Mathematics C4

Past Paper

This resource was created and owned by Pearson Edexcel

6666

Centre No.					Pape	er Refer	ence			Surname	Initial(s)
Candidate No.			6	6	6	6	/	0	1	Signature	

Paper Reference(s)

6666/01

Edexcel GCE

Core Mathematics C4 Advanced

Thursday 12 June 2008 – Morning

Time: 1 hour 30 minutes

Materials required for examination
Mathematical Formulae (Green)Items included with question papers
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, differentiation and integration, or have retrievable mathematical formulae stored in them.

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.

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 28 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.

This publication may be reproduced only in accordance with Edexcel Limited copyright policy.

©2008 Edexcel Limited

Printer's Log. No. H30427A

W850/R6666/57570 3/3/3/3/





Examiner's use only

Team Leader's use only

Total

Turn over

advancing learning, changing lives

Leave blank

1.

This resource was created and owned by Pearson Edexcel

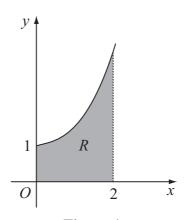


Figure 1

Figure 1 shows part of the curve with equation $y = e^{0.5x^2}$. The finite region R, shown shaded in Figure 1, is bounded by the curve, the x-axis, the y-axis and the line x = 2.

(a) Complete the table with the values of y corresponding to x = 0.8 and x = 1.6.

x	0	0.4	0.8	1.2	1.6	2
у	e^0	e ^{0.08}		$e^{0.72}$		e^2

(1)

(b) Use the trapezium rule with all the values in the table to find an approximate value for the area of R, giving your answer to 4 significant figures.

(3)

Paper	This resource was created and owned by Pearson Edexcel	
		Le
0 4 1 4	1	bl
Question 1 continue	a	
		Q1
		arks)

■ Past Paper

www.mystudybro.comThis resource was created and owned by Pearson Edexcel

	_	_	
ea	ıv	e	

(a) Use integration by parts to find $\int x e^x dx$.	
	(3)
(b) Hence find $\int x^2 e^x dx$.	
3	(3)

Paper	This resource was created and owned by Pearson Edexcel	(
		Le
Overtion 2 continue	a a	bl
Question 2 continue	a	
		Q2
	(Total 6 ma	rke)



6666

Leave blank

3.

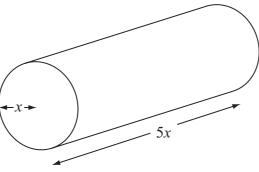


Figure 2

Figure 2 shows a right circular cylindrical metal rod which is expanding as it is heated. After t seconds the radius of the rod is x cm and the length of the rod is 5x cm. The cross-sectional area of the rod is increasing at the constant rate of 0.032 cm² s⁻¹.

(a) Find $\frac{dx}{dt}$ when the radius of the rod is 2 cm, giving your answer to 3 significant figures.

(b) Find the rate of increase of the volume of the rod when x = 2.

(4)

(4)

Julillier 2000	www.iiiystuuybio.coiii	Mathematics C	-
Past Paper	This resource was created and owned by Pearson Edexcel	666	36
		Leave	<u>a</u>

	blank
Overtion 2 continued	Olalik
Question 3 continued	

Mathematics C4

6666 Leave

Julilliel 2000	www.mystudybro.com	IVIALITE
Past Paper	This resource was created and owned by Pearson Edexcel	
	·	

Question 3 continued	blan

www.mystudybro.com was created and owned by Pearson Edexcel

pei	This resource was created and owned by Fearson Edexcer	
Question 3 continue	d	
-		

■ Past Paper

www.mystudybro.comThis resource was created and owned by Pearson Edexcel

Leave

A curve has equation $3x^2 - y^2 + xy = 4$. The points P and Q lie on the curve. To of the tangent to the curve is $\frac{8}{3}$ at P and at Q .	he gradient
(a) Use implicit differentiation to show that $y - 2x = 0$ at P and at Q .	(6)
(b) Find the coordinates of P and Q .	(3)

Juiiiii 2000	"" " " " " " " " " " " " " " " " " " "	mamomanoo o i
Past Paper	This resource was created and owned by Pearson Edexcel	6666

Question 4 continued		
		-
		-
		-
		-
		.

Mathematics C4

6666

Julilliel 2000	www.iiiystuuybio.com	Matricilia
Past Paper	This resource was created and owned by Pearson Edexcel	

astion A continued	
nestion 4 continued	

Paper	This resource was created and owned by Pearson Edexcel	660
·		Leav
		blanl
Question 4 continue	d	
		——
		Q4

Past

mmer Paper	20	08 www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathemati	ics C4 6666
				Leave blank
5.	(a)	Expand $\frac{1}{\sqrt{(4-3x)}}$, where $ x < \frac{4}{3}$, in ascending powers of x up to and incl	uding the	
		term in x^2 . Simplify each term.		
			(5)	
((b)	Hence, or otherwise, find the first 3 terms in the expansion of $\frac{x+8}{\sqrt{(4-3x)}}$ a in ascending powers of x.	s a series	
		in according powers or w.	(4)	
				l

ummer 2008 ast Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics C4
	,,,,	Leave blank
Question 5 contin	nued	
		Q5

(Total 9 marks)

This resource was created and owned by Pearson Edexcel

6666

Leave blank

6. With respect to a fixed origin O, the lines l_1 and l_2 are given by the equations

$$l_1$$
: $\mathbf{r} = (-9\mathbf{i} + 10\mathbf{k}) + \lambda(2\mathbf{i} + \mathbf{j} - \mathbf{k})$

$$l_2$$
: $\mathbf{r} = (3\mathbf{i} + \mathbf{j} + 17\mathbf{k}) + \mu(3\mathbf{i} - \mathbf{j} + 5\mathbf{k})$

where λ and μ are scalar parameters.

(a) Show that l_1 and l_2 meet and find the position vector of their point of intersection.

(6)

(b) Show that l_1 and l_2 are perpendicular to each other.

(2)

The point A has position vector $5\mathbf{i} + 7\mathbf{j} + 3\mathbf{k}$.

(c) Show that A lies on l_1 .

(1)

The point B is the image of A after reflection in the line l_2 .

(d) Find the position vector of *B*.

(3)

_				
e.	1100	mer	ാറ	no
Эl	ш	mer	ZU	Wo

Outilities 2000	www.mystadybro.com	Mathematics C+
Past Paper	This resource was created and owned by Pearson Edexcel	6666

Overtion (continued	Leave blank
Question 6 continued	

C4

Summer 2008	www.mystudybro.com	Mathematics	s C4
Past Paper	This resource was created and owned by Pearson Edexcel		6666
		I	Leave

	blank
Question 6 continued	
C	

	Paper	This resource was created and owned by Pearson Edexcei	666
Question 6 continued			Leav
			blanl
	Question 6 continued		
			—
			_
(Total 12 marks)			<u>Q</u> 6
(Total 12 marks)			[Y
1 2 0 0002 2 2 22200 19/7		(Total 12 mai	rks)

■ Past Paper

This resource was created and owned by Pearson Edexcel

Leave blank

7. (a) Express $\frac{2}{4-y^2}$ in partial fractions.

(3)

(b) Hence obtain the solution of

(3

$$2\cot x \, \frac{\mathrm{d}y}{\mathrm{d}x} = (4 - y^2)$$

for which y = 0 at $x = \frac{\pi}{3}$, giving your answer in the form $\sec^2 x = g(y)$.

(8)

_				
e.	1100	mer	ാറ	no
Эl	ш	mer	ZU	Wo

Dullillici 2000	www.iiiystaaybio.com	Mathematics 07
Past Paper	This resource was created and owned by Pearson Edexcel	6666

	Leave
	blank
Question 7 continued	
	1

Mathematics C4

6666 Leave

Julillier 2000	www.mystadybro.com	Watiic
ast Paper	This resource was created and owned by Pearson Edexcel	

Question 7 continued	blank

Sur	nn	۵r	20	ns
ЭUI	1111	ıeı	ZU	wc

aper	This resource was created and owned by Pearson Edexcel	
Question 7 continue	d	

8.

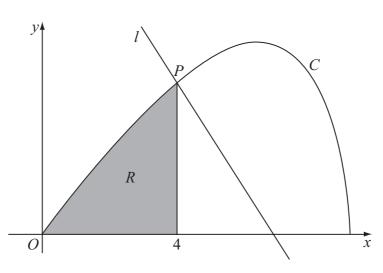


Figure 3

Figure 3 shows the curve C with parametric equations

$$x = 8\cos t$$
, $y = 4\sin 2t$, $0 \le t \le \frac{\pi}{2}$.

The point P lies on C and has coordinates $(4, 2\sqrt{3})$.

(a) Find the value of t at the point P.

(2)

The line l is a normal to C at P.

(b) Show that an equation for *l* is $y = -x\sqrt{3} + 6\sqrt{3}$.

(6)

The finite region R is enclosed by the curve C, the x-axis and the line x = 4, as shown shaded in Figure 3.

- (c) Show that the area of R is given by the integral $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} 64 \sin^2 t \cos t \, dt.$ (4)
- (d) Use this integral to find the area of R, giving your answer in the form $a + b\sqrt{3}$, where a and b are constants to be determined.

(4)

Sui	mn	٦Δr	20	ns
ЭUI		ıeı	ZU	wc

Julillici 2000	www.mystaaybro.com	Mathematics 04
Past Paper	This resource was created and owned by Pearson Edexcel	6666

Question 8 continued		b

Summer 2008 Past Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathemat	6666
Question 8 contin	nued		Leave blank

e.	ım	m	۸r	20	Λ	c
31	JM	m	er	ZU	U	č

www.mystudybro.comThis resource was created and owned by Pearson Edexcel

t Paper	This resource was created and owned by Pearson Edexcel	66
		Lea blai
Question 8 contin	nued	
	(Total 16 ma	rks)
	TOTAL FOR PAPER: 75 MA	
	END	