HIGHER

3.5 Circle Theorems: Angle Properties: 30-minute Pack

Total Marks

EDEXCEL 4MA1 · Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A, B and C are points on a circle with centre O. C lies on the major arc AB.
Angle AOB = 102 degrees.
Find angle ACB. Give a reason for your answer.

(Total for Question 1 is 3 marks)

2 ABCD is a cyclic quadrilateral. Angle ABC = 61 degrees.
Find angle ADC. Give a reason.

(Total for Question 2 is 3 marks)

3 A, B and C are points on a circle with centre O. C lies on the major arc AB. Angle ACB = 41 degrees.
Find angle OAB. Give reasons.

(Total for Question 3 is 4 marks)

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4 K, L, M and N are points on a circle, with M and N on the same side of the chord KL.
Angle KML = (2x - 2) degrees and angle KNL = (3x - 25) degrees.
Find the value of x and the size of angle KML. Give a reason.

(Total for Question 4 is 4 marks)

5 O is the centre of a circle. BC is a tangent to the circle at B, and CO is a straight line.
Angle OCB = 18 degrees. Find angle BOC. Give a reason.

(Total for Question 5 is 3 marks)

6 CA and CB are tangents from the point C to a circle with centre O, touching the circle at A and B.
Angle ACB = 52 degrees.
Find angle OAB. Give reasons.

(Total for Question 6 is 4 marks)

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Mark scheme · 3.5 Circle Theorems: Angle Properties: 30-minute Pack

Question 1

angle at the circumference is half the angle at the centre: 102 / 2	**M1**
angle ACB = 51 degrees	**A1**
reason: the angle at the centre is twice the angle at the circumference (standing on the same arc)	**B1**

Answer: Angle ACB = 51 degrees

Question 2

opposite angles of a cyclic quadrilateral add up to 180 degrees	**B1**
180 - 61	**M1**
angle ADC = 119 degrees	**A1**

Answer: Angle ADC = 119 degrees

Question 3

angle AOB = 2 x 41 = 82 degrees (angle at the centre is twice the angle at the circumference)	**B1**
OA = OB (radii) so triangle OAB is isosceles	**B1**
(180 - 82) / 2	**M1**
angle OAB = 49 degrees	**A1**

Answer: Angle OAB = 49 degrees

Question 4

angles in the same segment are equal	**B1**
2x - 2 = 3x - 25	**M1**
x = 23	**A1**
angle KML = 44 degrees	**A1**

Answer: x = 23; angle KML = 44 degrees

Question 5

angle OBC = 90 degrees (the tangent is perpendicular to the radius)	**B1**
180 - 90 - 18	**M1**
angle BOC = 72 degrees	**A1**

Answer: Angle BOC = 72 degrees

Question 6

CA = CB (tangents from a point are equal) so angle CAB = (180 - 52)/2 = 64 degrees	**B1**
angle OAC = 90 degrees (tangent perpendicular to radius)	**B1**
90 - 64	**M1**
angle OAB = 26 degrees	**A1**

Answer: Angle OAB = 26 degrees

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