Paper Reference (complete below)									Centre No.					
	6	6	6	3	/	0	1		Candidate No.					

Surname	Initial(s)
Signature	

Paper Reference(s)

6663

Edexcel GCE

Core Mathematics C3

Advanced Subsidiary

Set A: Practice Paper 1

Time: 1 hour 30 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
Total	

Materials required for examination
Mathematical Formulae

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature. You must write your answer for each question in the space following the question. If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
This paper has nine questions.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You must show sufficient working to make your methods clear to the examiner.
Answers without working may gain no credit.

Turn over

EDEXCEL CORE MATHEMATICS PRACTICE PAPER 1

1. Express as a single fraction in its simplest form

$$\frac{x^2 - 8x + 15}{x^2 - 9} \times \frac{2x^2 + 6x}{(x-5)^2}$$

(4)

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2. The root of the equation f(x) = 0, where

$$\mathrm{f}(x) = x + \ln 2x - 4$$

is to be estimated using the iterative formula $x_{n+1} = 4 - \ln 2x_n$, with $x_0 = 2.4$.

(a) Showing your values of $x_1, x_2, x_3, \ldots$, obtain the value, to 3 decimal places, of the root.

(4)

(b) By considering the change of sign of f(x) in a suitable interval, justify the accuracy of your answer to part (a). **(2)**

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3. The function f is defined by

$$f : x \mapsto |2x - a|, \quad x \in \mathbb{R}$$

where a is a positive constant.

(a) Sketch the graph of y = f(x), showing the coordinates of the points where the graph cuts the axes.

(2)

(b) On a separate diagram, sketch the graph of y = f(2x), showing the coordinates of the points where the graph cuts the axes.

(2)

(c) Given that a solution of the equation f(x) = $\frac{1}{2}x$ is $x = 4$, find the two possible values of a.

(4)

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4. Prove that

$$\frac{1 - \tan^2\theta}{1 + \tan^2\theta} \equiv \cos 2\theta .$$

(6)

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5. Express $\dfrac{3}{x^2+2x} + \dfrac{x-4}{x^2-4}$ as a single fraction in its simplest form. **(7)**

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6. The function f, defined for $x \in \mathbb{R}$, $x > 0$, is such that

$$f'(x) = x^2 - 2 + \frac{1}{x^2}.$$

(*a*) Find the value of $f''(x)$ at $x = 4$. **(3)**

(*b*) Given that $f(3) = 0$, find $f(x)$. **(4)**

(*c*) Prove that f is an increasing function. **(3)**

7.

$$f(x) = \frac{2}{x-1} - \frac{6}{(x-1)(2x+1)}, \quad x > 1$$

(*a*) Prove that $f(x) = \dfrac{4}{2x+1}$. **(4)**

(*b*) Find the range of f. **(2)**

(*c*) Find $f^{-1}(x)$. **(3)**

(*d*) Find the range of $f^{-1}(x)$. **(1)**

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8. The function f is given by

$$f : x \mapsto \ln(3x-6), \quad x \in \mathbb{R}, \quad x > 2.$$

(*a*) Find $f^{-1}(x)$.
(3)

(*b*) Write down the domain of f^{-1} and the range of f^{-1}.
(2)

(*c*) Find, to 3 significant figures, the value of x for which $f(x) = 3$.
(2)

The function g is given by

$$g : x \mapsto \ln|3x-6|, \quad x \in \mathbb{R}, \quad x \neq 2.$$

(*d*) Sketch the graph of $y = g(x)$.
(3)

(*e*) Find the exact coordinates of all the points at which the graph of $y = g(x)$ meets the coordinate axes. **(3)**