www.mystudybro.com

Mathematics FP2

Examiner's use only

Team Leader's use only

Question

1

2

Leave

Past Paper

This resource was created and owned by Pearson Edexcel

6668

Centre No.					Pape	er Refer	ence			Surname	Initial(s)
Candidate No.			6	6	6	8	/	0	1	Signature	

Paper Reference(s)

6668/01

Edexcel GCE

Further Pure Mathematics FP2 Advanced/Advanced Subsidiary

Thursday 23 June 2011 – Morning

Time: 1 hour 30 minutes

Materials required for examination
Mathematical Formulae (Pink)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 or symbolic differentiation/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.

Answer ALL the questions.

You must write your answer to 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

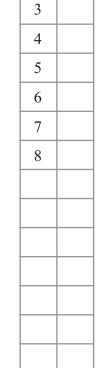
You must ensure that your answers to parts of questions are clearly labelled. You should show sufficient working to make your methods clear to the Examiner. Answers without working may not gain full credit.

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

©2011 Edexcel Limited.

Printer's Log. No. P35413A





Turn over

Total



Mathematic

■ Past Paper

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

s FP2 6668	
Leave blank	
0141111	

$3 \qquad r-4$		
$\frac{3}{x+3} > \frac{x-4}{x}$		
X 1 3 X	(7)	

nmer 2011 Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics I
·	·	L
Question 1 continu	ued	bl

(Total 7 marks)



Q1

Past Paper

This resource was created and owned by Pearson Edexcel

Leave blank

2.

$$\frac{\mathrm{d}^2 y}{\mathrm{d}x^2} = \mathrm{e}^x \left(2y \frac{\mathrm{d}y}{\mathrm{d}x} + y^2 + 1 \right)$$

(a) Show that

$$\frac{d^{3}y}{dx^{3}} = e^{x} \left[2y \frac{d^{2}y}{dx^{2}} + 2\left(\frac{dy}{dx}\right)^{2} + ky \frac{dy}{dx} + y^{2} + 1 \right],$$

where k is a constant to be found.

(3)

Given that, at x = 0, y = 1 and $\frac{dy}{dx} = 2$,

(b) find a series solution for y in ascending powers of x, up to and including the term in x^3 .

(4)

S

ummer 2011 st Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics FP2
· · · · · · · · · · · · · · · · · · ·		Leave blank
Question 2 continue	d	Orank

(Total 7 marks)

Mathematics FP2

Past Paper

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

	7
Leave	
Louve	
hlank	

$x\frac{\mathrm{d}y}{\mathrm{d}x} + 5y = \frac{\ln x}{x}, \qquad x > 0$	
giving your answer in the form $y = f(x)$.	(8)

S

ummer 2011 st Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics FP
		Leave blank
Question 3 continued		
		Q3

(Total 8 marks)



Past Paper

www.mystudybro.com

Mathematics FP2

This resource was created and owned by Pearson Edexcel

6668

Leave blank

4. Given that

$$(2r+1)^3 = Ar^3 + Br^2 + Cr + 1,$$

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

(2)

(b) Show that

$$(2r+1)^3 - (2r-1)^3 = 24r^2 + 2$$

(2)

(c) Using the result in part (b) and the method of differences, show that

$$\sum_{r=1}^{n} r^2 = \frac{1}{6} n(n+1)(2n+1) \tag{5}$$

www.mystudybro.com

- ·····	,	
Past Paper	This resource was created and owned by Pearson Edexcel	6668

uestion 4 continued	ł

www.mystudybro.com

- a	,		
Past Paper	This resource was created and owned by Pearson Edexcel		

 U3	•	•	_
	6		00

uestion 4 continued	

nmer 2011 Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematic	s FF 66
			Leav
			blar
Question 4 contin	ued		

Q4

(Total 9 marks)

www.mystudybro.com

Mathematics FP2

Past Paper

This resource was created and owned by Pearson Edexcel

Leave blank

5. The point P represents the complex number z on an Argand diagram, where

$$|z - \mathbf{i}| = 2$$

The locus of P as z varies is the curve C.

(a) Find a cartesian equation of C.

(2)

(b) Sketch the curve *C*.

(2)

A transformation T from the z-plane to the w-plane is given by

$$w = \frac{z + i}{3 + iz}, \quad z \neq 3i$$

The point Q is mapped by T onto the point R. Given that R lies on the real axis,

(c) show that Q lies on C.

(5)

www.mystudybro.com

Past Paper	This resource was created and owned by Pearson Edexcel	

	Leave
	blank
Question 5 continued	

Mathematics FP2

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

estion 5 continued	

www.mystudybro.com

Oullille ZVII	www.iiiystaaybio.com	Mathematics i i Z
Past Paper	This resource was created and owned by Pearson Edexcel	6668
		Leave

Question 5 continued		b
		Q:
	(Total 9 marks)	

Past Paper

This resource was created and owned by Pearson Edexcel

6668 Leave

blank

6.

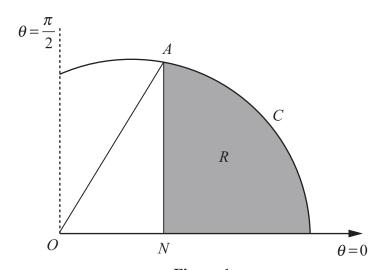


Figure 1

The curve C shown in Figure 1 has polar equation

$$r = 2 + \cos \theta$$
, $0 \leqslant \theta \leqslant \frac{\pi}{2}$

At the point A on C, the value of r is $\frac{5}{2}$.

The point N lies on the initial line and AN is perpendicular to the initial line.

The finite region R, shown shaded in Figure 1, is bounded by the curve C, the initial line and the line AN.

Find the exact area of the shaded region R.

(9)

Past Paper

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

estion 6 continued		

www.mystudybro.com

Mathematics FP2

6668

■ Past Paper

This resource	was cr	eated and	owned b	ov Pea	rson Ede	exce
THIS TOSOGIOC	Was or	catea and	OWNICAL	Jy i Cu		

Question 6 continued	Lea blar

Summer 2011	www.mystudybro.com	Mathematic	S FP2
Past Paper	This resource was created and owned by Pearson Edexcel		6668
			Leave

stion 6 continued	

■ Past Paper

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

	I
7. (a) Use de Moivre's theorem to show that	
$\sin 5\theta = 16\sin^5\theta - 20\sin^3\theta + 5\sin\theta$	
	(5)
Hence, given also that $\sin 3\theta = 3\sin\theta - 4\sin^3\theta$,	
(b) find all the solutions of	
$\sin 5\theta = 5\sin 3\theta,$	
in the interval $0 \le \theta < 2\pi$. Give your answers to 3 decimal places.	
	(6)

www.mystudybro.com

Guilline Zoll	www.mystudybro.com	Mathematics 1 1 2
Past Paper	This resource was created and owned by Pearson Edexcel	6668

Question 7 continued	bl
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_

www.mystudybro.com

Mather

	<i>-</i>	
Past Paper	This resource was created an	nd owned by Pearson Edexcel

natic	s FP2 6668
	Leave
	blank
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	

Question 7 continued	Dialik
Z	

S Pa

ummer 2011 ast Paper	www.mystudybro.com This resource was created and owned by Pearson Edexcel	Mathematics FP2
	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Leave
Question 7 continue	ed	blank
		Q7

(Total 11 marks)

Past Paper

This resource was created and owned by Pearson Edexcel

Leave blank

8. The differential equation

$$\frac{\mathrm{d}^2 x}{\mathrm{d}t^2} + 6\frac{\mathrm{d}x}{\mathrm{d}t} + 9x = \cos 3t, \quad t \geqslant 0$$

describes the motion of a particle along the *x*-axis.

(a) Find the general solution of this differential equation.

(8)

(b) Find the particular solution of this differential equation for which, at t = 0,

$$x = \frac{1}{2} \text{ and } \frac{\mathrm{d}x}{\mathrm{d}t} = 0.$$
 (5)

On the graph of the particular solution defined in part (b), the first turning point for t > 30 is the point A.

(c) Find approximate values for the coordinates of A.

(2)

www.mystudybro.com

Mathematics FP2

Allillici ZUII	www.mystudybro.com	Matricinati
st Paner	This resource was created and owned by Pearson Edeycel	

uestion 8 continued	

Mathematics FP2

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

estion 8 continued	

Q.	ım	m	٥r	20	1	
.71	1111	111	er	ZU	, ,	

mer 2011	This resource was created and owned by Pearson Edexcel	Matnematics FF
Paper	This resource was created and owned by Pearson Edexcei	66
		Leav blan
Question 8 continued	1	
		Q
	(Tota	l 15 marks)



END