

Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	6	6	5	/	0	1	Signature	

Paper Reference(s)

6665/01

**Edexcel GCE
Core Mathematics C3
Advanced**

Thursday 16 June 2011 – Afternoon
Time: 1 hour 30 minutes

Examiner's use only		
Team Leader's use only		

<u>Materials required for examination</u>	<u>Items included with question papers</u>
Mathematical Formulae (Pink)	Nil

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation or symbolic differentiation/integration, or have retrievable mathematical formulae stored in them.

Question Number	Leave Blank
1	
2	
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7	
8	
Total	

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature. Check that you have the correct question paper.
Answer ALL the questions.
You must write your answer for each question in the space following the question.
When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).
There are 8 questions in this question paper. The total mark for this paper is 75.
There are 24 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You should show sufficient working to make your methods clear to the Examiner.
Answers without working may not gain full credit.

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Turn over

1. Differentiate with respect to x

(a) $\ln(x^2 + 3x + 5)$ **(2)**

(b) $\frac{\cos x}{x^2}$ **(3)**



3.

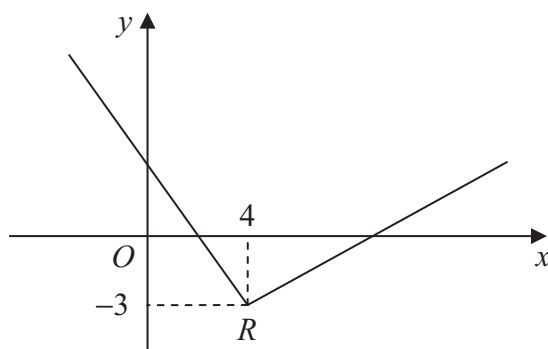


Figure 1

Figure 1 shows part of the graph of $y = f(x)$, $x \in \mathbb{R}$.

The graph consists of two line segments that meet at the point $R(4, -3)$, as shown in Figure 1.

Sketch, on separate diagrams, the graphs of

(a) $y = 2f(x+4)$, **(3)**

(b) $y = |f(-x)|$. **(3)**

On each diagram, show the coordinates of the point corresponding to R .



Question 3 continued

Q3

(Total 6 marks)



4. The function f is defined by

$$f : x \mapsto 4 - \ln(x+2), \quad x \in \mathbb{R}, x \geq -1$$

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

- (b) Find the domain of f^{-1} . **(1)**

The function g is defined by

$$g : x \mapsto e^{-x^2} - 2, \quad x \in \mathbb{R}$$

- (c) Find $fg(x)$, giving your answer in its simplest form. **(3)**

- (d) Find the range of fg . **(1)**



5. The mass, m grams, of a leaf t days after it has been picked from a tree is given by

$$m = p e^{-kt}$$

where k and p are positive constants.

When the leaf is picked from the tree, its mass is 7.5 grams and 4 days later its mass is 2.5 grams.

(a) Write down the value of p . (1)

(b) Show that $k = \frac{1}{4} \ln 3$. (4)

(c) Find the value of t when $\frac{dm}{dt} = -0.6 \ln 3$. (6)



6. (a) Prove that

$$\frac{1}{\sin 2\theta} - \frac{\cos 2\theta}{\sin 2\theta} = \tan \theta, \quad \theta \neq 90n^\circ, \quad n \in \mathbb{Z} \tag{4}$$

(b) Hence, or otherwise,

(i) show that $\tan 15^\circ = 2 - \sqrt{3}$, (3)

(ii) solve, for $0 < x < 360^\circ$,

$$\operatorname{cosec} 4x - \cot 4x = 1 \tag{5}$$



Question 6 continued

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Question 6 continued

A series of horizontal lines for writing the answer to Question 6.

Q6

(Total 12 marks)



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Question 7 continued

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Q7

(Total 13 marks)



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