## Section A  Finding Missing Angles  Grade B → A*
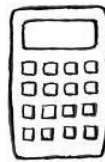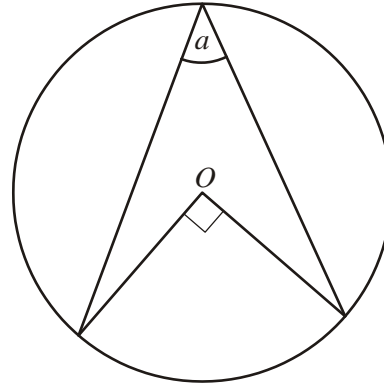
**In this section, no diagrams are drawn accurately**

**1.** (a) In the diagram, *O* is the centre of the circle.

Write down the value of *a*.

Answer ........................................................... degrees

**(1)**

(b)
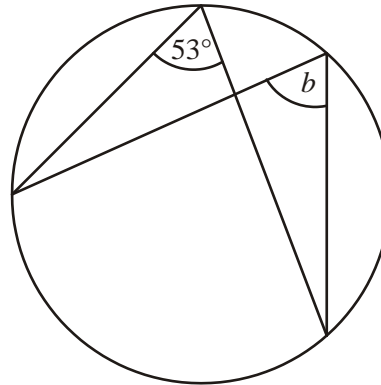
Write down the value of *b*.

Answer ........................................................... degrees

**(1)**

(c) In the diagram, *O* is the centre of the circle.
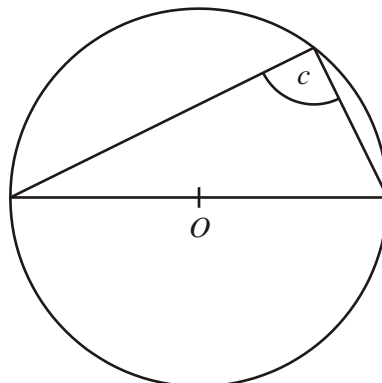
Write down the value of *c*.

Answer ........................................................... degrees

**(1)**

(d)
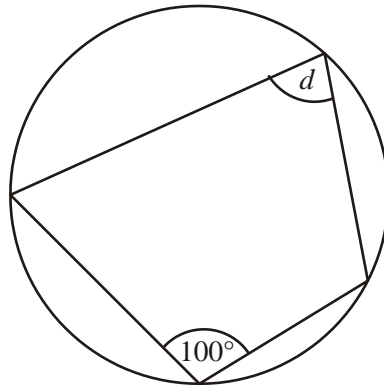


Write down the value of *d*.

Answer .......................................................... degrees

**(1)(Total 4 marks)**

**2.** (a) The diagram shows a circle with centre *O*.
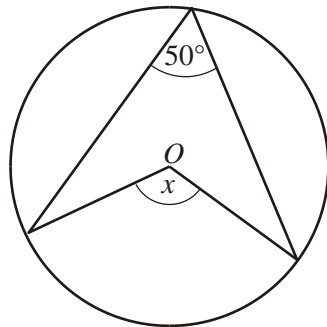


Not drawn accurately

Work out the size of the angle marked *x*.

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Answer .......................................................... degrees

**(1)**

(b) The diagram shows a different circle with centre *O*.
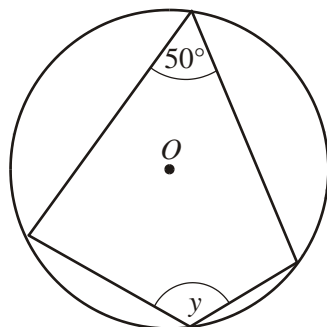


Not drawn accurately

Work out the size of the angle marked *y*.

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Answer .......................................................... degrees

**(1) (Total 2 marks)**

**3.** (a) In the diagram, *O* is the centre of the circle.

Not drawn accurately

Calculate the value of *a*.

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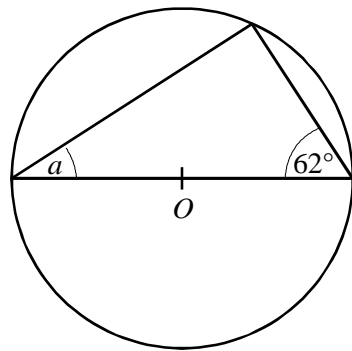
Answer ............................................................ degrees

**(2)**

(b)
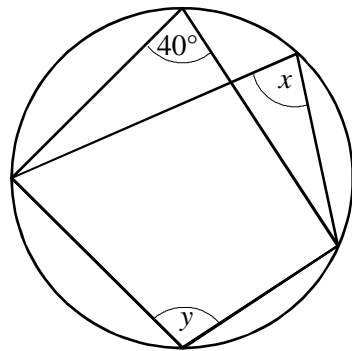
Not drawn accurately

(i) Write down the value of *x*.

Answer ............................................................ degrees

**(1)**

(ii) Calculate the value of *y*.

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Answer ............................................................ degrees

**(1)**
**(Total 4 marks)**

**4.**  (a)  *O* is the centre of the circle.



Not drawn accurately

Calculate the value of *a*.

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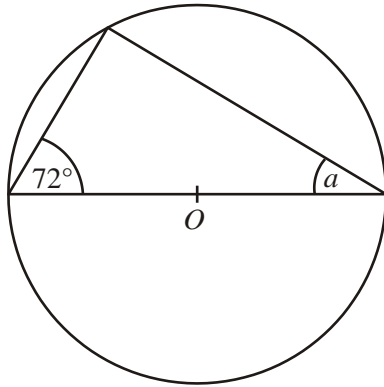
Answer ........................................... degrees

**(2)**

(b)  *O* is the centre of the circle.
*A, B, C* and *D* are points on the circumference.
Angle *AOC* = 126°
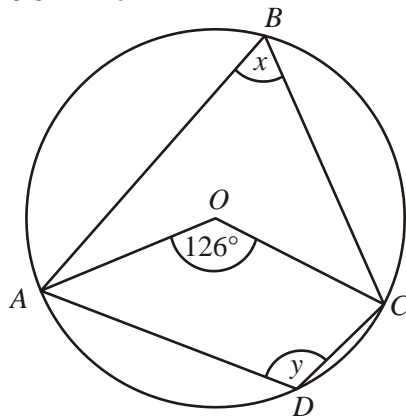


Not drawn accurately

(i)  Calculate the value of *x*.

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Answer ........................................... degrees

**(1)**

(ii)  Calculate the value of *y*.

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Answer ........................................... degrees

**(1)**
**(Total 4 marks)**

**5.** *A, B, C* and *D* are points on the circumference of a circle.
*AC* is a diameter of the circle.
Angle *BAC* = 65°
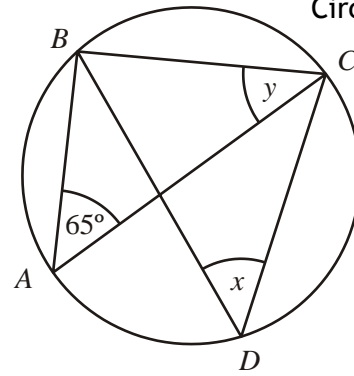
(a) Write down the value of *x*.

Answer ......................................................... degrees

**(1)**

(b) Calculate the value of *y*.

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Answer ......................................................... degrees

**(1)**
**(Total 2 marks)**

**6.** (a) *O* is the centre of the circle.
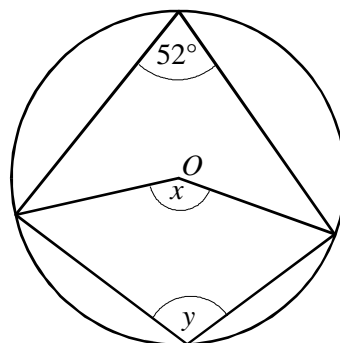
Not drawn

accurately

(i) Find the value of *x*.

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Answer *x* = .................................................... degrees

**(1)**

(ii) Find the value of *y*.

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Answer *y* = .................................................... degrees

**(1)**

(b)     *PQ* and *PR* are tangents to the circle centre *O*.
∠ *QPR* is 65°.
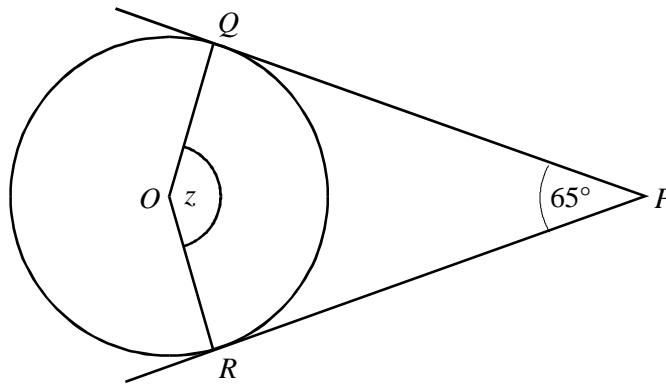


Not drawn

accurately

Calculate the size of angle *QOR* (marked z on the diagram).

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Answer .................................................... degrees

**(2)**

**(Total 4 marks)**

**7.**   (a)   In the diagram, *O* is the centre of the circle and *P*, *Q* and *R* are points on the
circumference.
Angle *P* = 25°
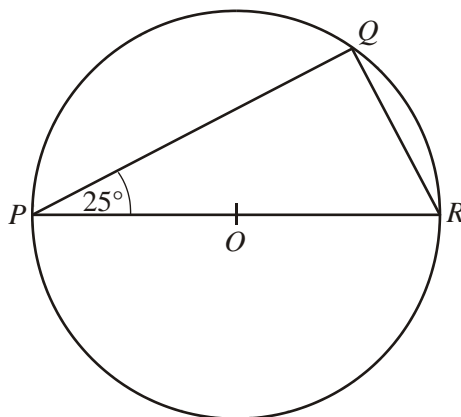


Not drawn accurately

Work out the size of angle *R*.

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Answer .......................................................... degrees

**(2)**

(b)    *A*, *B*, *C* and *D* are four points on the circumference of another circle.
       *AC* meets *BD* at *X*.
       Angle *ABD* = 56° and angle *CXD* = 80°
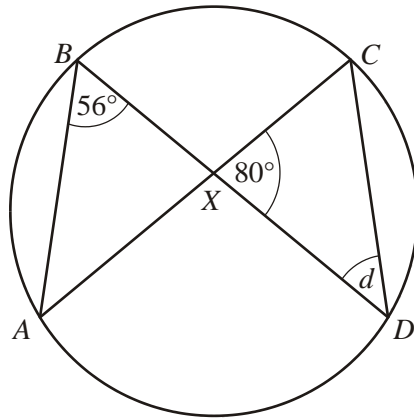


Not drawn accurately

Work out the value of angle *d*.
You **must** show all your working.

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                    Answer ........................................................ degrees

**(3)**
**(Total 5 marks)**

**8.**      In the diagram below, *O* is the centre of the circle and angle *PSR* = 100°.
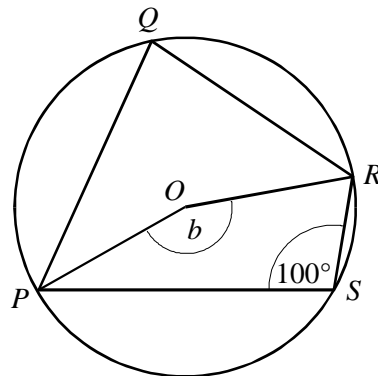


Not drawn accurately

Calculate the value of *b*.

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                    Answer ........................................................ degrees
**(Total 2 marks)**

**9.** *A, B, C* and *D* are four points on the circumference of a circle.
The lines *AB* and *DC* are produced to meet at *E*.
Angle *CBE* = 67° and angle *BEC* = 35°



Not drawn accurately
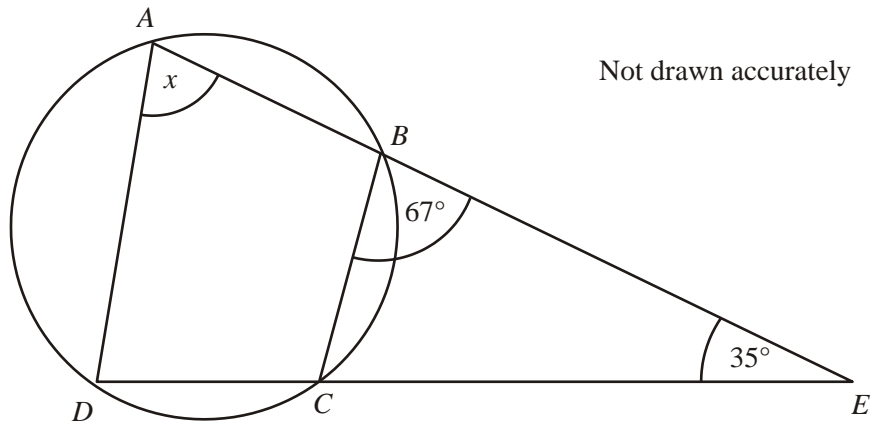
(a) What is the special name for the quadrilateral *ABCD?*

Answer ……………………………….........

**(1)**

(b) Work out the value of *x*.
You **must** show your working.

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Answer ………………………………… degrees

**(3)**
**(Total 4 marks)**

**10.** *A*, *B* and *C* are three points on the circumference of a circle.
The line *SAT* is a tangent to the circle at *A*.
The line *RBT* is a tangent to the circle at *B*.
These tangents meet at *T*.
Angle *CAB* = 47° and angle *BTA* = 56°
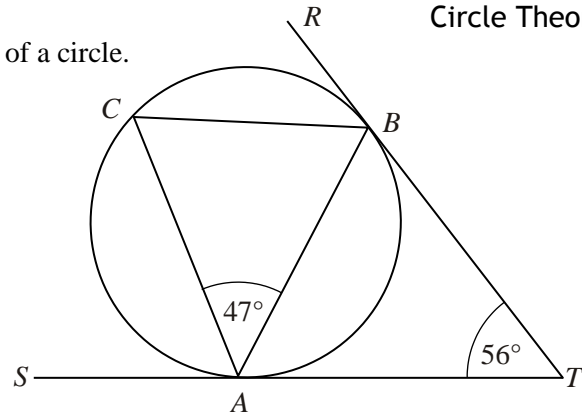
(a) Calculate the size of angle *BAT*.

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Answer ………………………………….…… degrees

**(2)**

(b) Calculate the size of angle *ABC*.

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Answer ………………………………….…… degrees

**(2)(Total 4 marks)**

**11.** (a) *A*, *B*, *C* and *D* are points on the circumference of a circle centre *O*.
∠*AOC* = 130°
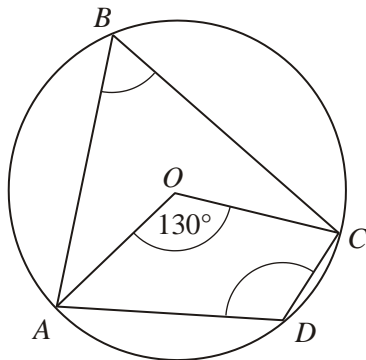
Not drawn accurately

Work out the size of angles *ABC* and *ADC*.

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Answer    Angle *ABC* ................................. degrees

**(1)**

Angle *ADC* ................................. degrees

**(1)**

(b)   *ABC* are three points on the circumference of a circle centre *O*.
       *SCT* is a tangent to the circle.
       $\angle SCA = 56°$       $\angle COB = 130°$

Not drawn accurately
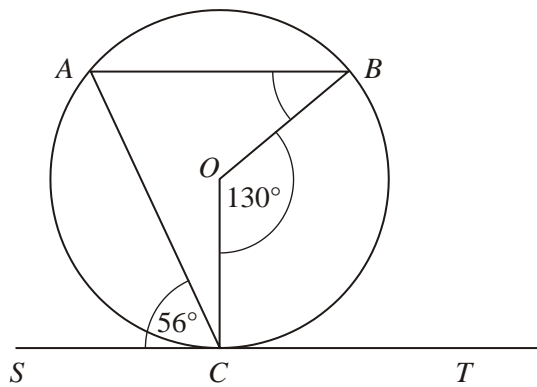


Find the size of angle *OBA*.

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Answer     Angle *OBA* = .............................. degrees

**(3)**
**(Total 5 marks)**

**12.**     The diagram shows a circle, centre *O*.
*TA* is a tangent to the circle at *A*.
Angle *BAC* = 58° and angle *BAT* = 74°.
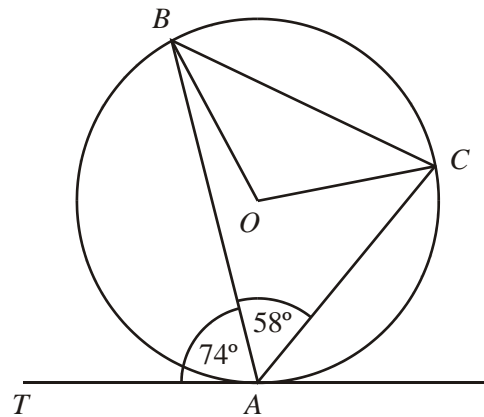


Not drawn accurately

(i)   Calculate angle *BOC*.

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Answer Angle *BOC* = ............................... degrees

**(1)**

(ii)   Calculate angle *OCA*.

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Answer Angle *OCA* = ............................... degrees

**(3)**
**(Total 4 marks)**

**13.** *A, B* and *C* are points on the circumference of a circle with centre *O.*
*BD* and *CD* are tangents.
Angle *BDC* = 40°
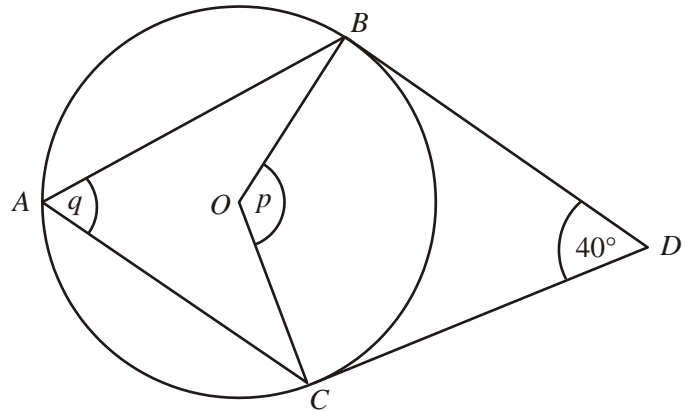
(a) (i) Work out the value of *p*.

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Answer ......................................................... degrees

**(2)**

(ii) Hence write down the value of *q*.

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Answer ......................................................... degrees

**(1)**

(b)   The tangent *DB* is extended to *T*.
      The line *AO* is added to the diagram.
      Angle *TBA* = 62°
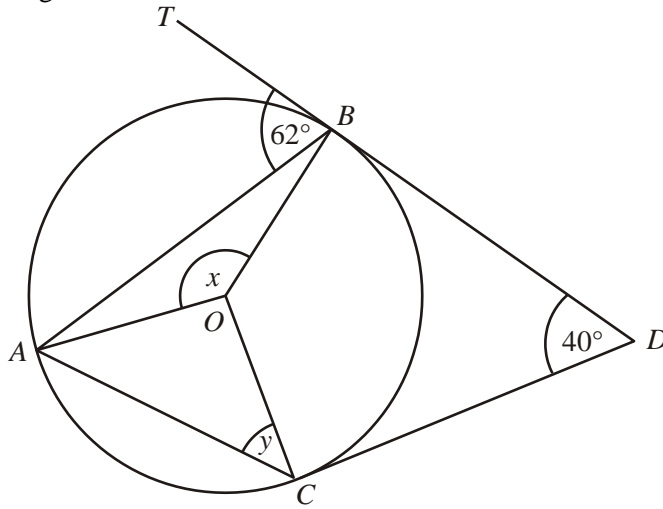
Not drawn accurately

(i)   Work out the value of *x*.

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Answer ........................................................... degrees

**(2)**

(ii)  Work out the value of *y*.

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Answer ........................................................ degrees

**(2)**
**(Total 7 marks)**

Success:

Target:
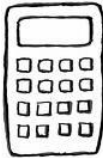
## Section B    Explanation of Missing Angles    Grade A / A*

1. In the diagram, $O$ is the centre of the circle.
   $A, B, C$ and $D$ are points on the circumference.
   Angle $AOC = 130°$
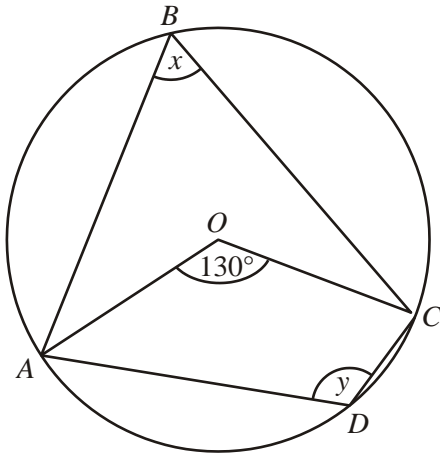


Not drawn accurately

(a) Calculate the value of $x$.
   Give a reason for your answer.

   Answer $x =$ .........................degrees

   Reason .................................................................................................................

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   **(2)**

(b) Calculate the value of $y$.
   Give a reason for your answer.

   Answer $y =$ .........................degrees

   Reason .................................................................................................................

   **(2)**
   **(Total 4 marks)**

**2.** *O* is the centre of the circle.

not drawn accurately
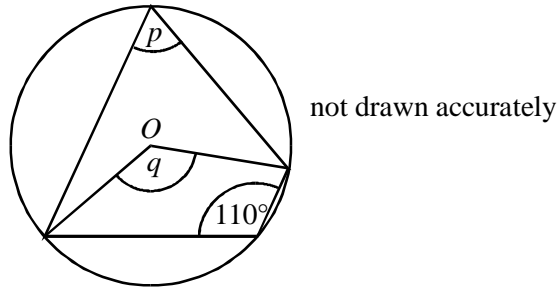
(a) Calculate the value of angle *p*.

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Answer *p* = ............................................. degrees

Reason ..................................................................................................................

**(2)**

(b) Calculate the value of angle *q*.
Give a reason for your answer.

Answer *q* = ............................................. degrees

Reason ..................................................................................................................

**(2)**
**(Total 4 marks)**

**3.** *A* and *C* are points on the circumference of a circle centre *B*.
*AD* and *CD* are tangents.
Angle *ADB* = 40°.

Not drawn accurately
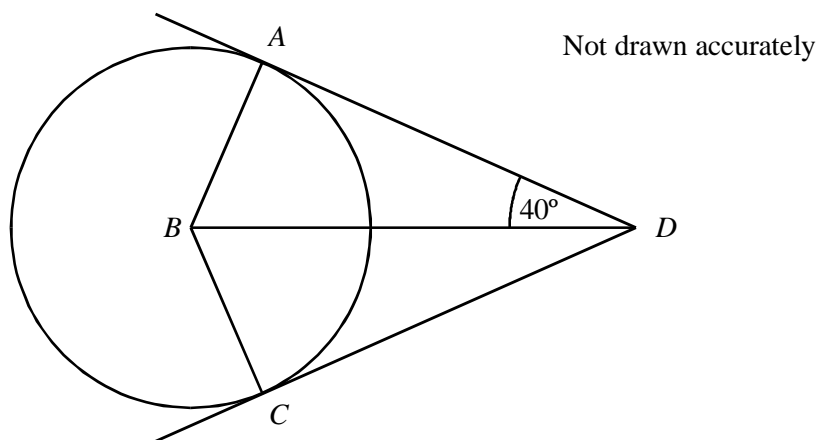
Explain why angle *ABC* is 100°.

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**(Total 2 marks)**

**4.**     *A*, *B* and *C* are points on the circumference of a circle with centre *O*.
*BOC* is a straight line.
Angle *ABC* = 20°
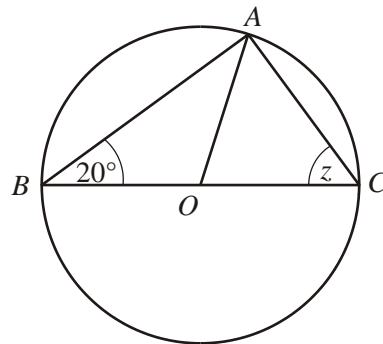


Not drawn accurately

Work out the size of the angle marked *z*.
Explain your answer.

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Answer .................................. degrees
**(Total 2 marks)**

**5.**     Which **one** of the following kites is a cyclic quadrilateral? Give a reason for your answer.

**Kite 1**            **Kite 2**            **Kite 3**
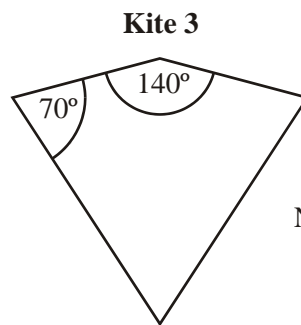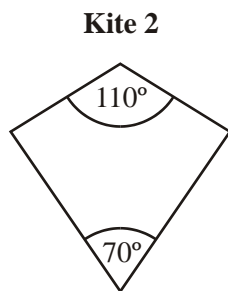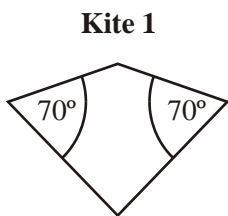


Not drawn accurately

Answer .......................................................

Reason ..................................................................................................................

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**(Total 2 marks)**

**6.**     Points *P*, *Q*, *R* and *S* lie on a circle.

*PQ = QR*

Angle *PQR* = 116°
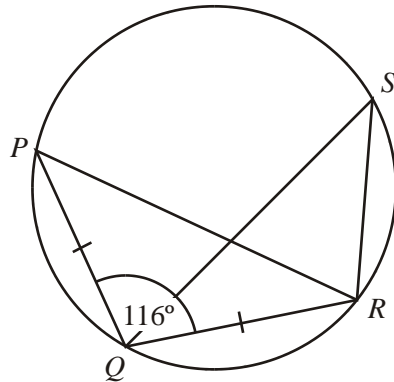


Not drawn accurately

Explain why angle *QSR* = 32°.

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**(Total 2 marks)**

**7.**     *P, Q* and *R* are points on the circumference of the circle.
*NPT* is the tangent to the circle at *P*.
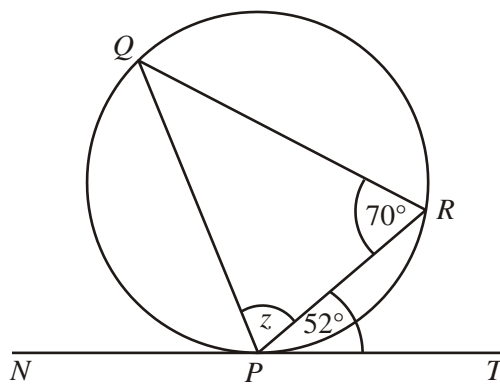


Not drawn accurately

Calculate the value of *z*.
Give a reason for each step of your working.

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Answer .......................................................degrees

**(Total 3 marks)**

**8.** *CD* is a tangent to the circle at *C*.
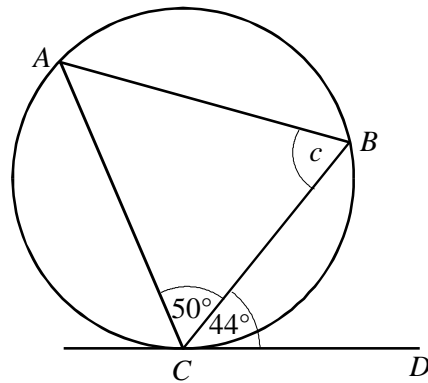
Not drawn accurately

Calculate the value of *c*.

Give reasons for your answer.

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Answer ......................................................... degrees

**(Total 3 marks)**

Success:

Target:

## Section C             Proof             Grade A / A*

1.  *AB* is the diameter of the circle, centre *O*.
    *TP* is a tangent to the circle at the point *P*.
    *ABT* is a straight line.
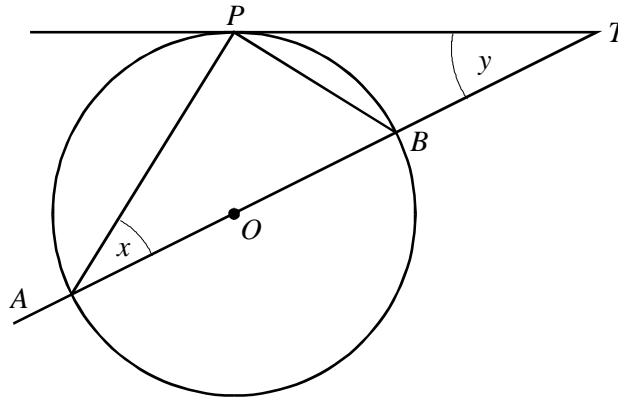


Angle *BAP* = $x°$ and angle *BTP* = $y°$.

Show that $y = 90 - 2x$.

You **must** explain clearly how you obtain your answer.

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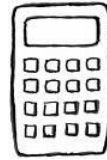
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**(Total 4 marks)**

**2.**  The diagram shows a cyclic quadrilateral *ABCD*.
The straight lines *BA* and *CD* are extended and meet at *E*.

*EA = AC*

Angle *ABC* = $3x°$

Angle *ADC* = $9x°$

Angle *DAC* = $2x°$

Not drawn accurately
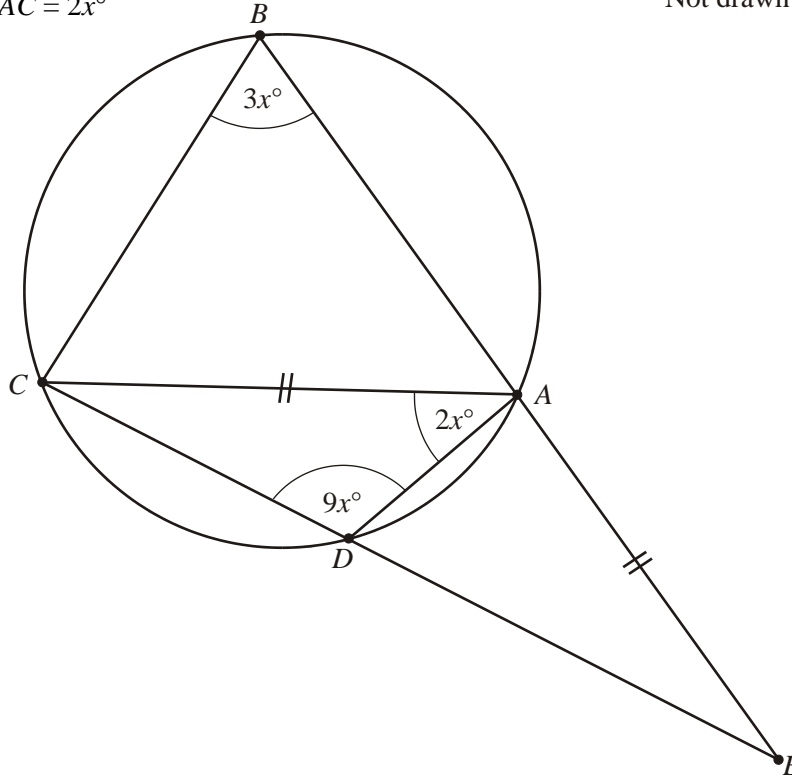


(i)  Show that *x* = 15

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**(2)**

(ii)  Calculate the size of angle *EAD*.

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Answer ................................ degrees

**(4)(Total 6 marks)**

**3.** *A*, *B* and *C* are points on the circumference of a circle with centre *O*.
*BOC* is a diameter of the circle.
Angle *ABC* = 30°
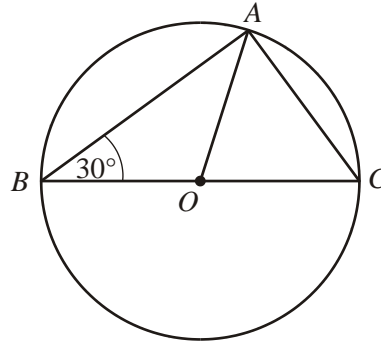
Explain why triangle *OAC* is equilateral.

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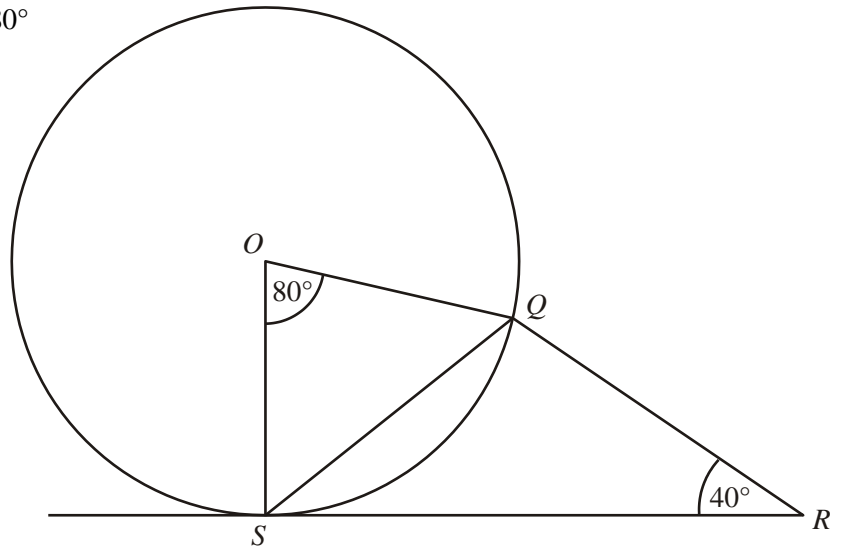.........................................................................................................................

**(Total 3 marks)**

**4.** In the diagram below points *Q* and *S* lie on a circle centre *O*.
*SR* is a tangent to the circle at *S*.
Angle *QRS* = 40° and angle *SOQ* = 80°

Prove that triangle *QSR* is isosceles.

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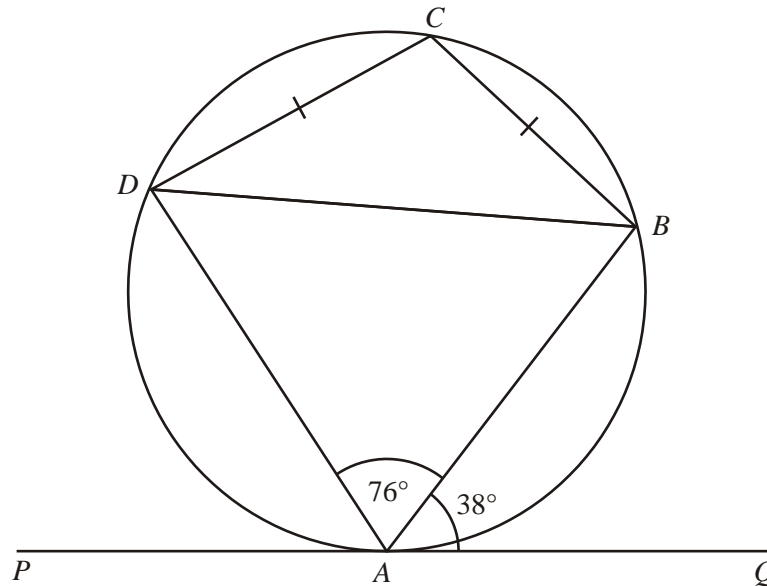
**(Total 3 marks)**

**5.** *ABCD* is a cyclic quadrilateral.
*PAQ* is a tangent to the circle at *A*.
*BC* = *CD*
Angle *QAB* = 38° and angle *BAD* = 76°

Not drawn accurately



Show that *AD* is parallel to *BC*.
Give reasons to justify any values you write down or calculate.

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**(Total 4 marks)**

Success:

Target: