www.mystudybro.com

Mathematics C2

Past Paper

This resource was created and owned by Pearson Edexcel

6664

Surname	Other nar	mes
Pearson Edexcel GCE	Centre Number	Candidate Number
Core Mat Advanced Subsidi		s C2
	·	
Wednesday 25 May 2016 Time: 1 hour 30 minute	_	Paper Reference 6664/01

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

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B). Coloured pencils and highlighter pens must not be used.
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer all questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided - there may be more space than you need.
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information

- The total mark for this paper is 75.
- The marks for **each** question are shown in brackets
 - use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶



st Pape	er I his resource was created and owned by Pearson Edexcei		666
			Leave
	2		blank
1.	A geometric series has first term a and common ratio $r = \frac{3}{4}$		
	4		
	The sum of the first 4 terms of this series is 175		
	(a) Show that $a = 64$		
		(2)	
	(b) Find the sum to infinity of the series.		
		(2)	
	(c) Find the difference between the 9th and 10th terms of the series.		
	Give your answer to 3 decimal places.		
		(3)	
			1

Summer 2016
Past Paper
Question 1

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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

Nathematics	C2
6	664
	$\overline{}$

Question 1 continued	blank
Question 1 continued	
	Q1
(Total 7 marks)	



blank

2. The curve *C* has equation

$$y = 8 - 2^{x-1}, \qquad 0 \le x \le 4$$

(a) Complete the table below with the value of y corresponding to x = 1

χ	0	1	2	3	4
y	7.5		6	4	0

(1)

(b) Use the trapezium rule, with all the values of y in the completed table, to find an approximate value for $\int_0^4 (8-2^{x-1}) dx$



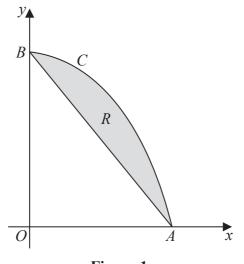


Figure 1

Figure 1 shows a sketch of the curve C with equation $y = 8 - 2^{x-1}$, $0 \le x \le 4$

The curve C meets the x-axis at the point A and meets the y-axis at the point B.

The region R, shown shaded in Figure 1, is bounded by the curve C and the straight line through A and B.

(c) Use your answer to part (b) to find an approximate value for the area of R.

(2)

Sum	mar	201	e
Sum	mer	ZU I	O

Summer 2016 Past Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics Ca
Question 2 cont		Leave blank

Summer 2016	www.mystudybro.com	Mathematics C2
ast Paper	This resource was created and owned by Pearson Edexcel	6664

Question 2 continued	Leav blan

Summer	201	6
Past Paper		

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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

Mathematics C

d	τı	er	n	a	τı	C	5	C.	_
							6	66	4

Q_2	2
(Total 6 marks)	



Leave blank

6664

3.

Past Paper

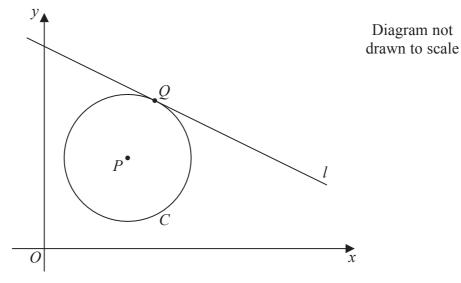


Figure 2

The circle C has centre P(7, 8) and passes through the point Q(10, 13), as shown in Figure 2.

(a) Find the length PQ, giving your answer as an exact value.

(2)

(b) Hence write down an equation for C.

(2)

The line *l* is a tangent to *C* at the point *Q*, as shown in Figure 2.

(c) Find an equation for l, giving your answer in the form ax + by + c = 0, where a, b and c are integers.

(4)

Past Paper

	Leave
	blank
Question 3 continued	0.000
Question 5 continued	



Past Paper

uestion 3 continued	blank
destion 5 continued	

st Paper	This resource was created and owned by Pearson Edexcel	Mathematics (664
Question 3 continued	1	Lear blar	
	*		
		Q3	
	UP- 4		
	(10t)	al 8 marks)	



Past Paper	This resource was created and owned by Pearson Edexcel	666
		Leave
4.	$f(x) = 6x^3 + 13x^2 - 4$	blank
4.	1(x) - 0x + 13x - 4	
(2	Use the remainder theorem to find the remainder when $f(x)$ is divided by $(2x + 3)$.	
	(2)	
(t	Use the factor theorem to show that $(x + 2)$ is a factor of $f(x)$.	
	(2)	
(0	e) Factorise $f(x)$ completely.	
	(4)	

nmer 2016 Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics	66
			Leav blan
Question 4 continue	d		Jiui



Q4

(Total 8 marks)

DO NOT WRITE IN THIS AREA

(a) Find the first 3 terms, in ascending powers of x, of the binomial expansion of

$$(2-9x)^4$$

giving each term in its simplest form.

(4)

$$f(x) = (1 + kx)(2 - 9x)^4$$
, where k is a constant

The expansion, in ascending powers of x, of f(x) up to and including the term in x^2 is

$$A - 232x + Bx^2$$

where A and B are constants.

(b) Write down the value of A.

(1)

(c) Find the value of k.

(2)

(d) Hence find the value of *B*.

(2)

Past Paper	This resource was created and owned by Pearson Edexcel	666
		Leave
Overtion 5 com	45mm and	blank
Question 5 con	tinued	



Paper	This resource was created and owned by Pearson Edexcel	66
		Leav
		blan
Question 5 continued		
		1

	Summer 2016 Past Paper
	Question 5
IIS AREA	
TE IN THIS	
OO NOT WRITE	
DON	

Paper	This resource was created and owned by Pearson Edexcel	6664
		Leave
Question 5 conti	inuad	blank
Question 5 conti	inueu	
		Q5
	(Total 9 m	arks)

www.mystudybro.com



Mathematics C2

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave blank

(i) Solve, for $-\pi < \theta \leqslant \pi$,

$$1 - 2\cos\left(\theta - \frac{\pi}{5}\right) = 0$$

giving your answers in terms of π .

(3)

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

$$4\cos^2 x + 7\sin x - 2 = 0$$

giving your answers to one decimal place.

(Solutions based entirely on graphical or numerical methods are not acceptable.)

⋖
ш
~
4
2
Τ.
Ξ.
Z
ш
<u>—</u>
~
5
\geq
<u>—</u>
Ö
\preceq
0
ă

α
⋖
S
₹.
÷.
Z
_
щ.
ᇤ
α
≥
_
$\underline{\circ}$
Z
ă
_

ш
α
⋖
M
$\stackrel{\sim}{=}$
王
\vdash
Z
=
ш
느
~
2
?
$\overline{0}$
Z
0

⋖

t Paper	This resource was created and owned by Pearson Edexcel	666
		Leave
Overtion 6 continue	J	blank
Question 6 continue	u	

www.mystudybro.com

Mathematics C2

Gailline Edit	www.mystaaybro.com	Matri
■ Past Paper	This resource was created and owned by Pearson Edexcel	

eave	1
lank	
lank	

DO NOT WRITE IN THIS AREA

Question 6 continued	blank	

_	ς.
V	 ע ר

6664 Leave blank

(Total 9 marks)

Leave blank

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

7.

Past Paper

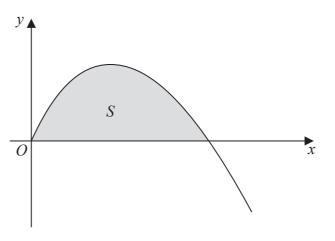


Figure 3

Figure 3 shows a sketch of part of the curve with equation

$$y = 3x - x^{\frac{3}{2}}, \qquad x \geqslant 0$$

The finite region S, bounded by the x-axis and the curve, is shown shaded in Figure 3.

(a) Find

$$\int \left(3x - x^{\frac{3}{2}}\right) \mathrm{d}x \tag{3}$$

(b) Hence find the area of S.

1	.) 1	
٦	υ,	
	` '	

Past Paper	This resource was created and owned by Pearson Edexcel	6664
С С С С С С С С С С С С С С С С С С С		Leave
		blank
Overtion 7 continued		Dialik
Question 7 continued		
		<u> </u>



t Paper	This resource was created and owned by Pearson Edexcel		6664
			Leave
Overtion 7 continue	A		blank
Question 7 continue	a		

Immer 2016 st Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics C2
		Leave
Overtion 7 continued		blank
Question 7 continued		
		Q 7



(Total 6 marks)

■ Past Paper

(i) Given that

$$\log_3(3b+1) - \log_3(a-2) = -1, \quad a > 2$$

express b in terms of a.

(3)

(ii) Solve the equation

$$2^{2x+5} - 7(2^x) = 0$$

giving your answer to 2 decimal places.

(Solutions based entirely on graphical or numerical methods are not acceptable.)

(4)

Leave blank

Q8

(Total 7 marks)

This resource was created and owned by Pearson Edexcel

DO NOT WRITE IN THIS AREA

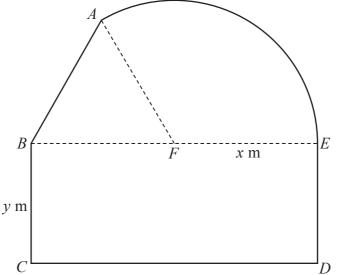


Figure 4

Figure 4 shows a plan view of a sheep enclosure.

The enclosure ABCDEA, as shown in Figure 4, consists of a rectangle BCDE joined to an equilateral triangle BFA and a sector FEA of a circle with radius x metres and centre F.

The points B, F and E lie on a straight line with FE = x metres and $10 \le x \le 25$

(a) Find, in m^2 , the exact area of the sector *FEA*, giving your answer in terms of x, in its simplest form.

Given that BC = y metres, where y > 0, and the area of the enclosure is 1000 m^2 ,

(b) show that

$$y = \frac{500}{x} - \frac{x}{24} \left(4\pi + 3\sqrt{3} \right) \tag{3}$$

(c) Hence show that the perimeter P metres of the enclosure is given by

$$P = \frac{1000}{x} + \frac{x}{12} \left(4\pi + 36 - 3\sqrt{3} \right) \tag{3}$$

- (d) Use calculus to find the minimum value of P, giving your answer to the nearest metre. **(5)**
- (e) Justify, by further differentiation, that the value of P you have found is a minimum.

(2)

Past Paper	This resource was created and owned by Pearson Edexcel	666
		Leave
Overtion 0 conti	mus d	blank
Question 9 conti	nued	



www.mystudybro.com

Mathematics C

Jan	ii ii ii ii yotaay bi olooiii		
ast Paner	This resource was created and owned by Pearson Edexcel		

1	II	lc	ıτ	C	5	CΖ	
					(3664	

	DO
	NOT
	WRITE
	Z
	SIHI
	AREA

~	s
- 7	₹
-	=
	3
_	٦
	٦
_	-
5	31
<	
- 3	3
	=
-	а
_	3
П	٦
-	_
	Ξ
-	_
	4
-	Ē
-	
	=
·U	٦
-	
- 10	⋑
	_
-	J
TT.	٦
- 12	ľ
J	ø

D

Question 9 continued	blank

	Leave
	blank
Question 9 continued	0141111
Question > continued	

i mer 2016 Paper Thi	www.mystudybro.com s resource was created and owned by Pearson Edexcel	Mathematics C2
		Leave blank
Question 9 continued		

(Total 15 marks)

TOTAL FOR PAPER: 75 MARKS

END

Q9