Mathematics C4

Past Paper

This resource was created and owned by Pearson Edexcel

6666

Centre No.					Pape	r 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

Monday 18 June 2007 – 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 formulas 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 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.

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

©2007 Edexcel Limited.

Printer's Log, No. N26110A W850/R6666/57570 3/3/3/3/3/



Turn over



Examiner's use only

Team Leader's use only

1

Leave

7

8

m 1

Total

Mathematics C4

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

6666

Leave	
blonk	- 1

$f(x) = (3+2x)^{-3}, x < \frac{3}{2}.$
Find the binomial expansion of $f(x)$, in ascending powers of x , as far as the term in x^3 .
Give each coefficient as a simplified fraction.
(5)

Summer	2007
Past Paper	

mmer 200 <i>7</i>	This resource was created and owned by Pearson Edexcel	Mathematics C
t Paper	This resource was created and owned by Pearson Edexcel	66
		Leav
0 4 1 4	1	blan
Question 1 continue	a control of the cont	
		01

(Total 5 marks)

■ Past Paper

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

6666

$\int_0^1 \frac{2^x}{(2^x + 1)^2} \mathrm{d}x .$	
0 (2 . 1)	(6)

_					
Sı	ım	m	er	20	M7

ummer 2007 ast Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics C4
		Leave
Question 2 contin	nued	blank
		Q2

(Total 6 marks)

■ Past Paper

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

•	•	_	•
6	6	2	2

<u> </u>	
(a) Find [
(a) Find $\int x \cos 2x dx$.	(4)
(b) Hence we have the identity $a = a + b + b + c + c + c + c + c + c + c + c$	
(b) Hence, using the identity $\cos 2x = 2\cos^2 x - 1$, deduce $\int x \cos^2 x dx$.	(3)

nmer 2007 Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematic	666 666
	,,,,,		Leav
			blan
Question 3 continued	1		

____Q3

(Total 7 marks)



■ Past Paper

This resource was created and owned by Pearson Edexcel

6666

Leave blank

4.	$\frac{2(4x^2+1)}{} \equiv A +$	B	C
	$\frac{1}{(2x+1)(2x-1)} = A +$		

(a) Find the values of the constants A, B and C.

(4)

(b) Hence show that the exact value of $\int_{1}^{2} \frac{2(4x^{2}+1)}{(2x+1)(2x-1)} dx$ is $2 + \ln k$, giving the value of the constant k.

(6)

Summer	2007
Past Paper	

ummer 2007	www.mystudybro.com	Mathematics C4
st Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	6666
		Leave
		blank
Question 4 contin	nued	
		Q4
	(Tota	l 10 marks)
	(======================================	/ 1 1

6666

This resource was created and owned by Pearson Edexcel

Leave blank

5.

Past Paper

The line l_1 has equation $\mathbf{r} = \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$.

The line l_2 has equation $\mathbf{r} = \begin{pmatrix} 1 \\ 3 \\ 6 \end{pmatrix} + \mu \begin{pmatrix} 2 \\ 1 \\ -1 \end{pmatrix}$.

(a) Show that l_1 and l_2 do not meet.

(4)

The point A is on l_1 where $\lambda = 1$, and the point B is on l_2 where $\mu = 2$.

(b) Find the cosine of the acute angle between AB and l_1 .

(6)

Summer	2007
Past Paper	

st Paper	This resource was created and owned by Pearson Edexcel	
Overtion 5 continue	nd.	Leave blank
Question 5 continue	ea	
		Q5
	(Total	l 10 maulta)

■ Past Paper

This resource was created and owned by Pearson Edexcel

Leave blank

6. A curve has parametric equations

$$x = \tan^2 t, \qquad y = \sin t, \qquad 0 < t < \frac{\pi}{2}.$$

(a) Find an expression for $\frac{dy}{dx}$ in terms of t. You need not simplify your answer.

(3)

(b) Find an equation of the tangent to the curve at the point where $t = \frac{\pi}{4}$.

Give your answer in the form y = ax + b, where a and b are constants to be determined.

(5)

(c) Find a cartesian equation of the curve in the form $y^2 = f(x)$.

(4)

_				
Q.	ım	mer	・つり	กร

Mathematics C4

Leave

www.mystudybro.comThis resource was created and owned by Pearson Edexcel Past Paper 6666

Question 6 continued	blank

Mathematics C4

6666

ullilliel 2001	www.mystudybro.com	Maniemanc
ist Paper	This resource was created and owned by Pearson Edexcel	

	d blar
I	

_				
Q.	ım	mer	・つり	กร

Summer 2007 ast Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics C4
азт прет	This resource was created and owned by I carson Edexocr	Leave
	_	blank
Question 6 contin	nued	
		000
		Q6

(Total 12 marks)

6666

Leave blank

7.

Past Paper

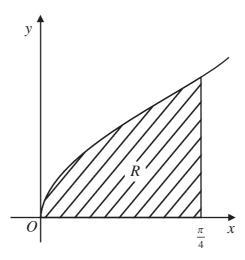


Figure 1

Figure 1 shows part of the curve with equation $y = \sqrt{(\tan x)}$. The finite region R, which is bounded by the curve, the x-axis and the line $x = \frac{\pi}{4}$, is shown shaded in Figure 1.

(a) Given that $y = \sqrt{(\tan x)}$, complete the table with the values of y corresponding to $x = \frac{\pi}{16}$, $\frac{\pi}{8}$ and $\frac{3\pi}{16}$, giving your answers to 5 decimal places.

х	0	$\frac{\pi}{16}$	$\frac{\pi}{8}$	$\frac{3\pi}{16}$	$\frac{\pi}{4}$
у	0				1
				•	(3)

(b) Use the trapezium rule with all the values of y in the completed table to obtain an estimate for the area of the shaded region R, giving your answer to 4 decimal places.

(4)

The region R is rotated through 2π radians around the x-axis to generate a solid of revolution.

(c) Use integration to find an exact value for the volume of the solid generated.

(4)

C	mer	200	_
Sum	ımer	ZUU	/

Mathematics C4

Leave

	ciliatios of
Past Paper This resource was created and owned by Pearson Edexcel	6666

Question 7 continued	blanl

Mathematics C4

6666

		•		- ,	-	
ast Paper	This resource	was create	d and	owned b	y Pearson	Edexce

, , , , , , , , , , , , , , , , , , , ,	
	Lea
	bla
Question 7 continued	
Question / communica	
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	-
	-
	_
	-
	—
	—
	1

e.		mer	200	۱7
51	ım	mer	Z ()()/

Mathematics C

Paper	This resource was created and owned by Pearson Edexcel	
Overtion 7 continued	1	Leave blank
Question 7 continued		
		Q7

(10tal 11 marks

Leave blank

8. A population growth is modelled by the differential equation

$$\frac{\mathrm{d}P}{\mathrm{d}t} = kP \; ,$$

where P is the population, t is the time measured in days and k is a positive constant.

Given that the initial population is P_0 ,

(a) solve the differential equation, giving P in terms of P_0 , k and t.

(4)

Given also that k = 2.5,

(b) find the time taken, to the nearest minute, for the population to reach $2P_0$.

(3)

In an improved model the differential equation is given as

$$\frac{\mathrm{d}P}{\mathrm{d}t} = \lambda P \cos \lambda t \;,$$

where P is the population, t is the time measured in days and λ is a positive constant.

Given, again, that the initial population is P_0 and that time is measured in days,

(c) solve the second differential equation, giving P in terms of P_0 , λ and t.

(4)

Given also that $\lambda = 2.5$,

(d) find the time taken, to the nearest minute, for the population to reach $2P_0$ for the first time, using the improved model.

(3)

_				
Q.	ım	mer	・つり	กร

Mathematics C4

www.mystudybro.comThis resource was created and owned by Pearson Edexcel 6666 Past Paper

usation 8 continued	
uestion 8 continued	

Mathematics C4

6666 Leave

Julillici 2001	www.iiiystaaybio.com
Past Paper	This resource was created and owned by Pearson Edexcel

estion 8 continued	

Ç,	ım	m	۵r	20	Λ7
Ðι	ш	ш	er	ZU	u,

Mathematics C4

t Paper	This resource was created and owned by Pearson Edexcel	666
		Leave blank
Question 8 continued		
		Q8
	(Total 14 ma	
	TOTAL FOR PAPER: 75 MA	RKS
	END	

