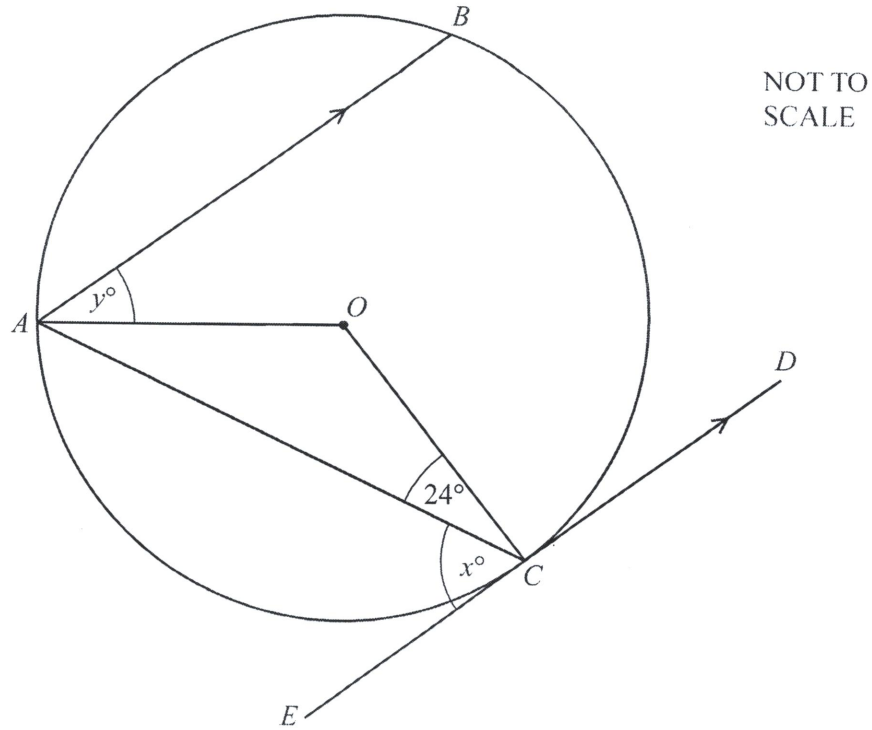Give your answer correct to 1 decimal place.

.... cm [3]

Question 9 is printed on the next page.

NOT TO SCALE

The diagram shows a circle with centre O.
ED is a tangent to the circle at C.
AB is parallel to ED and angle ACO = 24°.

Find the value of

(a) x,

Answer(a) x = ... [1]

(b) y.

Answer(b) y = ... [2]

21

NOT TO
SCALE
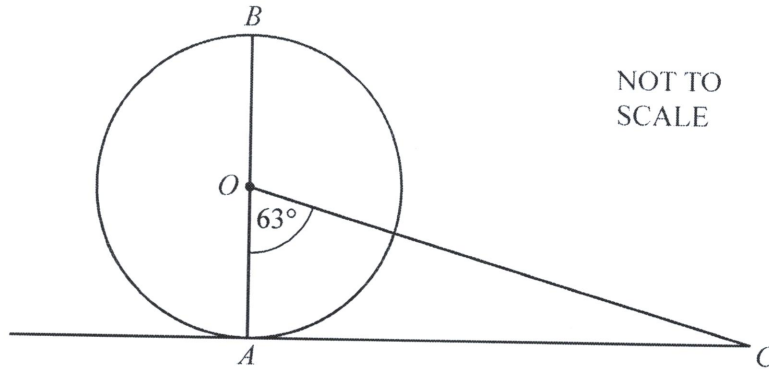
The diagram shows a circle, centre O with diameter $AB = 15\,\text{cm}$.
AC is a tangent to the circle at A and angle $AOC = 63°$.

(a) Calculate the area of the circle.

Answer(a) .... cm^2 [2]

(b) (i) Work out the size of angle ACO.

Answer(b)(i) Angle $ACO =$ .... [2]

(ii) Give one geometrical reason for your answer to **part (b)(i)**.

Answer(b)(ii) ....

.... [1]

22 **(a)** The diagram shows a circle, centre O.
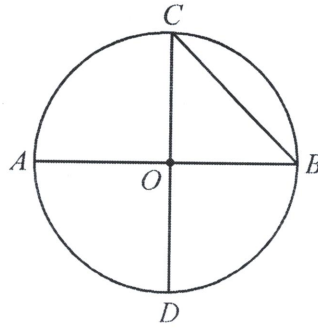
NOT TO SCALE

Write down the mathematical name of the line

(i) OD,

Answer(a)(i) .... [1]

(ii) BC.

Answer(a)(ii) .... [1]

(b)
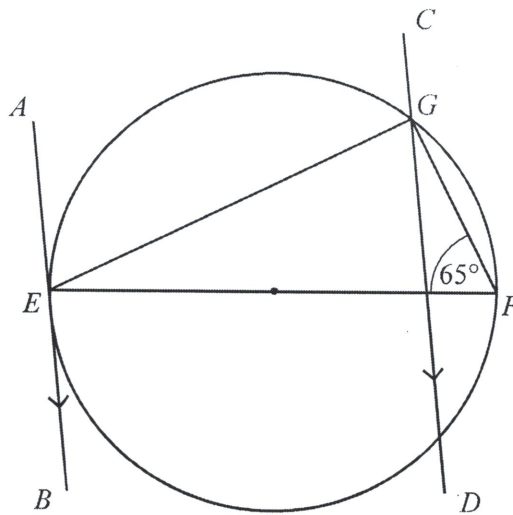
NOT TO SCALE

The diagram shows a circle with diameter EF.
AEB is a tangent to the circle at E.
CD is parallel to AB and angle $EFG = 65°$.

Calculate the size of the following angles, giving a reason for each answer.

(i) Angle $EGF =$ .... because .... [2]

(ii) Angle $GEF =$ .... because .... [2]

(iii) Angle $AEG =$ .... because .... [2]

(iv) Angle $EGD =$ .... because .... [2]

2 **3**   (a)

31- 17

NOT TO
SCALE
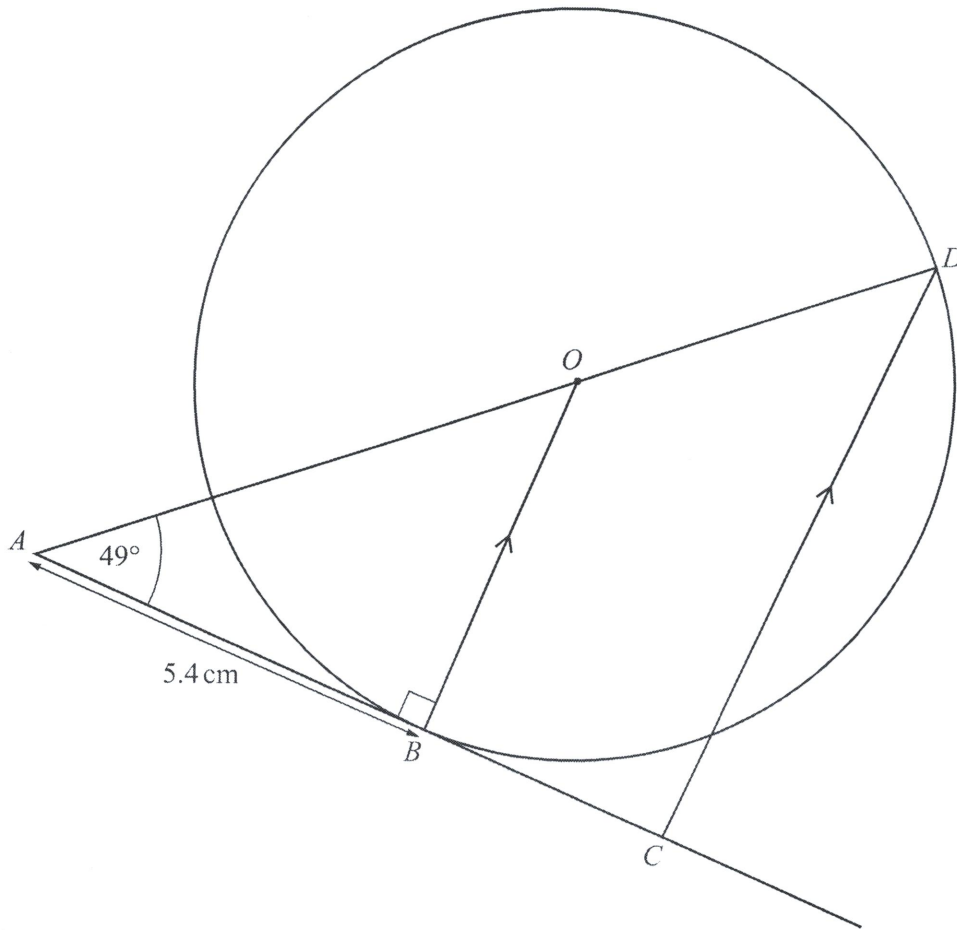
The diagram shows a circle, centre *O*, with points *B* and *D* on the circumference.
The line *AC* touches the circle at *B*.
OB is parallel to *DC* and angle *OAB* = 49°.

(i)   Write down the mathematical name of the line *OB*.

.... [1]

(ii)   Write down the reason why angle *ABO* is 90°.

....

.... [1]

(iii)   Find angle *AOB*.

Angle *AOB* = ... [1]

(iv)   Write down the reason why angle *ADC* = angle *AOB*.

.... [1]

(v)   Complete the statement using a mathematical word.

Triangle *AOB* is .... to triangle *ADC*.   [1]

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(vi) $AB = 5.4\,\text{cm}$

Calculate

(a) OB,

$OB = $ .... cm [2]

(b) OA,

$OA = $ .... cm [2]

(c) the area of triangle AOB.

.... cm^2 [2]

(b) Here is a polygon with 7 sides.
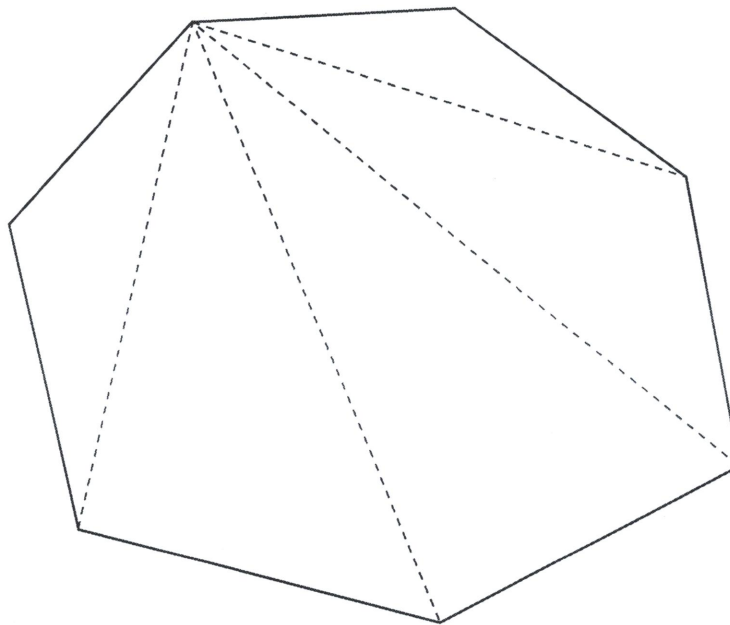
Show that the sum of the interior angles of this polygon is 900°.

[1]