

Rewarding Learning

ADVANCED SUBSIDIARY (AS) General Certificate of Education 2018

### **Mathematics**

Assessment Unit C2 assessing Module C2: AS Core Mathematics 2

### 

**Centre Number** 

**Candidate Number** 

\*AMC21\*

### [AMC21] WEDNESDAY 23 MAY, MORNING

#### TIME

1 hour 30 minutes.

#### INSTRUCTIONS TO CANDIDATES

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

You must answer all eight questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. Do not write with a gel pen.

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 75

Figures in brackets printed down the right-hand side of pages 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  $\ln z \equiv \log_e z$ 

## 

#### \*24AMC2101\*

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\*24AMC2102\*

1	Use the Trapezium Rule with five ordinates to find an estimate of
	$\int_{1}^{2} \sqrt{1+2x^2}  \mathrm{d}x $ [6]
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The	e equation of a circle is
	$x^2 + y^2 + 2x - 4y = 0$
(i)	Find the centre and radius of this circle. [4]

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4 A wing of a toy aeroplane can be modelled by two triangles ABC and ACD joined together to make a quadrilateral ABCD, as shown in **Fig. 2** below.





AB = 3.5 cm BC = 6.9 cmThe area of the triangle ABC is  $9.8 \text{ cm}^2$ 

(i) Find the size of CBA.

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Find the size of CÂD.	[6]

5	(i)	Use the binomial theorem to expand
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 $(3+x)^5$ 

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$(3+x)^5 - (3-x)^5 \equiv Px + Qx^3 + Rx^5$

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\*24AMC2113\*

$\frac{(1 - \cos \theta) (1 + \cos \theta)}{\sin \theta \cos \theta} \equiv \tan \theta$	[4]
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#### (ii) Hence, solve the equation

$$\frac{(1 - \cos \theta) (1 + \cos \theta)}{\sin \theta \cos \theta} = 2 - \tan^2 \theta$$

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- 7 Animator Paul is designing a new character, Alfie, for a game as shown in **Fig. 3** below. **Fig. 4** below shows a circle of radius *r* and centre O. AB is a chord of the circle with  $A\hat{O}B = \theta$  radians.



Paul models Alfie's hat as the minor segment and his face as the major segment of this circle.

(i) Find, in terms of *r* and *θ*, the area of Alfie's hat. [3]



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\*24AMC2116\*

In the model, the area of Alfie's face is *m* times the area of his hat.

(ii)	Find m	in terms	of $\theta$ and $\pi$ .
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<b>8</b> (a) Given that		<b>(a)</b>	Given	that
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 $\frac{5^{x-1}}{3^{2x}} = 27$ 

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\*24AMC2119\*

*24AMC2120*
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	log(4x + 1), lo	$\log(2x+3), \log(x)$	(x + 3)
Find the value of	f <i>x</i> .		
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Question Number	Marks	
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