



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2019

Centre Number

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Candidate Number

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Mathematics

Assessment Unit AS1

assessing

Pure Mathematics

MV18

[SMT11]

WEDNESDAY 15 MAY, MORNING

Time

1 hour 45 minutes, plus your additional time allowance.

Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer **all nine** questions in the spaces provided.

Do not write on blank pages.

Complete in black ink only.

Questions which require drawing or sketching should be completed using an H.B. pencil.

All working should be clearly shown in the spaces provided.

Marks may be awarded for partially correct solutions. **Answers without working may not gain full credit.**

Answers should be given to three significant figures unless otherwise stated.

You are permitted to use a graphic or scientific calculator in this paper.

Information for Candidates

The total mark for this paper is 100.

Figures in brackets at the end of each question indicate the marks awarded to each question or part question.

A copy of the **Mathematical Formulae and Tables booklet** is provided.

Throughout the paper the logarithmic notation used is $\ln z$ where it is noted that $\ln z \equiv \log_e z$

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(Questions start overleaf)

(b) $\vec{OA} = 4\mathbf{i} - \mathbf{j}$

$$\vec{OB} = 6\mathbf{i} + 2\mathbf{j}$$

Find:

- (i)** the magnitude of the vector \vec{AB} , [3 marks]

- 2 **Fig. 1** below shows a sketch of the graph of the curve given by the equation $y = f(x)$.

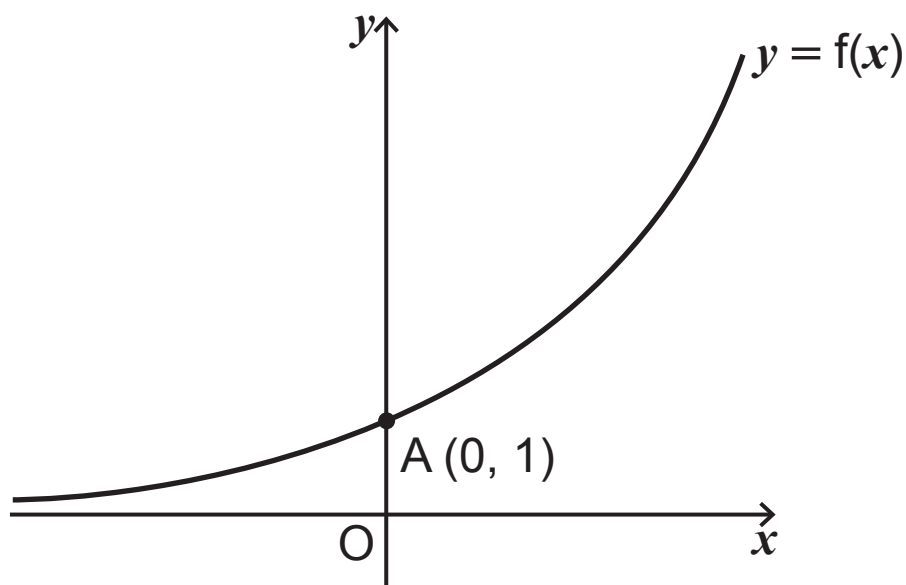


Fig. 1

Point A has coordinates $(0, 1)$.

- (a) Write down the coordinates of the point A under the following transformations:

(i) $y = f(x) + 1$ [2 marks]

(ii) $y = f(x - 3)$ [2 marks]

(iii) $y = f(-x)$ [2 marks]

9 Fig. 3 below shows a diagram of a circle with centre O.

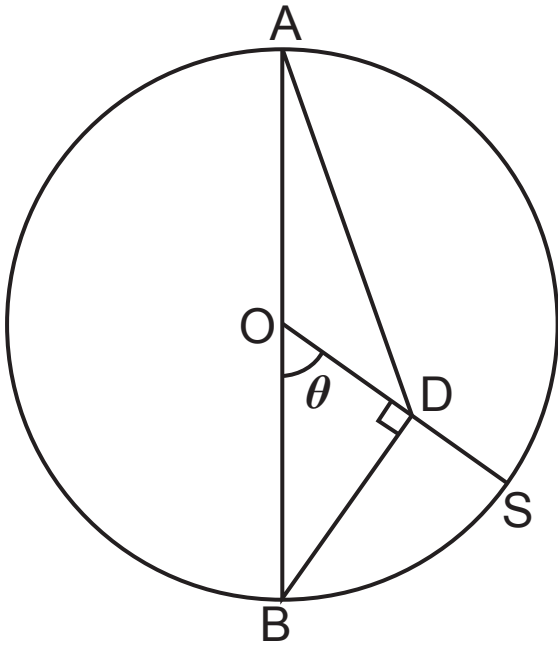


Fig. 3

AB is a diameter of the circle.

S lies on the circumference of the circle.

D is the foot of the perpendicular from B to OS.

The acute angle BOS is θ

$$OA = OB = r$$

$$OD = x$$

(i) By applying the cosine rule to triangle AOD, show that

$$AD^2 = r^2 (1 + 3 \cos^2 \theta) \quad [7 \text{ marks}]$$

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Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Examiner Number

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