



EXAM PAPERS PRACTICE

GCSE Edexcel Math
1MA1
Proof/Reasoning

Question Paper

*"We will help you to
achieve A Star "*



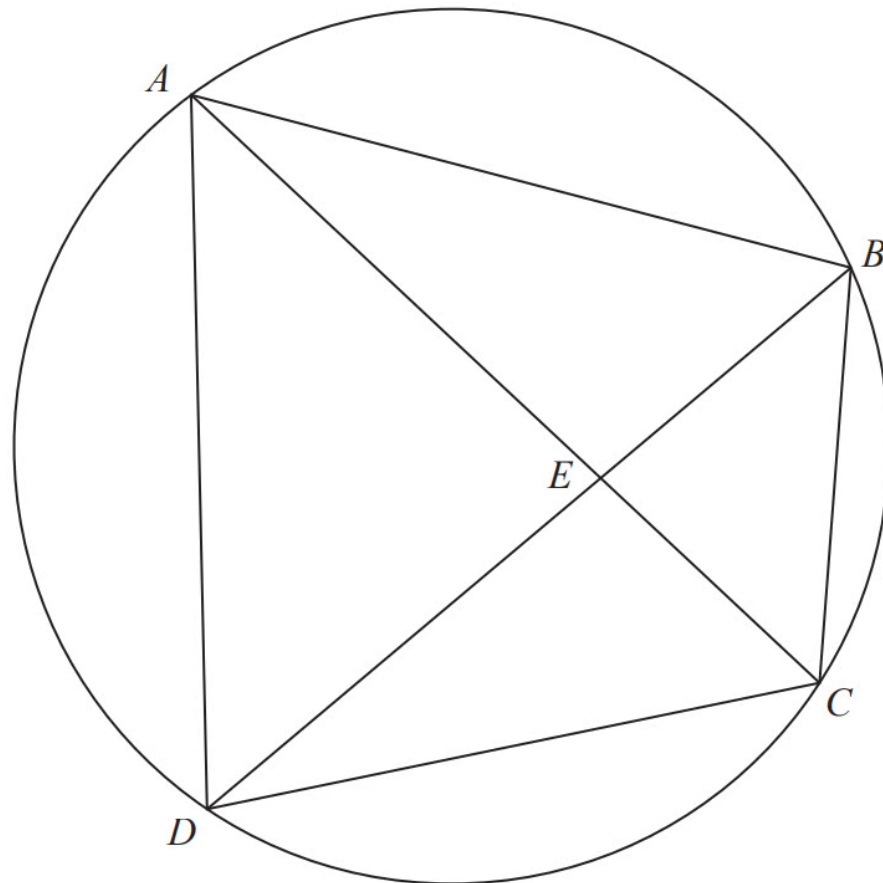
Question 1

Show that $(n + 3)^2 - (n - 3)^2$ is an even number for all positive integer values of n .

[3 marks]

Question 2

A , B , C and D are four points on the circumference of a circle.



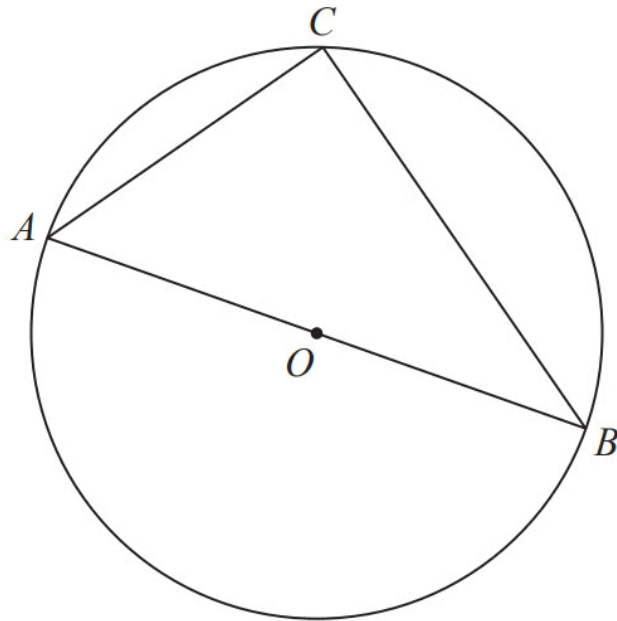
AEC and BED are straight lines.

Prove that triangle ABE and triangle DCE are similar.
You must give reasons for each stage of your working.

[3 marks]



Question 3



A , B and C are points on the circumference of a circle, centre O .
 AOB is a diameter of the circle.

Prove that angle ACB is 90°

You must **not** use any circle theorems in your proof.

[4 marks]

Question 4

The product of two consecutive positive integers is added to the larger of the two integers.

Prove that the result is always a square number.

[3 marks]



Question 5

n is an integer greater than 1

Prove algebraically that $n^2 - 2 - (n - 2)^2$ is always an even number.

[4 marks]

Question 6

Prove that

$(2n + 3)^2 - (2n - 3)^2$ is a multiple of 8

for all positive integer values of n .

[3 marks]

Question 7

Prove algebraically that

$(2n + 1)^2 - (2n + 1)$ is an even number

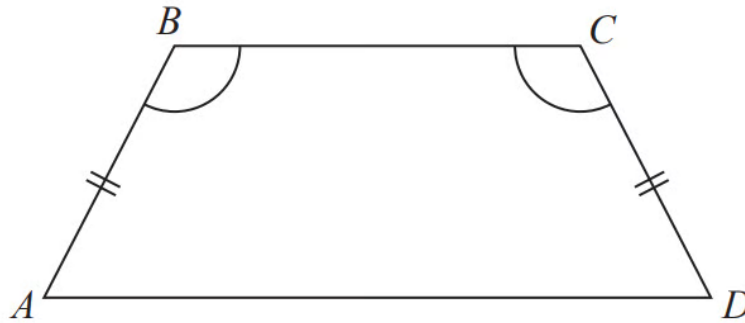
for all positive integer values of n .

[3 marks]



Question 8

$ABCD$ is a quadrilateral.



$AB = CD$.

Angle $ABC =$ angle BCD .

Prove that $AC = BD$.

[4 marks]

Question 9

Prove that the square of an odd number is always 1 more than a multiple of 4

[4 marks]



Question 10

(i) Factorise $2t^2 + 5t + 2$

(ii) t is a positive whole number.

The expression $2t^2 + 5t + 2$ can never have a value that is a prime number.

Explain why.

[3 marks]

Question 11

Prove algebraically that the difference between the squares of any two consecutive integers is equal to the sum of these two integers.

[4 marks]



Question 12

Here are the first five terms of an arithmetic sequence.

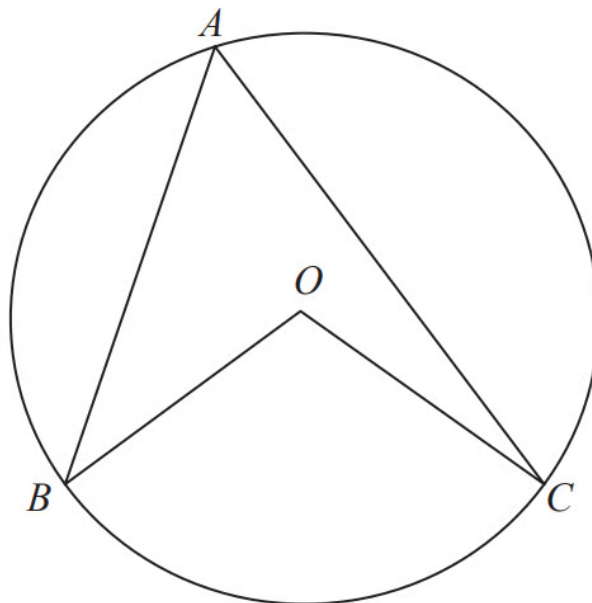
7 13 19 25 31

Prove that the difference between the squares of any two terms of the sequence is always a multiple of 24

[6 marks]

Question 13

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

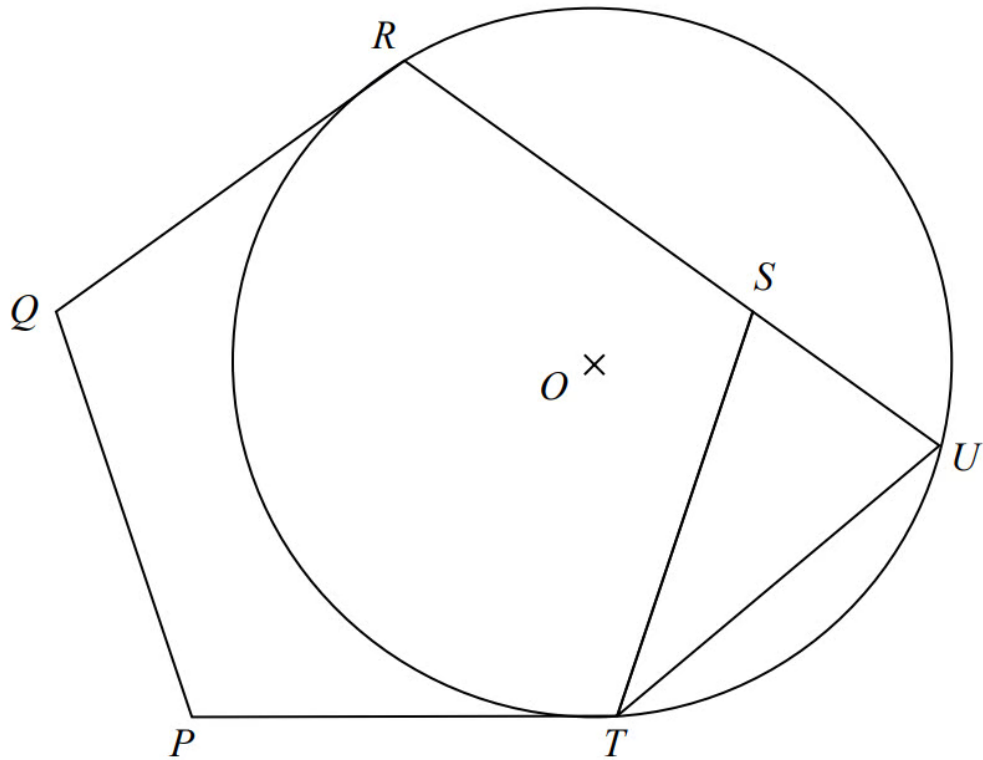


Prove that angle BOC is twice the size of angle BAC .

[4 marks]



Question 14



$PQRST$ is a regular pentagon.

R , U and T are points on a circle, centre O .

QR and PT are tangents to the circle.

RSU is a straight line.

Prove that $ST = UT$.

[5 marks]



Question 15

Prove that, for all positive values of n ,

$$\frac{(n + 2)^2 - (n + 1)^2}{2n^2 + 3n} = \frac{1}{n}$$

[4 marks]