In the style of:
Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number

Candidate Number

Mathematics

Circle Theorems

Higher Tier

GCSE style questions arranged by topic

Paper Reference
1MA1/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

1   *ABCD* is a cyclic quadrilateral within a circle centre *O*.

XY is the tangent to the circle at *A*.

Angle *XAB* = 58°

Angle *BAD* = 78°

Angle *DBC* = 34°

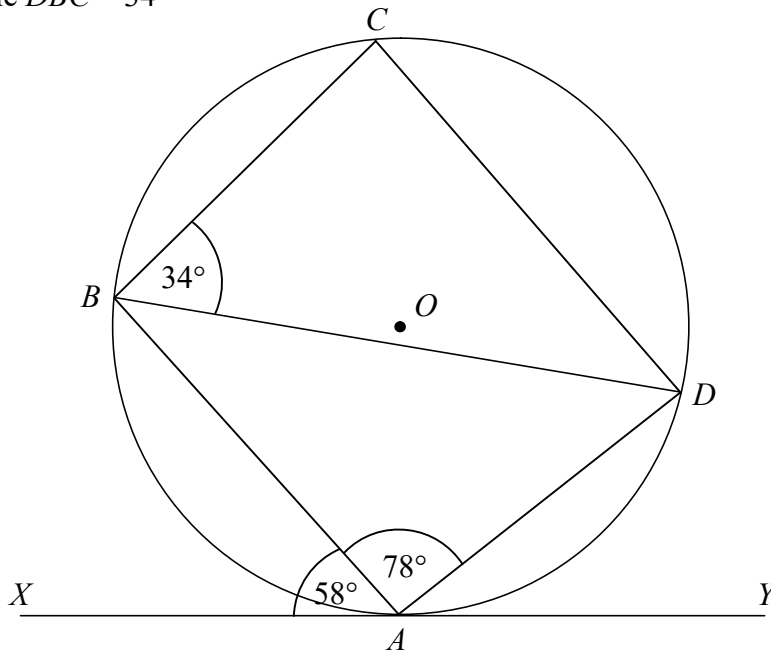Diagram **NOT** accurately drawn

Prove that *AB* is parallel to *CD*.

(Total for Question 1 is 5 marks)
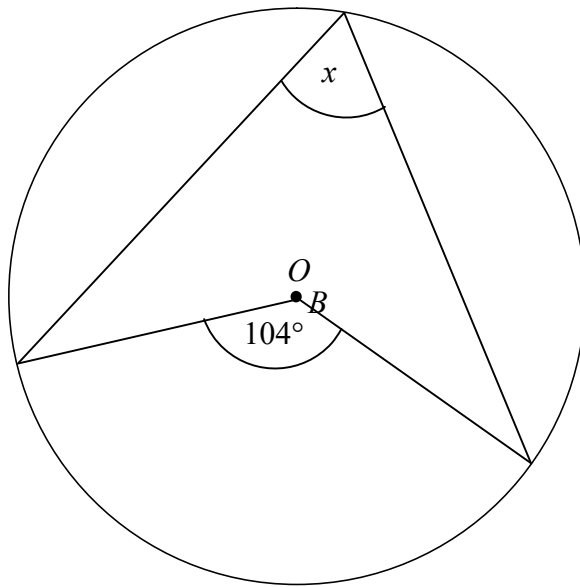
2 (a) Here is a circle with centre *O*.

Diagram **NOT** accurately drawn

Write down the value of *x*.

.... degrees

(1)

(b) Here is a different circle.
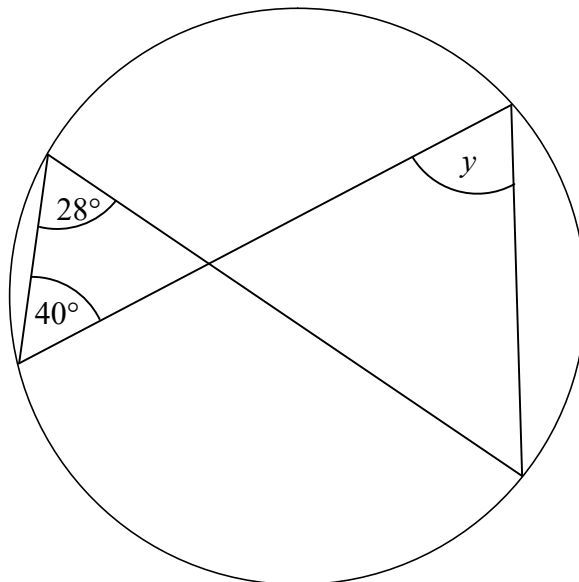
Diagram **NOT** accurately drawn

Write down the value of *y*.

.... degrees
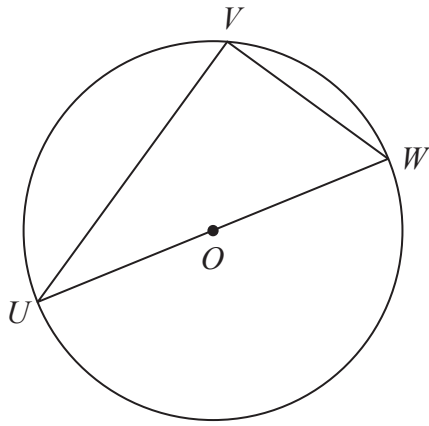
(1)

(Total for Question 2 is 2 marks)

3

Diagram **NOT** accurately drawn

U, *V* and *W* are points on the circumference of a circle, centre *O*. *UW* is a diameter of the circle.

(a) (i) Write down the size of angle *UVW*.

.... °

(ii) Give a reason for your answer.

....

....
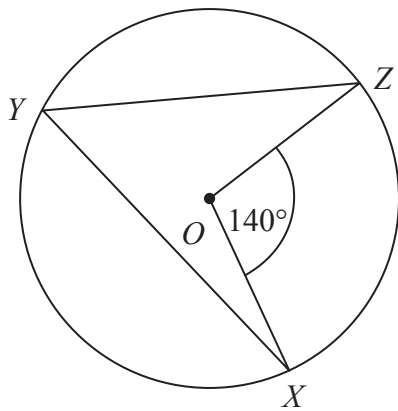
(2)

Diagram **NOT** accurately drawn

X, *Y* and *Z* are points on the circumference of a circle, centre *O*. Angle *XOZ* = 140°.

(b) (i) Work out the size of angle *XYZ*.

.... °

(ii) Give a reason for your answer.

....

....
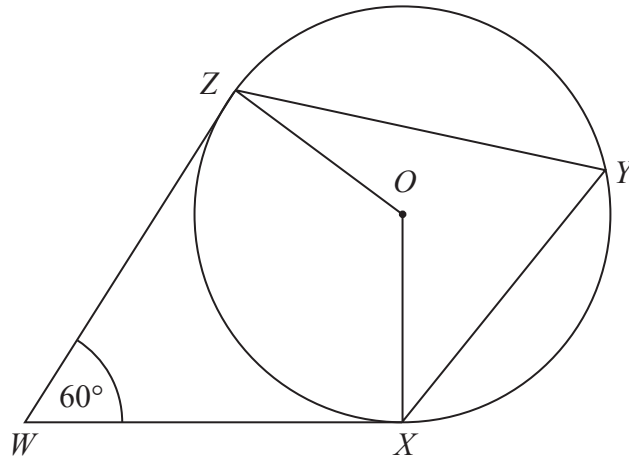
(2)

(Total for Question 3 is 4 marks)

4

Diagram **NOT** accurately drawn

X, Y and Z are points on the circumference of a circle, centre O.
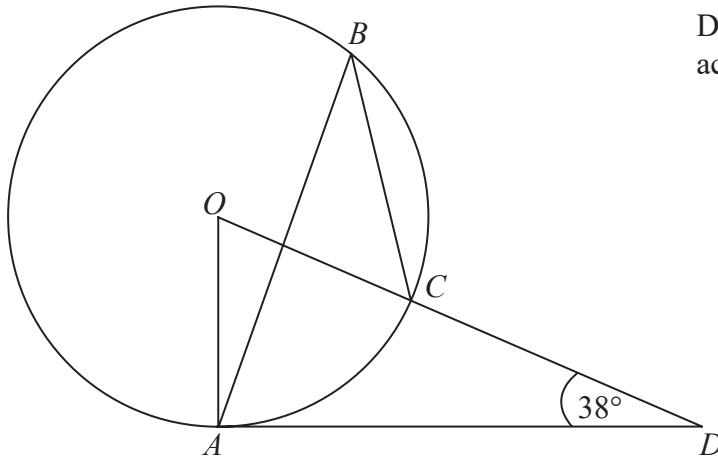WX and WZ are tangents to the circle.

Angle $ZWX = 60°$

Work out the size of angle XYZ.
Give a reason for each stage in your working.

(Total for Question 4 is 4 marks)

5

The diagram shows a circle centre *O*.
A, *B* and *C* are points on the circumference.

DCO is a straight line.
DA is a tangent to the circle.

Angle *ADO* = 38°

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

.... °
.... **(2)**

(b) (i) Work out the size of angle *ABC*.

.... °
....

(ii) Give a reason for your answer.

....

(3)

(Total for Question 5 is 5 marks)

6
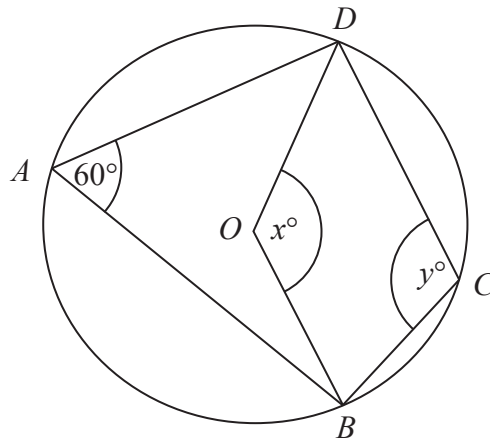
In the diagram, *A*, *B*, *C* and *D* are points on the circumference of a circle, centre *O*.
Angle *BAD* = 60°.
Angle *BOD* = *x*°.
Angle *BCD* = *y*°.

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

x = ...

(ii) Give a reason for your answer.

....

....

(2)

(b) (i) Work out the value of *y*.

y = ...

(ii) Give a reason for your answer.

....

....
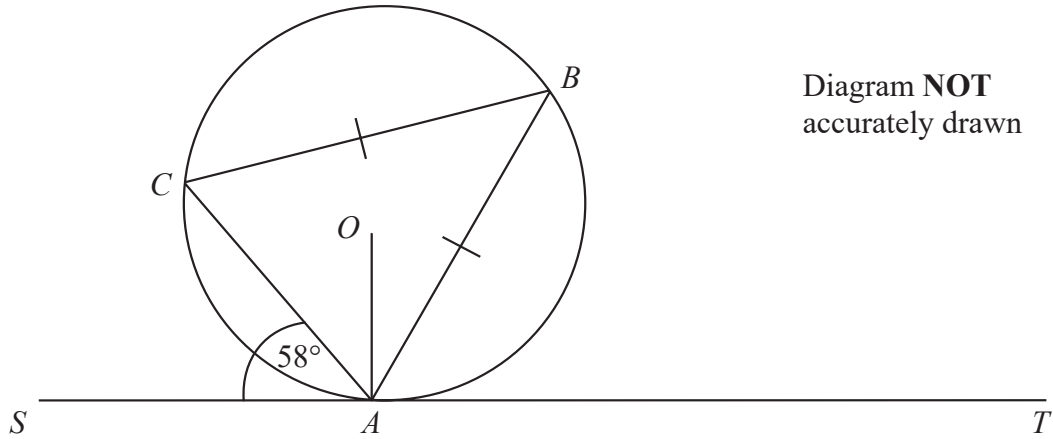
(2)

(Total for Question 6 is 4 marks)

7

Diagram **NOT** accurately drawn

A, *B* and *C* are points on the circumference of a circle, centre *O*.
The line *SAT* is the tangent at *A* to the circle.

CB = *AB*.
Angle *CAS* = 58°.

Calculate the size of angle *OAB*.
Give a reason for each stage in your working.

....................................°

....

(Total for Question 7 is 5 marks)

8
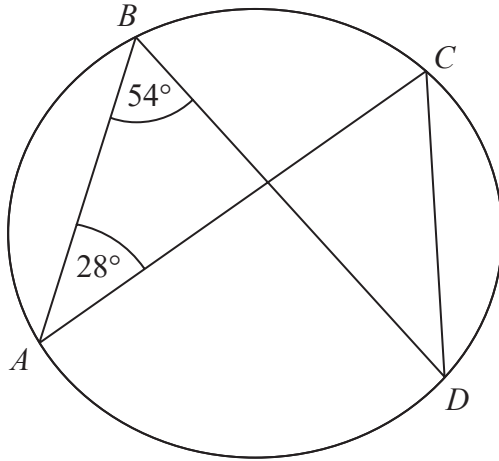
Diagram **NOT** accurately drawn

A, B, C and D are points on the circumference of a circle.
Angle ABD = 54°.
Angle BAC = 28°.

(i) Find the size of angle ACD.

.......................°

(ii) Give a reason for your answer.

....

....

(Total for Question 8 is 2 marks)

9
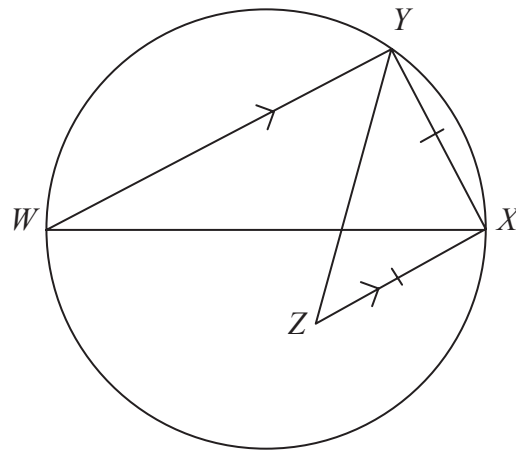
WX is a diameter of a circle.
Y is a point on the circle.

Z is the point inside the circle such that *ZX* = *XY* and *XZ* is parallel to *YW*.
Find the size of angle *XZY*.
You must give reasons for your answer.

.... °

(Total for Question 9 is 4 marks)

10   *ABCD* is a cyclic quadrilateral.
AE is a tangent at *A*.
CDE is a straight line.
Angle *CAD* = 32°
Angle *ABD* = 40°
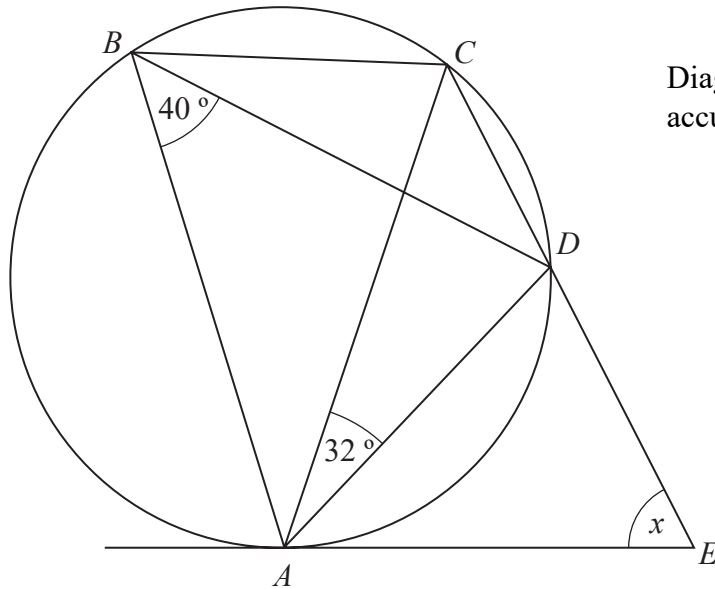
Diagram **NOT**
accurately drawn

Work out the size of angle *AED*, marked *x*, on the diagram.
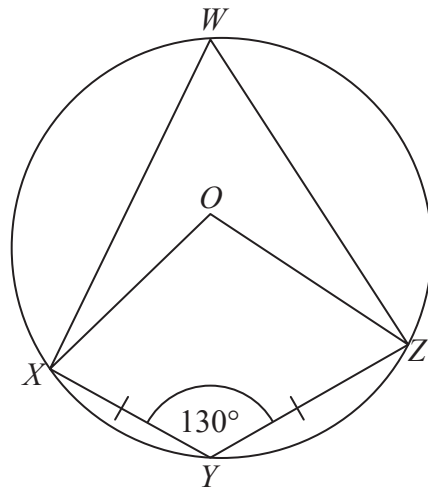You **must** show your working.
Give reasons for any angles you work out.

.... degrees

(Total for Question 10 is 5 marks)

11

W, X, Y and *Z* are points on a circle, centre *O*.
XY = YZ.
Angle *XYZ* = 130°.

(a) Write down the size of angle *XWZ*.
   Give a reason for your answer.

.... °

.... **(2)**

(b) Work out the size of angle *OZY*.
   Give reasons for your answer.

.... °

.... **(4)**

(Total for Question 11 is 6 marks)

12 *A, B, C* and *D* are points on the circumference of a circle, centre *O*.
   AC is a diameter of the circle.
   Angle *ABD* = 58°.
   Angle *CDB* = 22°.

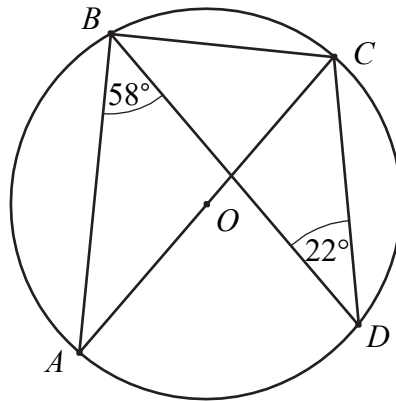Diagram **NOT** accurately drawn

Work out the sizes of angle *ACD* and *ACB*, giving reasons for your answers.

(a) Angle *ACD* = ...°
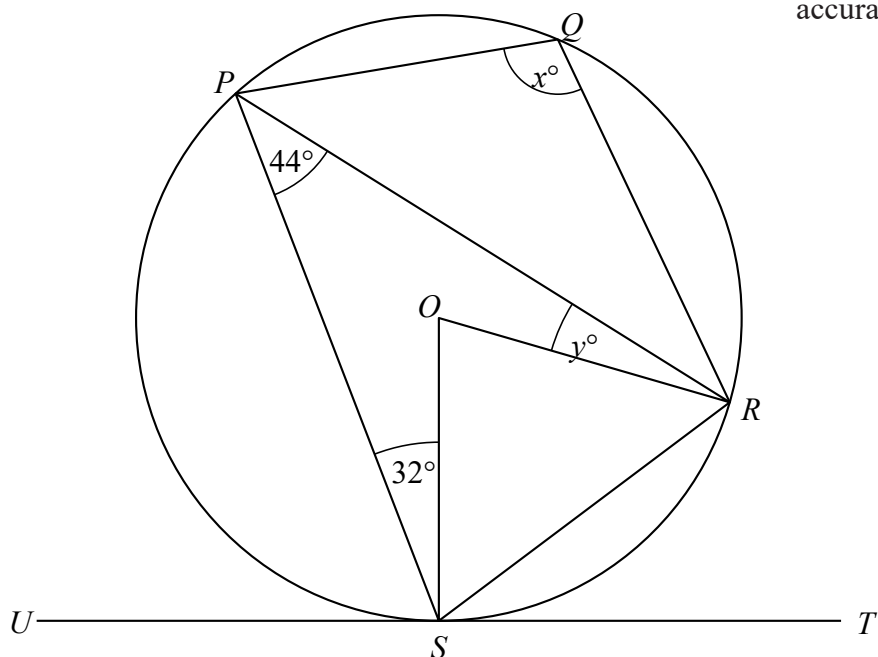
(2)

(b) Angle *ACB* = ...°

(3)

(Total for Question 12 is 5 marks)

Points *P, Q, R* and *S* lie on the circumference of the circle.
UST is a tangent to the circle.
Angle *RPS* = 44° and angle *PSO* = 32°.

Diagram **NOT**
accurately drawn

(a) Work out the value of x.

x = ...

(4)

(b) Work out the value of y.

y = ...

(Total for Question 13 is 7 marks) (3)

14   *A*, *B* and *C* are points on a circle.

- *BC* bisects angle *ABQ*.
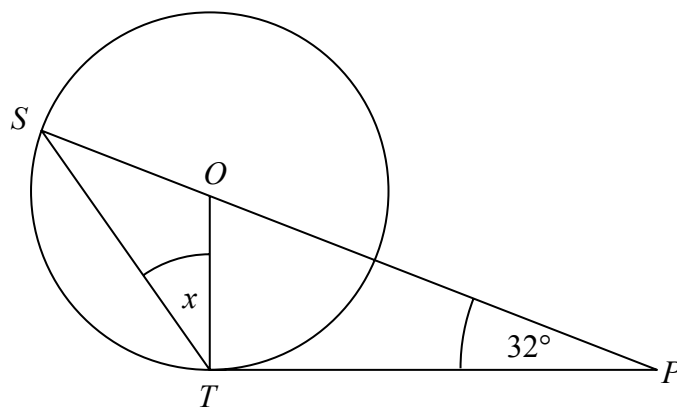- *PBQ* is a tangent to the circle.
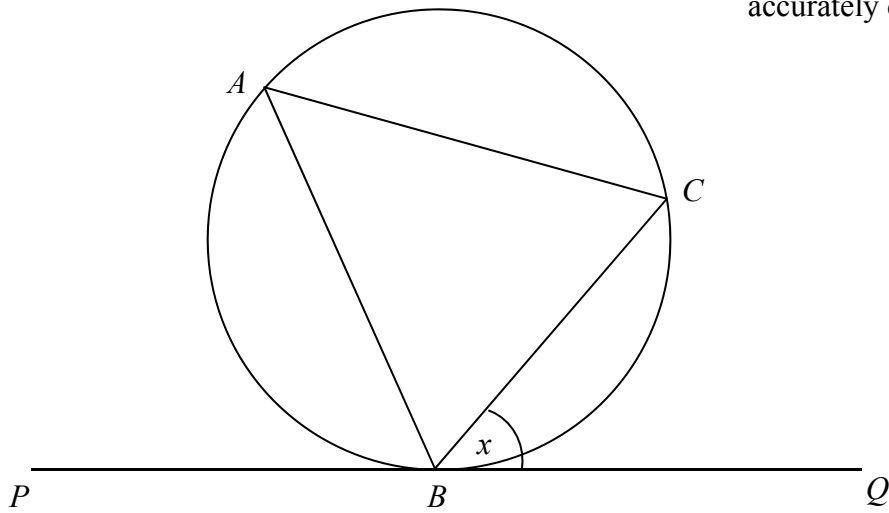
Angle $CBQ = x$

Prove that $AC = BC$

(3)

(Total for Question 14 is 3 marks)

15

S and *T* are points on the circumference of a circle, centre *O*.
PT is a tangent to the circle.
SOP is a straight line.
Angle *OPT* = 32°

Work out the size of the angle marked *x*.
You must give a reason for each stage of your working.

(Total for Question 15 is 4 marks)