

# Edexcel GCSE

## Mathematics (Linear) – 1MA0

# CIRCLE THEOREMS

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### Instructions

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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.

### Information

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The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.

Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

### Advice

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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.

1.

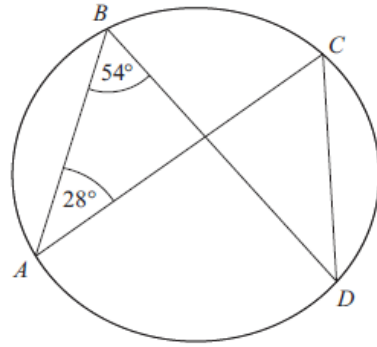


Diagram NOT accurately drawn

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

(i) Find the size of angle  $ACD$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

.....  
 .....

**(3 marks)**

2.

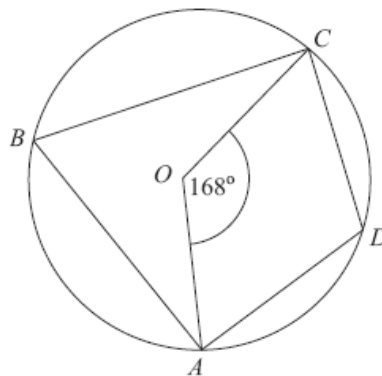


Diagram NOT accurately drawn

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

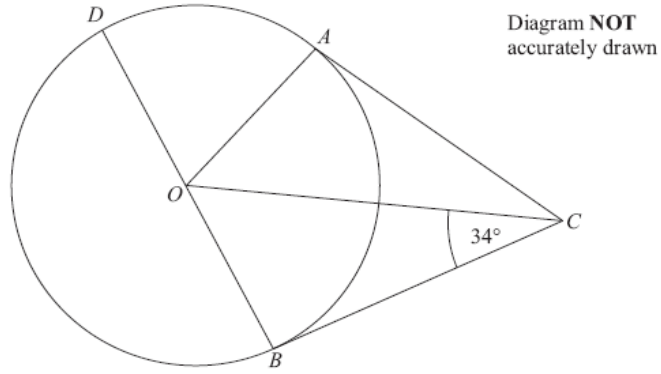
Angle  $AOC = 168^\circ$

Work out the size of angle  $ADC$ .  
 You must give reasons for your working.

.....<sup>o</sup>

**(4 marks)**

3.



$A$ ,  $B$  and  $D$  are points on the circumference of a circle, centre  $O$ .  
 $BOD$  is a diameter of the circle.  
 $BC$  and  $AC$  are tangents to the circle.  
Angle  $OCB = 34^\circ$ .

Work out the size of angle  $DOA$ .

.....<sup>o</sup>

**(4 marks)**

4.

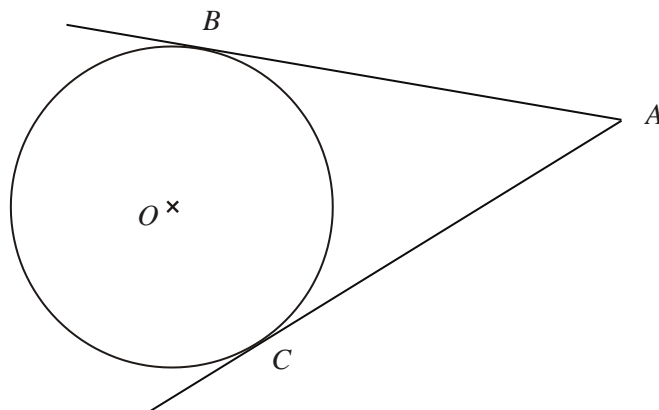


Diagram NOT accurately drawn

$B$  and  $C$  are points on a circle, centre  $O$ .  
 $AB$  and  $AC$  are tangents to the circle.  
Angle  $BOC = 130^\circ$ .

Work out the size of angle  $BAO$ .

.....<sup>o</sup>

**(4 marks)**

5.

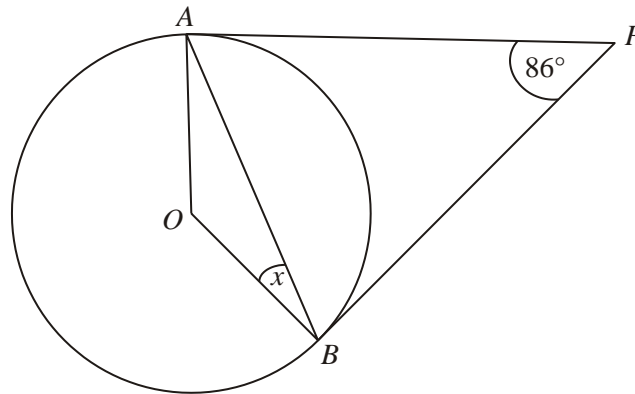


Diagram **NOT** accurately drawn

$A$  and  $B$  are points on the circumference of a circle, centre  $O$ .  
 $PA$  and  $PB$  are tangents to the circle.  
Angle  $APB$  is  $86^\circ$ .

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

.....<sup>o</sup>

**(3 marks)**

6.

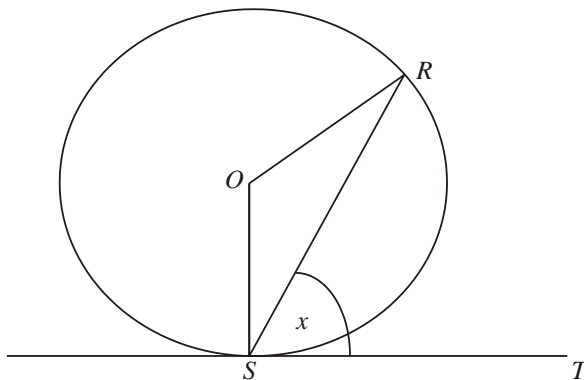


Diagram **NOT** accurately drawn

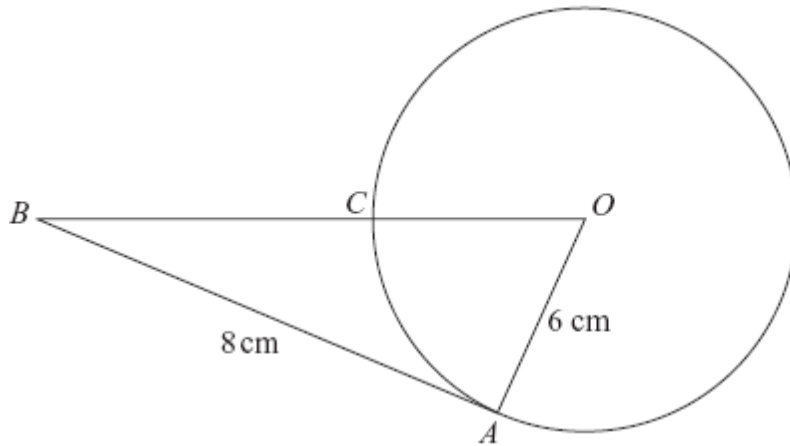
$R$  and  $S$  are two points on a circle, centre  $O$ .  
 $TS$  is a tangent to the circle.  
Angle  $RST = x$ .

Prove that angle  $ROS = 2x$ .  
You must give reasons for each stage of your working.

**(4 marks)**

7.

Diagram NOT  
accurately drawn



In the diagram,  $O$  is the centre of the circle.  
 $A$  and  $C$  are points on the circumference of the circle.  
 $BCO$  is a straight line.  
 $BA$  is a tangent to the circle.

$AB = 8$  cm.  
 $OA = 6$  cm.

(a) Explain why angle  $OAB$  is a right angle.

.....  
.....

(1)

(b) Work out the length of  $BC$ .

.....cm  
(3)

**(4 marks)**

8.

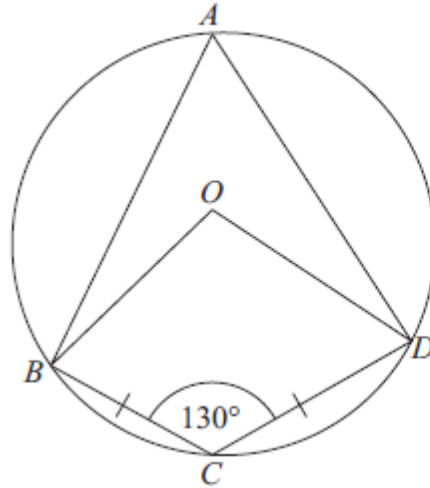


Diagram NOT  
accurately drawn

$A, B, C$  and  $D$  are points on a circle, centre  $O$ .  
 $BC = CD$ .  
Angle  $BCD = 130^\circ$ .

- (a) Write down the size of angle  $BAD$ .  
Give a reason for your answer.

.....<sup>o</sup>  
(2)

- (b) Work out the size of angle  $ODC$ .  
Give reasons for your answer.

.....<sup>o</sup>  
(4)

**(6 marks)**

9.

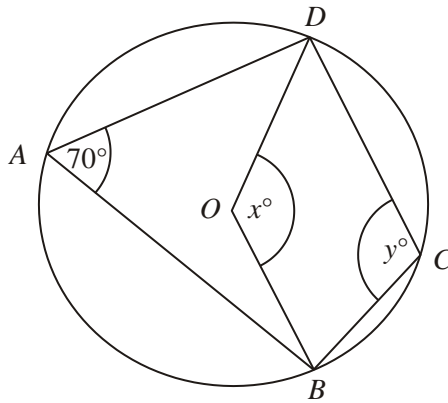


Diagram **NOT** accurately drawn

In the diagram,  $A$ ,  $B$ ,  $C$  and  $D$  are points on the circumference of a circle, centre  $O$ .

Angle  $BAD = 70^\circ$ .

Angle  $BOD = x^\circ$ .

Angle  $BCD = y^\circ$ .

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

$x = \dots\dots\dots$

(ii) Give a reason for your answer.

.....  
.....

(2)

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

$y = \dots\dots\dots$

(ii) Give a reason for your answer.

.....  
.....

(2)

**(4 marks)**

10.

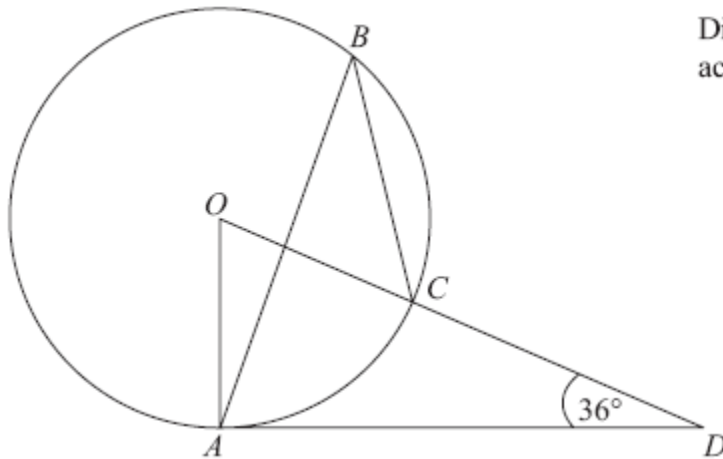


Diagram **NOT** accurately drawn

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  $ADO = 36^\circ$

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

.....<sup>o</sup>  
**(2)**

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

.....<sup>o</sup>

(ii) Give a reason for your answer.

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

**(3)**

**(4 marks)**



11.

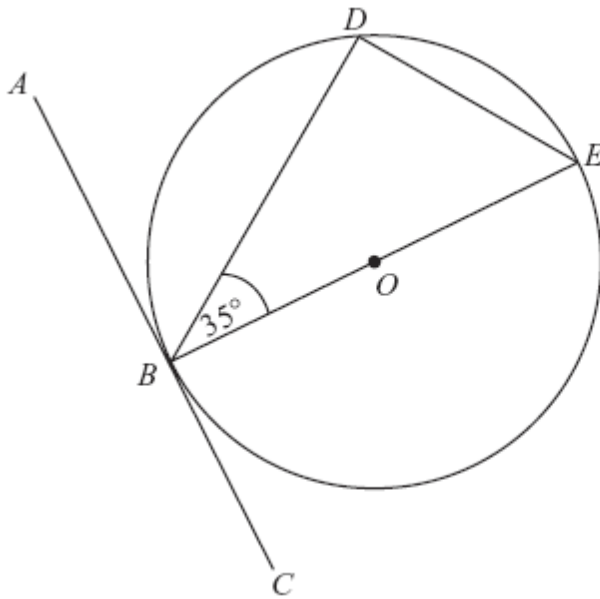


Diagram NOT  
accurately drawn

$B$ ,  $D$  and  $E$  are points on a circle centre  $O$ .  
 $ABC$  is a tangent to the circle.  
 $BE$  is a diameter of the circle.  
Angle  $DBE = 35^\circ$ .

(a) Find the size of angle  $ABD$ .

Give a reason for your answer.

.....<sup>o</sup>  
(2)

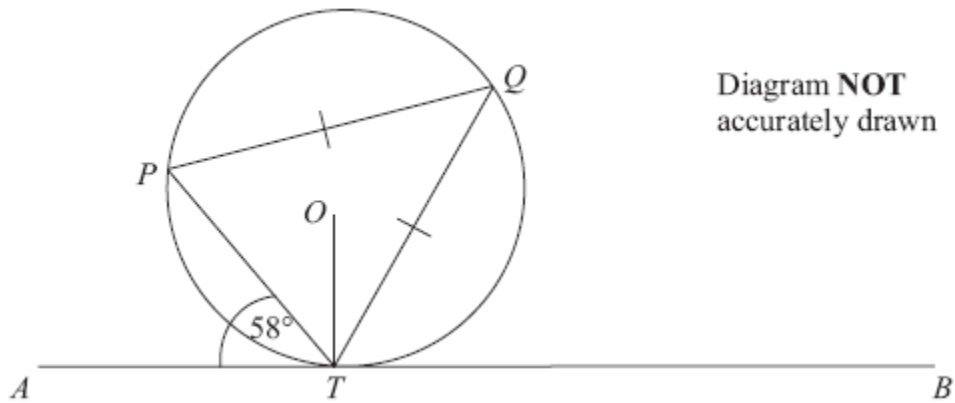
(b) Find the size of angle  $DEB$ .

Give a reason for your answer.

.....<sup>o</sup>  
(2)

(4 marks)

12.



$P$ ,  $Q$  and  $T$  are points on the circumference of a circle, centre  $O$ .  
The line  $ATB$  is the tangent at  $T$  to the circle.

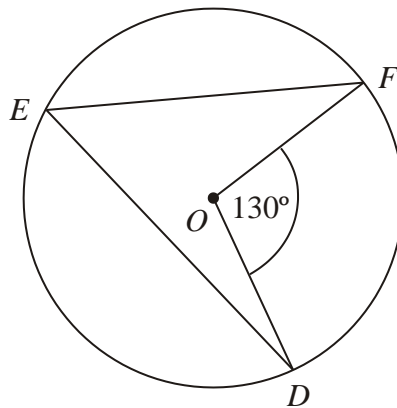
$PQ = TQ$ .  
Angle  $ATP = 58^\circ$ .

Calculate the size of angle  $OTQ$ .  
Give a reason for each stage in your working.

..... °

**(4 marks)**

13. (a)



$D$ ,  $E$  and  $F$  are points on the circumference of a circle, centre  $O$ .  
Angle  $DOF = 130^\circ$ .

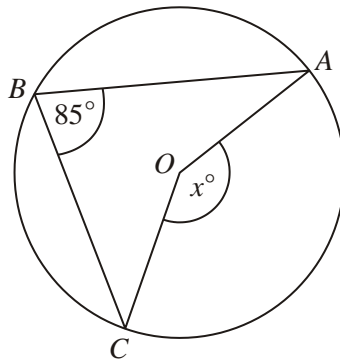
(i) Work out the size of angle  $DEF$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

.....  
.....

(2)



(b)

In the diagram,  $A$ ,  $B$  and  $C$  are points on the circumference of a circle, centre  $O$ .  
Angle  $ABC = 85^\circ$ .

(i) Work out the size of the angle marked  $x^\circ$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

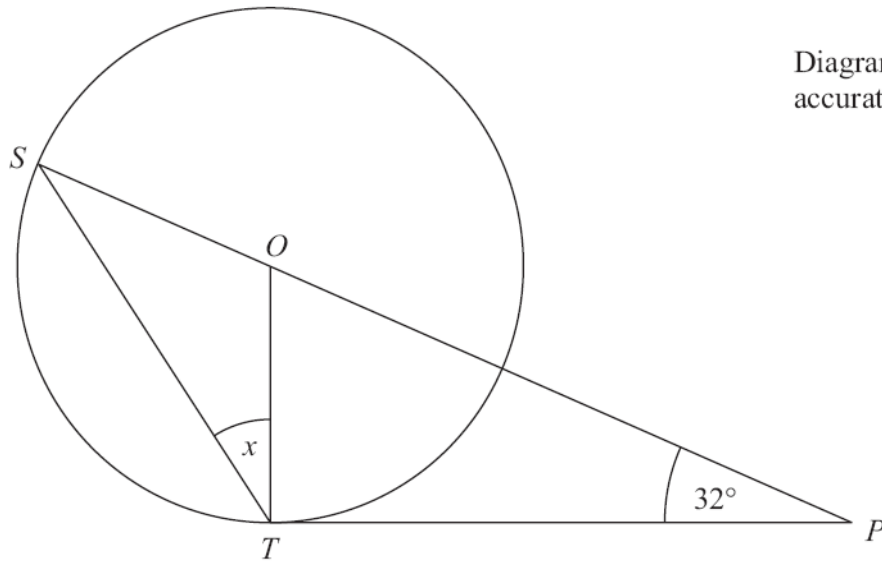
.....  
.....

(2)

**(4 marks)**

**\*14.**

Diagram **NOT**  
accurately drawn



$S$  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  $OPT = 32^\circ$ .

Work out the size of the angle marked  $x$ .  
Give reasons for your answer.

.....<sup>o</sup>

**(Total 5 marks)**