# 6.10 Circle Theorems: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

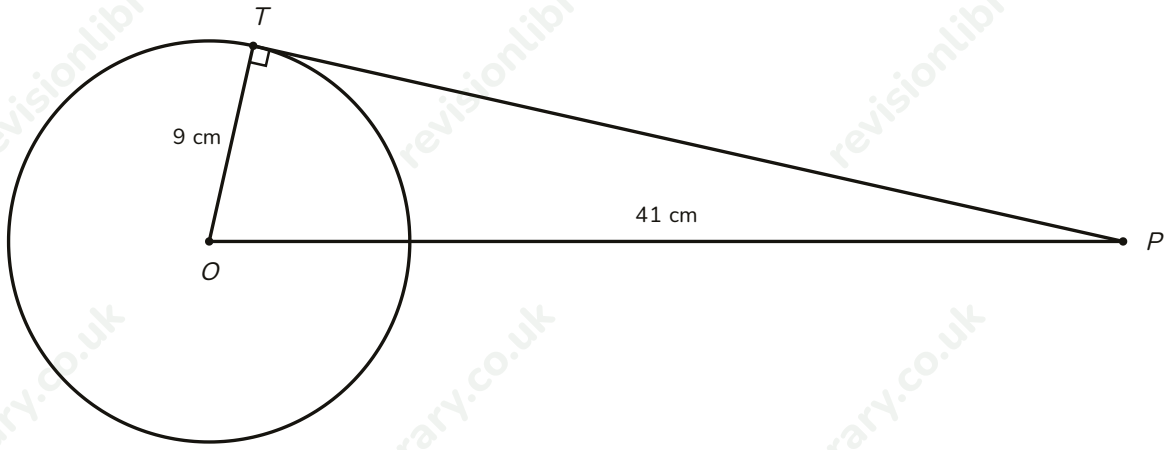
Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** TP is a tangent to a circle with centre O, touching the circle at T. OT = 9 cm and OP = 41 cm.

Diagram NOT accurately drawn




**(a)** State the size of angle OTP. Give a reason for your answer. **(1)**

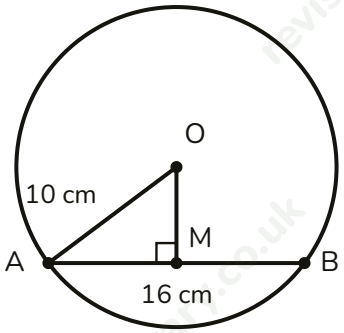
**(b)** Work out the length TP. **(2)**

**(Total for Question 1 is 3 marks)**


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**2** A chord AB of a circle with centre O has length 16 cm. The radius of the circle is 10 cm. M is the midpoint of AB, and OM is drawn perpendicular to AB.

Diagram NOT accurately drawn



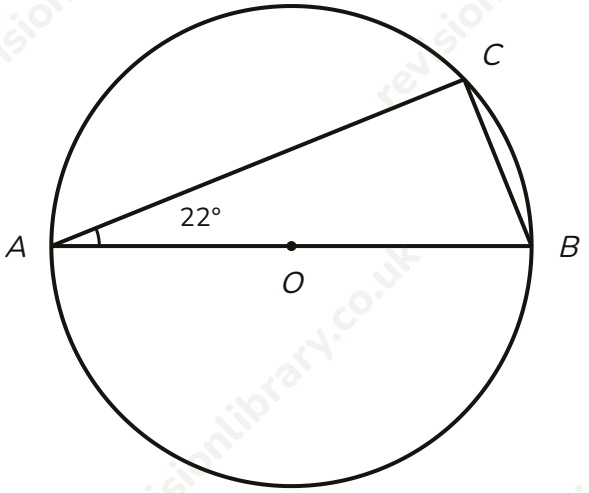

**(a)** Explain why AM = 8 cm. **(1)**

**(b)** Work out the length OM. **(2)**

**(Total for Question 2 is 3 marks)**


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**3** AB is a diameter of a circle with centre O. C is a point on the circumference. Angle CAB = 22 degrees. Work out the size of angle ABC. Give reasons for your working.




**(Total for Question 3 is 3 marks)**

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**4** A, B and C are points on the circumference of a circle with centre O. C is on the major arc AB. Angle ACB = 59 degrees. Work out the size of angle AOB. Give a reason for your answer.

**(Total for Question 4 is 2 marks)**

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**5** T and A are points on a circle. The tangent at T makes an angle of 60 degrees with the chord TA. B is a point on the major arc TA. Work out the size of angle TBA. Give a reason for your answer.

**(Total for Question 5 is 2 marks)**

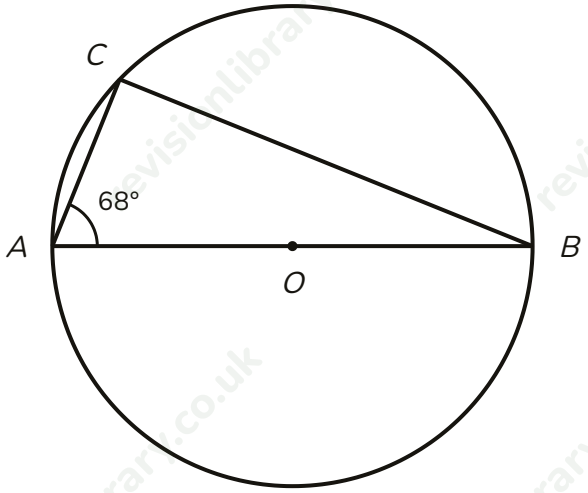

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**6** A, B, C and D are points on a circle, in that order, so that ABCD is a cyclic quadrilateral. Angle BAD = 127 degrees. Work out the size of angle BCD. Give a reason for your answer.

**(Total for Question 6 is 2 marks)**

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**7** AB is a diameter of a circle with centre O. C is a point on the circumference. Angle CAB = 68 degrees. Work out the size of angle ABC. Give reasons for your working.




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

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**8** PA and PB are tangents from the point P to a circle with centre O, touching the circle at A and B. Angle APB = 138 degrees. Work out the size of angle AOB.

**(Total for Question 8 is 3 marks)**


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**9** PT is a tangent to a circle with centre O at the point T. P is outside the circle. Angle TPO = 51 degrees. Work out the size of angle POT. Give reasons for your working.

**(Total for Question 9 is 3 marks)**

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**10** A, B and C are points on the circumference of a circle with centre O. C is on the major arc AB. Angle AOB = 160 degrees. Work out the size of angle ACB. Give a reason for your answer.

**(Total for Question 10 is 2 marks)**

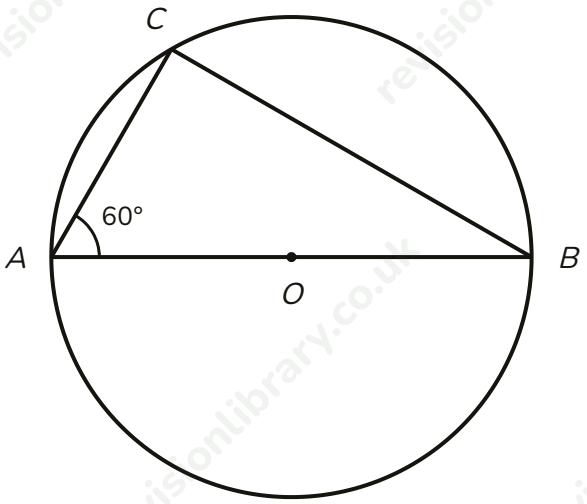
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**11** T and A are points on a circle. The tangent at T makes an angle of 74 degrees with the chord TA. B is a point on the major arc TA. Work out the size of angle TBA. Give a reason for your answer.

**(Total for Question 11 is 2 marks)**


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**12** AB is a diameter of a circle with centre O. C is a point on the circumference. Angle CAB = 60 degrees. Work out the size of angle ABC. Give reasons for your working.




**(Total for Question 12 is 3 marks)**

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**13** PT is a tangent to a circle with centre O at the point T. P is outside the circle. Angle TPO = 50 degrees. Work out the size of angle POT. Give reasons for your working.

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

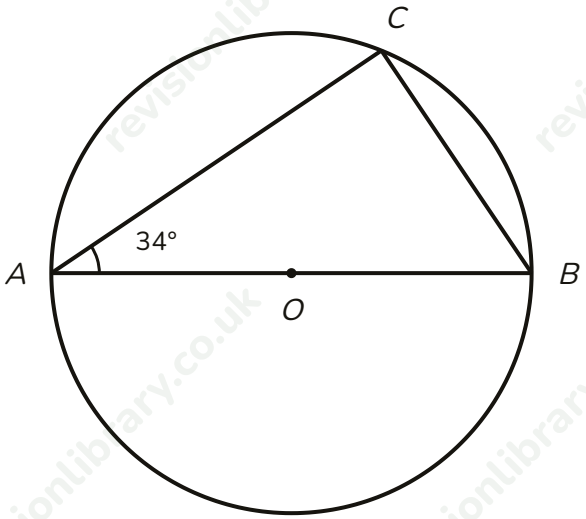

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**14** PA and PB are tangents from the point P to a circle with centre O, touching the circle at A and B. Angle APB = 116 degrees. Work out the size of angle AOB.

**(Total for Question 14 is 3 marks)**

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**15** AB is a diameter of a circle with centre O. C is a point on the circumference. Angle CAB = 34 degrees. Work out the size of angle ABC. Give reasons for your working.



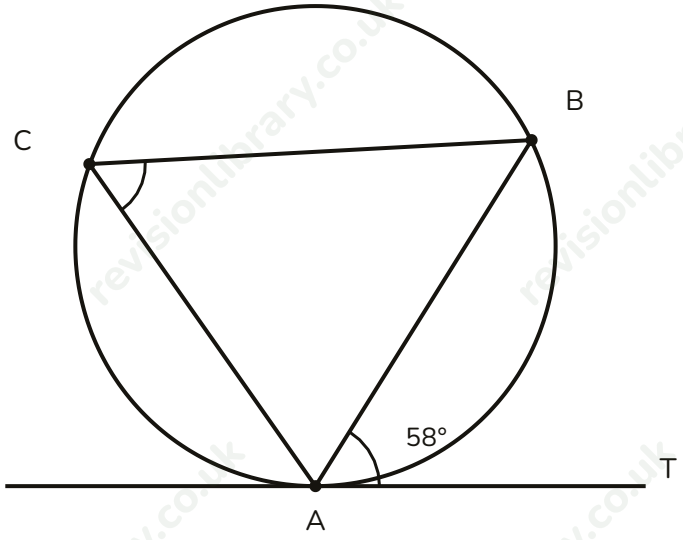

**(Total for Question 15 is 3 marks)**


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**16** TA is a tangent to a circle at the point A. AB is a chord of the circle, and C is a point on the circle in the alternate segment. The angle between the tangent TA and the chord AB is 58 degrees.

Write down the size of angle ACB, giving a reason for your answer.

Diagram NOT accurately drawn

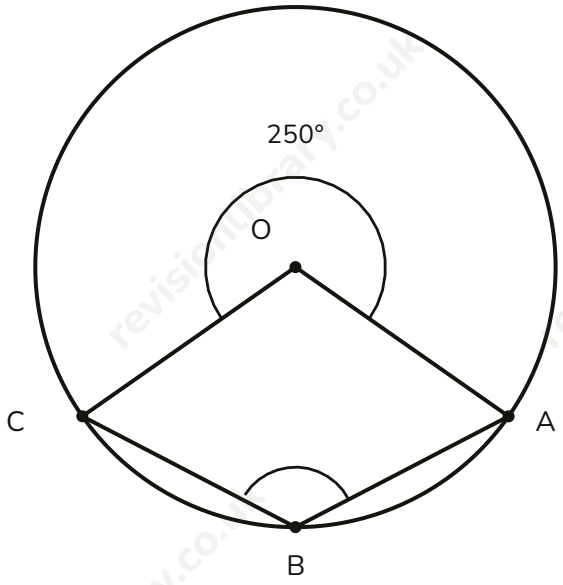



**(Total for Question 16 is 2 marks)**


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**17** A, B and C are points on the circumference of a circle with centre O. B lies on the minor arc AC. The reflex angle AOC = 250 degrees.
Work out the size of angle ABC.

Diagram NOT accurately drawn




**(Total for Question 17 is 3 marks)**


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# Mark scheme · 6.10 Circle Theorems: 1-hour Pack

## Question 1

(a) 90 degrees, since the tangent is perpendicular to the radius at the point of contact oe **B1**

**(a) Answer: 90 degrees, because a tangent is perpendicular to the radius at the point of contact.**

(b) $\sqrt{41^2 - 9^2}$ oe **M1**

(b) 40 cm cao **A1**

**(b) Answer: 40 cm**

## Question 2

(a) the perpendicular from the centre to a chord bisects the chord, so AM = 16 / 2 = 8 cm oe **B1**

**(a) Answer: The perpendicular from the centre to a chord bisects the chord, so AM = 16 / 2 = 8 cm.**

(b) $\sqrt{10^2 - 8^2}$ oe **M1**

(b) 6 cm cao **A1**

**(b) Answer: 6 cm**

## Question 3

angle ACB = 90 degrees (angle in a semicircle) **B1**

180 - 90 - 22 **M1**

68 degrees cao **A1**

**Answer: 68 degrees**

## Question 4

118 degrees **B1**

reason: the angle at the centre is twice the angle at the circumference **B1**

**Answer: 118 degrees**

## Question 5

60 degrees **B1**

reason: alternate segment theorem **B1**

**Answer: 60 degrees**

## Question 6

53 degrees **B1**

reason: opposite angles of a cyclic quadrilateral add up to 180 degrees **B1**

**Answer: 53 degrees**

## Question 7

angle ACB = 90 degrees (angle in a semicircle) **B1**

180 - 90 - 68 **M1**

22 degrees cao **A1**

**Answer: 22 degrees**

## Question 8

angles OAP and OBP are each 90 degrees (tangent meets radius at 90 degrees) **B1**

360 - 90 - 90 - 138 **M1**

42 degrees cao **A1**

**Answer: 42 degrees**

## Question 9

angle OTP = 90 degrees (tangent meets radius at 90 degrees) **B1**

180 - 90 - 51 **M1**

39 degrees cao **A1**

**Answer: 39 degrees**

## Question 10

80 degrees **B1**

reason: the angle at the centre is twice the angle at the circumference **B1**

**Answer: 80 degrees**

## Question 11

74 degrees **B1**

reason: alternate segment theorem **B1**

**Answer: 74 degrees**

## Question 12

angle ACB = 90 degrees (angle in a semicircle) **B1**

180 - 90 - 60 **M1**

30 degrees cao **A1**

**Answer: 30 degrees**

## Question 13

angle OTP = 90 degrees (tangent meets radius at 90 degrees) **B1**

180 - 90 - 50 **M1**

40 degrees cao **A1**

**Answer: 40 degrees**

## Question 14

angles OAP and OBP are each 90 degrees (tangent meets radius at 90 degrees) **B1**

360 - 90 - 90 - 116 **M1**

64 degrees cao **A1**

**Answer: 64 degrees**

## Question 15

angle ACB = 90 degrees (angle in a semicircle) **B1**

180 - 90 - 34 **M1**

56 degrees cao **A1**

**Answer: 56 degrees**

## Question 16

58 degrees cao **B1**

reason: alternate segment theorem, the angle between a tangent and a chord equals the angle in the alternate segment oe **B1**

**Answer: 58 degrees, by the alternate segment theorem.**

## Question 17

identify that the angle at the centre theorem applies to the reflex angle AOC **M1**

125 degrees cao **A1**

reason: the angle at the centre is twice the angle at the circumference, subtended by the same (major) arc AC oe **B1**

**Answer: 125 degrees**


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