6.10 Circle Theorems: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

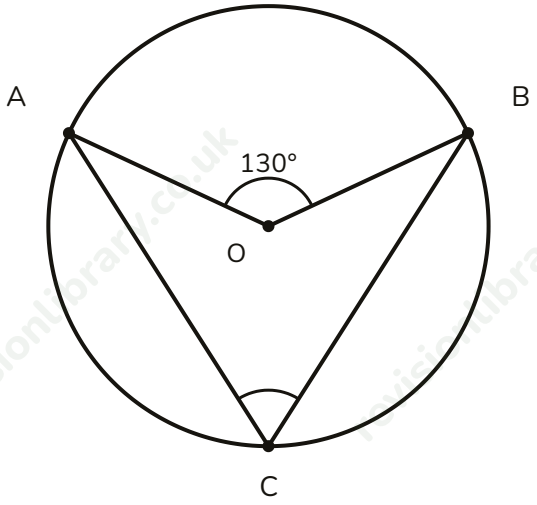
Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A, B and C are points on the circumference of a circle with centre O. Angle AOB = 130 degrees, where angle AOB is the angle at the centre standing on the same arc AB as angle ACB.

Diagram NOT accurately drawn



(a) Work out the size of angle ACB. **(2)**

.....

(b) Give a reason for your answer to part (a). **(1)**

.....

.....

.....

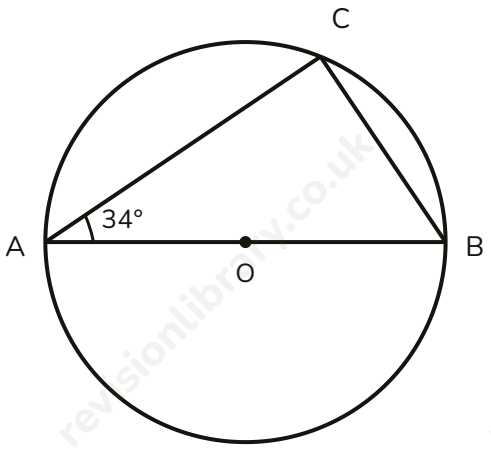
.....

(Total for Question 1 is 3 marks)

© Revision Library | revisionlibrary.co.uk

2 AB is a diameter of a circle with centre O. C is a point on the circumference. Angle CAB = 34 degrees.

Diagram NOT accurately drawn



(a) Write down the size of angle ACB. Give a reason for your answer. **(2)**

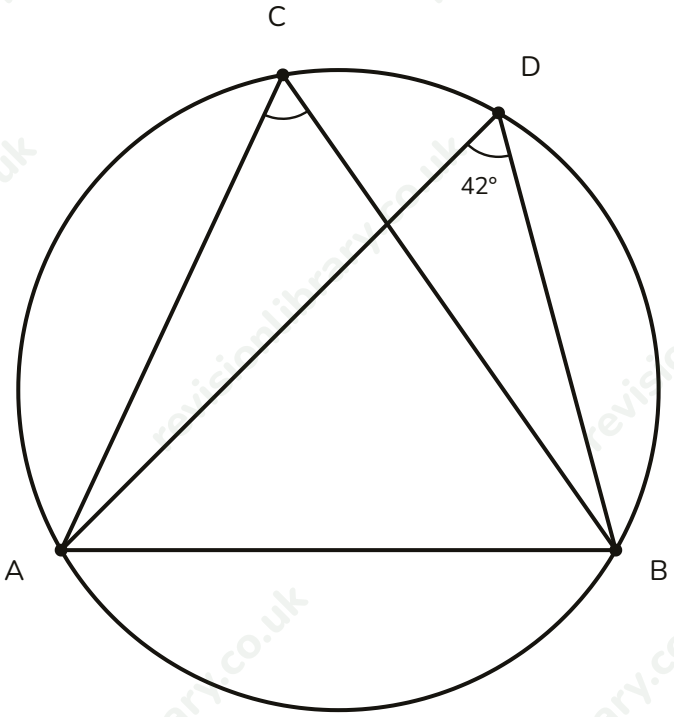
(b) Work out the size of angle ABC. **(2)**

(Total for Question 2 is 4 marks)

© Revision Library | revisionlibrary.co.uk

3 A, B, C and D are points on the circumference of a circle. C and D are on the same side of the chord AB, so angle ACB and angle ADB are angles in the same segment. Angle ADB = 42 degrees.

Diagram NOT accurately drawn



(a) Work out the size of angle ACB. **(2)**

.....

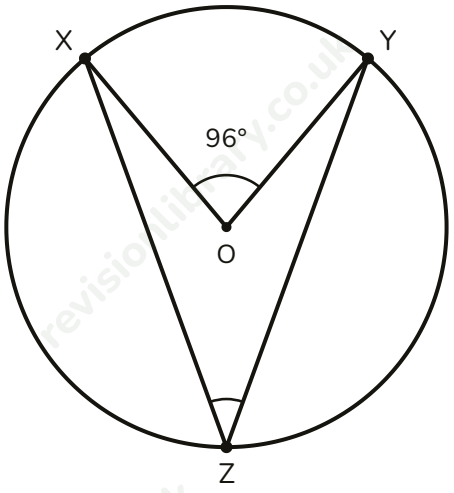
(b) State the circle theorem used in part (a). **(1)**

(Total for Question 3 is 3 marks)

© Revision Library | revisionlibrary.co.uk

4 X, Y and Z are points on the circumference of a circle with centre O. Angle XOY = 96 degrees, where angle XOY is the angle at the centre standing on the same arc XY as angle XZY.
Work out the size of angle XZY, giving a reason for your answer.

Diagram NOT accurately drawn

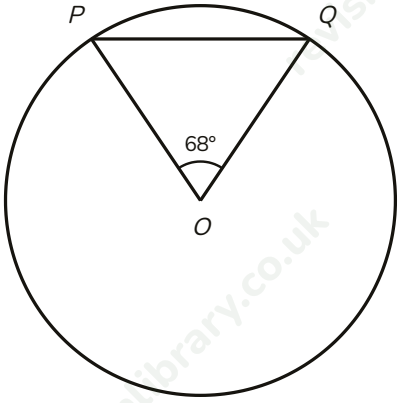


(Total for Question 4 is 3 marks)

© Revision Library | revisionlibrary.co.uk

5 O is the centre of a circle. P and Q are points on the circumference, so OP and OQ are radii. Angle POQ = 68 degrees.

Diagram NOT accurately drawn



(a) Explain why triangle OPQ is isosceles. **(1)**

(b) Work out the size of angle OPQ. **(2)**

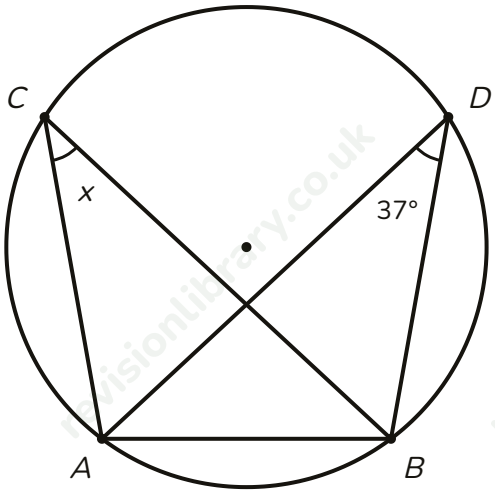
(Total for Question 5 is 3 marks)

© Revision Library | revisionlibrary.co.uk

6 A, B, C and D are points on the circumference of a circle. C and D are on the same side of the chord AB, so angle ACB and angle ADB are angles in the same segment. Angle ADB = 37 degrees.

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

Diagram NOT accurately drawn

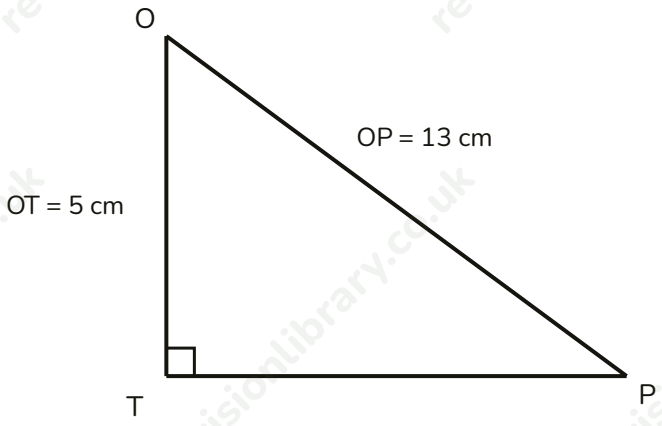


(Total for Question 6 is 2 marks)

© Revision Library | revisionlibrary.co.uk

7 TP is a tangent to a circle with centre O, touching the circle at T. OT = 5 cm and OP = 13 cm. Since OT is a radius and TP is a tangent at T, angle OTP = 90 degrees.

Diagram NOT accurately drawn



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

.....

(b) Work out the size of angle TPO. Give your answer correct to 1 decimal place. **(2)**

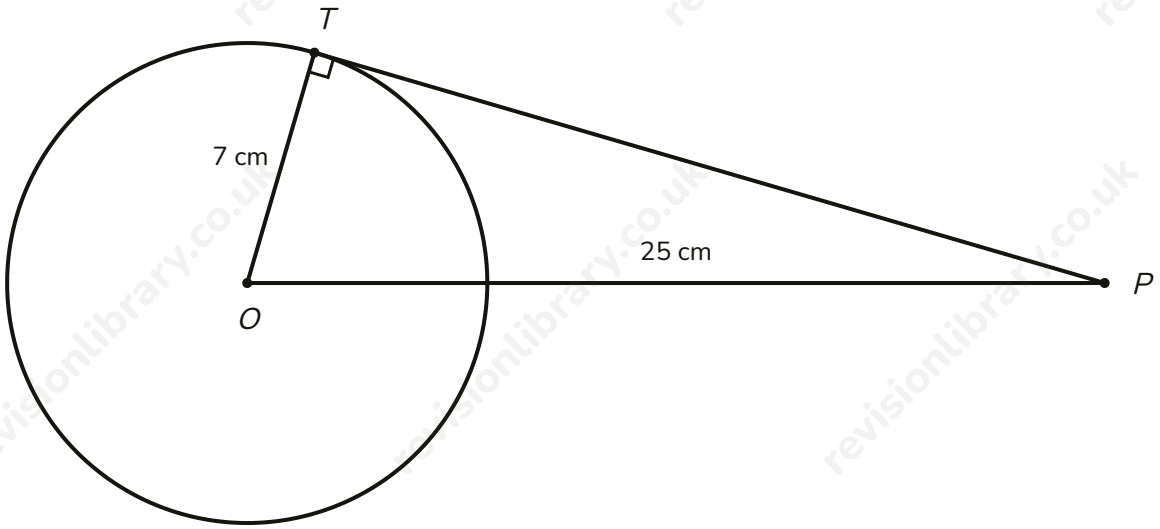
.....

(Total for Question 7 is 4 marks)

© Revision Library | revisionlibrary.co.uk

8 O is the centre of a circle of radius 7 cm. P is a point outside the circle with OP = 25 cm. PT is a tangent to the circle, touching it at T.
Show that PT = 24 cm.

Diagram NOT accurately drawn



(Total for Question 8 is 3 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 6.10 Circle Theorems: 30-minute Pack

Question 1

(a) 130 / 2 oe **M1**

(a) 65 degrees cao **A1**

(a) Answer: 65 degrees

(b) the angle at the centre is twice the angle at the circumference, subtended by the same arc oe **B1**

(b) Answer: The angle at the centre is twice the angle at the circumference standing on the same arc.

Question 2

(a) 90 degrees cao **B1**

(a) reason: the angle in a semicircle is 90 degrees oe **B1**

(a) Answer: 90 degrees, because the angle in a semicircle is a right angle.

(b) 180 - 90 - 34 oe **M1**

(b) 56 degrees cao **A1**

(b) Answer: 56 degrees

Question 3

(a) identify angle ACB = angle ADB (same segment) **M1**

(a) 42 degrees cao **A1**

(a) Answer: 42 degrees

(b) angles in the same segment (subtended by the same arc) are equal oe **B1**

(b) Answer: Angles in the same segment are equal.

Question 4

96 / 2 oe **M1**

48 degrees cao **A1**

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

Answer: 48 degrees

Question 5

(a) OP = OQ, since both are radii of the same circle oe **B1**

(a) Answer: OP and OQ are both radii of the circle, so OP = OQ, making triangle OPQ isosceles.

(b) (180 - 68) / 2 oe **M1**

(b) 56 degrees cao **A1**

(b) Answer: 56 degrees

Question 6

37 degrees cao **B1**

reason: angles in the same segment (subtended by the same arc) are equal oe **B1**

Answer: 37 degrees, because angles in the same segment are equal.

Question 7

(a) $\sqrt{13^2 - 5^2}$ oe **M1**

(a) 12 cm cao **A1**

(a) Answer: 12 cm

(b) sin(TPO) = 5/13 oe, or use tan = 5/12 with their TP **M1**

(b) awrt 22.6 degrees **A1**

(b) Answer: 22.6 degrees (1 d.p.)

Question 8

angle OTP = 90 degrees, since the tangent is perpendicular to the radius at the point of contact **B1**

$PT^2 = 25^2 - 7^2$ oe **M1**

PT = 24 cm cso **A1**

Answer: PT = 24 cm (shown)

© Revision Library | revisionlibrary.co.uk