Centre No.				Paper Reference			Surname	Initial(s)			
Candidate No.			6	6	6	4	/	0	1	Signature	_

Paper Reference(s)

### 6664/01

## **Edexcel GCE**

# **Core Mathematics C2 Advanced Subsidiary**

Monday 14 January 2013 – Morning

Time: 1 hour 30 minutes

Materials required for examination	Items included with question paper
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.

#### **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 9 questions in this question paper. The total mark for this paper is 75.

There are 32 pages in this question paper. Any blank pages are indicated.

#### **Advice to Candidates**

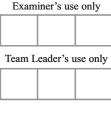
You must ensure that your answers to parts of questions are clearly labelled. You should show sufficient working to make your methods clear to the Examiner. Answers without working may not gain full credit.

This publication may be reproduced only in accordance with Pearson Education Ltd copyright policy.

©2013 Pearson Education Ltd.

Printer's Log. No. P41487A
W850/R6664/57570 5/5/5/5/

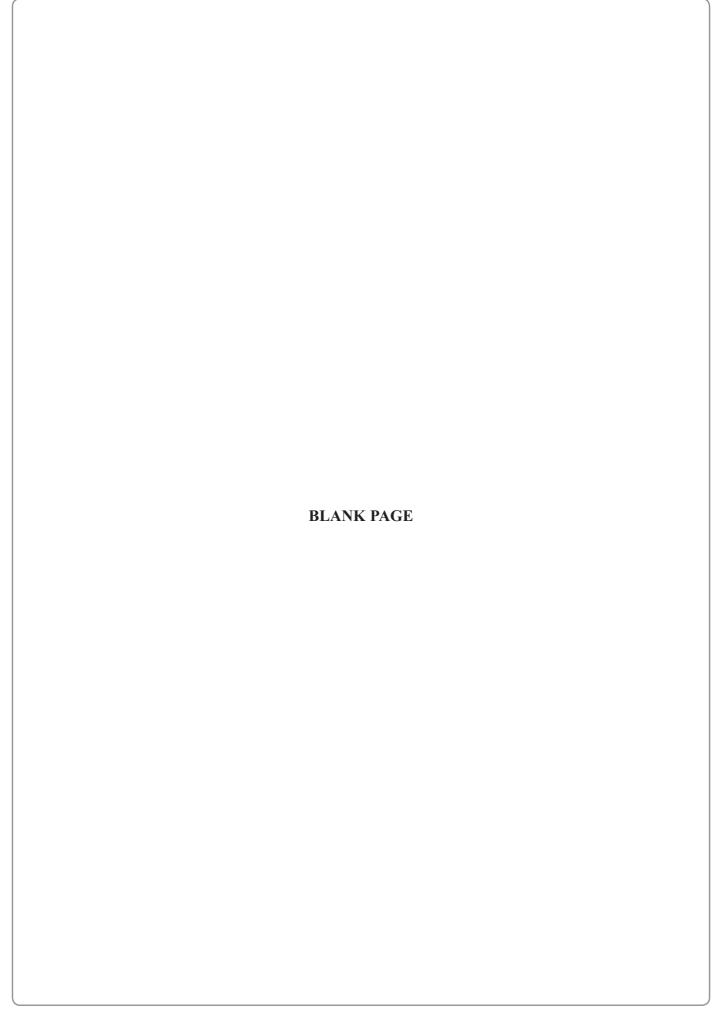




Turn over

Total

PEARSON



$(2-5x)^6$	
Give each term in its simplest form.	(4)

2. $f(x) = ax^3 + bx^2 - 4x - 3$ , where a and b are constants.	
Given that $(x - 1)$ is a factor of $f(x)$ ,	
(a) show that $a + b = 7$	(2)
Given also that, when $f(x)$ is divided by $(x + 2)$ , the remainder is 9,	
(b) find the value of $a$ and the value of $b$ , showing each step in your working.	(4)



3.	A company predicts a yearly profit of £120 000 in the year 2013. The company predicts that the yearly profit will rise each year by 5%. The predicted yearly profit forms a geometric sequence with common ratio 1.05							
	(a) Show that the predicted profit in the year 2016 is £138 915	(1)						
	(b) Find the first year in which the yearly predicted profit exceeds £200 000	(5)						
	(c) Find the total predicted profit for the years 2013 to 2023 inclusive, giving your to the nearest pound.	answer						
		(3)						





uestion 3 continued	bla



**4.** Solve, for  $0 \le x < 180^{\circ}$ ,

$\cos(3x - 10^{\circ}) = -0.4$					
giving your answers to 1 decimal place.	You should show each step in your working. (7)				



_	T1	-:1-	C 1	
5.	The	circle	C nas	equation

$$x^2 + y^2 - 20x - 24y + 195 = 0$$

The centre of *C* is at the point *M*.

- (a) Find
  - (i) the coordinates of the point M,
  - (ii) the radius of the circle C.

**(5)** 

N is the point with coordinates (25, 32).

(b) Find the length of the line MN.

**(2)** 

The tangent to C at a point P on the circle passes through point N.

(c) Find the length of the line NP.

**(2)** 



nestion 5 continued		



<b>6.</b> Gi	ven that
--------------	----------

$$2\log_2(x+15) - \log_2 x = 6$$

$$x^2 - 34x + 225 = 0$$

**(5)** 

$$2\log_2(x+15) - \log_2 x = 6$$

**(2)** 



nestion 6 continued		



7.

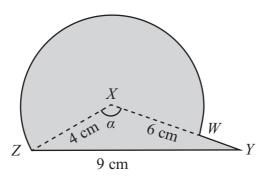


Figure 1

The triangle XYZ in Figure 1 has XY = 6 cm, YZ = 9 cm, ZX = 4 cm and angle  $ZXY = \alpha$ . The point W lies on the line XY.

The circular arc ZW, in Figure 1 is a major arc of the circle with centre X and radius 4 cm.

(a) Show that, to 3 significant figures,  $\alpha = 2.22$  radians.

**(2)** 

(b) Find the area, in  $cm^2$ , of the major sector XZWX.

**(3)** 

The region enclosed by the major arc ZW of the circle and the lines WY and YZ is shown shaded in Figure 1.

Calculate

(c) the area of this shaded region,

**(3)** 

(d) the perimeter ZWYZ of this shaded region.

**(4)** 



estion 7 continued		



- **8.** The curve C has equation  $y = 6 3x \frac{4}{x^3}$ ,  $x \ne 0$ 
  - (a) Use calculus to show that the curve has a turning point P when  $x = \sqrt{2}$

**(4)** 

(b) Find the x-coordinate of the other turning point Q on the curve.

**(1)** 

(c) Find  $\frac{d^2y}{dx^2}$ .

**(1)** 

(d) Hence or otherwise, state with justification, the nature of each of these turning points P and Q.

**(3)** 



uestion 8 continued		
		-
		_
		.
		-
		.
		.
		-
		_
		.
		-
		.
		-
		-
		.
		.
		-
		.
		.
		.
		-
		-
		-



Leave blank

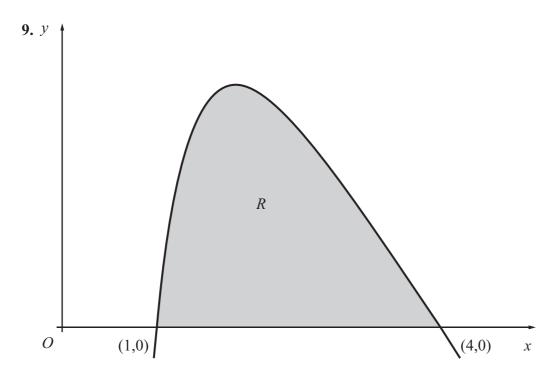


Figure 2

The finite region R, as shown in Figure 2, is bounded by the x-axis and the curve with equation

$$y = 27 - 2x - 9\sqrt{x - \frac{16}{x^2}}, \qquad x > 0$$

The curve crosses the x-axis at the points (1, 0) and (4, 0).

(a) Complete the table below, by giving your values of y to 3 decimal places.

X	1	1.5	2	2.5	3	3.5	4
у	0	5.866		5.210		1.856	0

**(2)** 

(b) Use the trapezium rule with all the values in the completed table to find an approximate value for the area of *R*, giving your answer to 2 decimal places.

**(4)** 

(c) Use integration to find the exact value for the area of R.

**(6)** 





estion 9 continued	 	



Question 9 continued					
	(Total 12 marks)				