

ADVANCED General Certificate of Education 2017

#### Mathematics

Assessment Unit C3 assessing Module C3: Core Mathematics 3

#### 

**Centre Number** 

**Candidate Number** 

\*AMC31\*

#### [AMC31] THURSDAY 1 JUNE, AFTERNOON

#### 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  $\ln z \equiv \log_e z$ 10387

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#### \*24AMC3101\*

and	$y = 4 \cos x$	
from $x = \frac{-\pi}{2}$ to $x = \frac{\pi}{2}$		
Find the area of the tray.		

The tray on a child's high chair can be modelled as the area between the curves

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\*24AMC3103\*

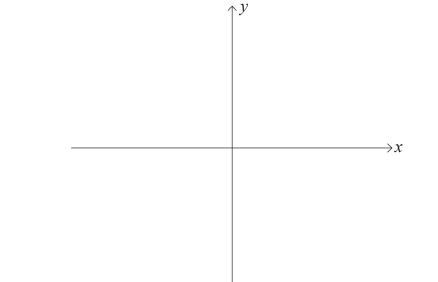
2	The speed, y	m s <sup>-1</sup> , of a	an accelera	ting car is	recorded ev	ery second	, <i>x</i> , for six s	seconds.
	Time x	0	1	2	3	4	5	6
	Speed y	0	5.3	8.1	10.3	11.9	13.0	14.1
	Use Simpson	i's rule to	estimate th	e distance	the car trave	els during t	he six seco	nds. [4]
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\*24AMC3104\*

#### 3 The function f(x) is defined as

$$f(x) = |2x - 1|$$

(i) On the axes below sketch the graph of 
$$y = f(x)$$
.



(ii) Describe fully the two successive transformations that will map y = f(x) onto

y = 3 - f(x)[4] [Turn over



# \*24AMC3105\*

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[2]

$x = 3 \tan \theta$	$y = 2 \sec \theta$	[

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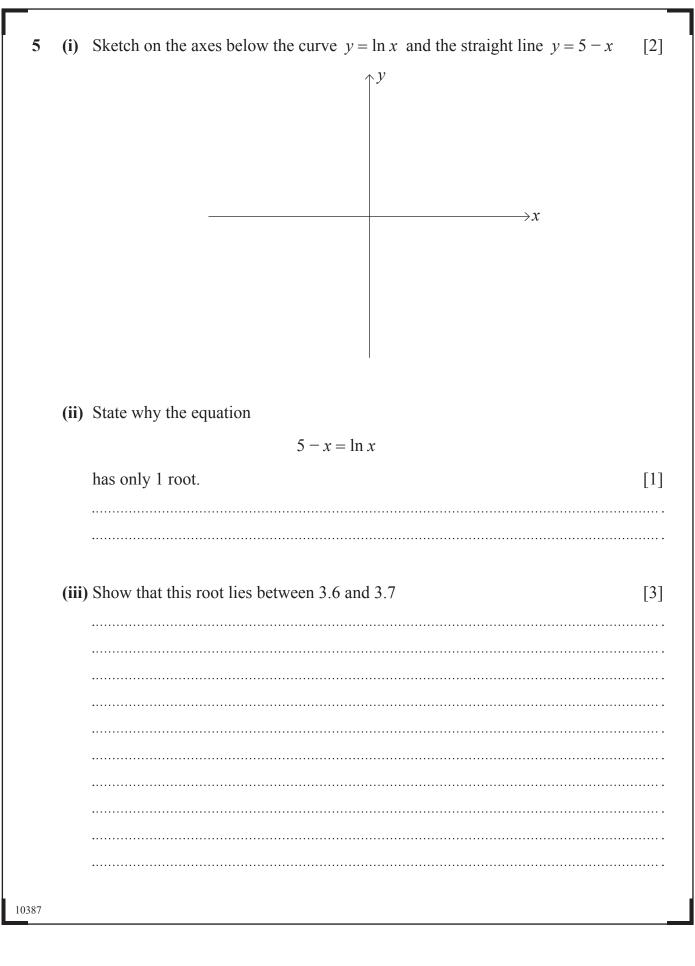


\*24AMC3106\*

	$\frac{\operatorname{cosec}\theta}{\operatorname{cosec}\theta - \sin\theta} \equiv \sec^2\theta$	[5]
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\*24AMC3107\*





\*24AMC3108\*

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\*24AMC3109\*

*24AMC3110*

	and state if it is a maximum or a minimum.
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6

Find the turning point on the curve

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\*24AMC3111\*

7 (i)	Write in partial fractions
	$6r^2$
	$\frac{6x^2}{(1-x)(1+2x)}$ [8]
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\*24AMC3112\*

[Turn over

\*24AMC3113\*

(ii) Hence find, in ascending powers of x, the binomial expansion of

$$\frac{6x^2}{(1-x)(1+2x)}$$

as far as the term in $x^3$	[8



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\*24AMC3115\*

8 (a) (i)	Differentiate $\sqrt{\frac{x}{x^2+1}}$ [3]	51
	$\sqrt{x^2+1}$	5]
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\*24AMC3118\*

(0	) Find $\int \frac{2x^2}{x^3 - 1} + \csc^2(3 - 7x) + \frac{x + 1}{x^2} dx$ [6]
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