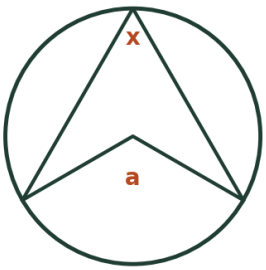
Proof of the Circle Theorems

Grade 8/9 topic · Higher tier · Edexcel and AQA

How to use this pack
20 questions that get harder as you go. Questions 1–15 (75 marks) build up to the harder Grade 8–9 style questions at the end; aim to complete all 20. Show your working on the lines and write your final answer on the answer line, then mark yourself with the answers at the back. Diagrams are not drawn accurately. Total: 96 marks.

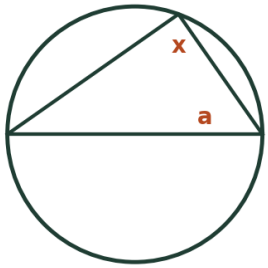
Warm-up

1 Prove that the angle at the centre of a circle is twice the angle at the circumference. **[6 marks]**



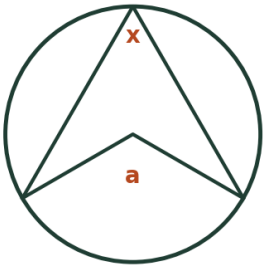
Answer _____

2 Prove that the angle in a semicircle is a right angle. **[6 marks]**



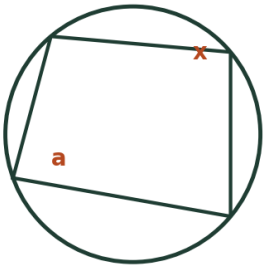
Answer _____

3 Prove that angles in the same segment are equal. **[6 marks]**



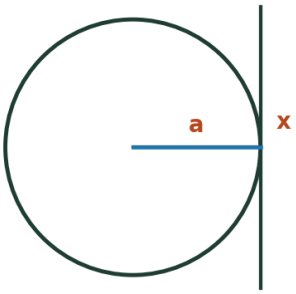
Answer _____

4 Prove that opposite angles of a cyclic quadrilateral sum to 180°. **[6 marks]**



Answer _____

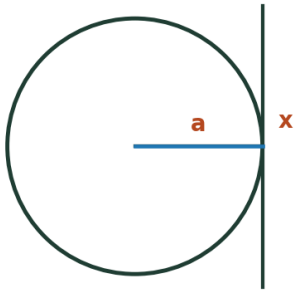
5 Prove that a tangent is perpendicular to the radius at the point of contact. **[6 marks]**



Answer _____

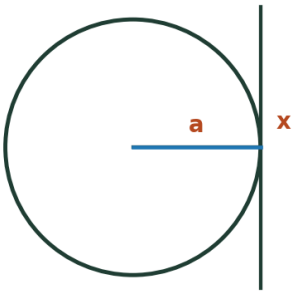
Core

6 Prove that the tangents from an external point to a circle are equal in length. **[6 marks]**



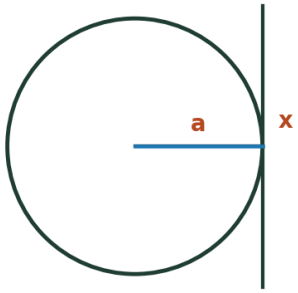
Answer

7 Prove the alternate segment theorem. **[6 marks]**



Answer _____

8 Prove that the perpendicular from the centre of a circle to a chord bisects the chord. **[6 marks]**



Answer _____

9 The angle at the centre standing on arc AB is 60°. Work out the angle at the circumference on the same arc. Give the circle theorem you use. **[4 marks]**

Answer _____

10 ABCD is a cyclic quadrilateral with angle ABC = 120°. Work out angle ADC and give the reason. **[4 marks]**

Answer _____

Stretch

11 A tangent meets a circle at T. O is the centre. Angle OTP = x where P is on the tangent. Write down x and give the reason. **[3 marks]**

Answer _____

12 Triangle ABC is inscribed in a circle with AB as a diameter. Angle BAC = 45°. Work out angle ABC and explain. **[5 marks]**

Answer _____

13 The angle at the centre standing on arc AB is 120°. Work out the angle at the circumference on the same arc. Give the circle theorem you use. **[4 marks]**

Answer _____

14 ABCD is a cyclic quadrilateral with angle ABC = 40°. Work out angle ADC and give the reason. **[4 marks]**

Answer _____

15 A tangent meets a circle at T. O is the centre. Angle OTP = x where P is on the tangent. Write down x and give the reason. **[3 marks]**

Answer _____

Challenge

16 Triangle ABC is inscribed in a circle with AB as a diameter. Angle BAC = 30°. Work out angle ABC and explain. **[5 marks]**

Answer _____

17 The angle at the centre standing on arc AB is 110°. Work out the angle at the circumference on the same arc. Give the circle theorem you use. **[4 marks]**

Answer _____

18 ABCD is a cyclic quadrilateral with angle ABC = 80°. Work out angle ADC and give the reason. **[4 marks]**

Answer _____

19 A tangent meets a circle at T. O is the centre. Angle OTP = x where P is on the tangent. Write down x and give the reason. **[3 marks]**

Answer _____

20 Triangle ABC is inscribed in a circle with AB as a diameter. Angle BAC = 25°. Work out angle ABC and explain. **[5 marks]**

Answer _____