

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

Wednesday 20 May 2015 – Morning

Time: 1 hour 30 minutes

Examiner's use only

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Team Leader's use only

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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.

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

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.

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Question 1 continued

A series of horizontal lines for writing, intended for the student's response to the question.

Q1

(Total 4 marks)



4.

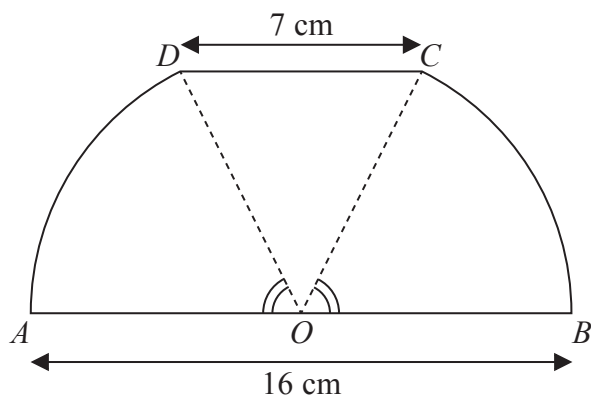


Figure 1

Figure 1 shows a sketch of a design for a scraper blade. The blade $AOBCDA$ consists of an isosceles triangle COD joined along its equal sides to sectors OBC and ODA of a circle with centre O and radius 8 cm. Angles AOD and BOC are equal. AOB is a straight line and is parallel to the line DC . DC has length 7 cm.

- (a) Show that the angle COD is 0.906 radians, correct to 3 significant figures. (2)

- (b) Find the perimeter of $AOBCDA$, giving your answer to 3 significant figures. (3)

- (c) Find the area of $AOBCDA$, giving your answer to 3 significant figures. (3)



6. (a) Find

$$\int 10x(x^{\frac{1}{2}} - 2) dx$$

giving each term in its simplest form.

(4)

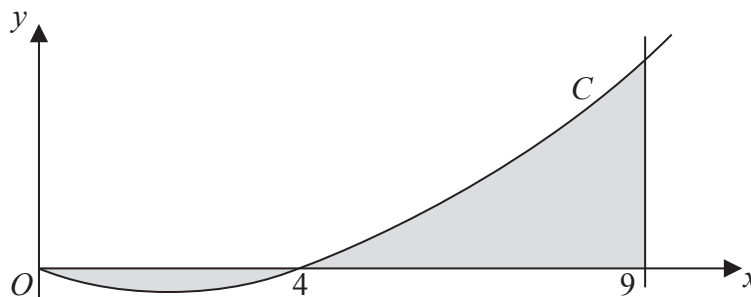


Figure 2

Figure 2 shows a sketch of part of the curve C with equation

$$y = 10x(x^{\frac{1}{2}} - 2), \quad x \geq 0$$

The curve C starts at the origin and crosses the x -axis at the point $(4, 0)$.

The area, shown shaded in Figure 2, consists of two finite regions and is bounded by the curve C , the x -axis and the line $x = 9$

(b) Use your answer from part (a) to find the total area of the shaded regions.

(5)



Question 6 continued

Lined area for writing an answer to Question 6.



Leave blank

Question 6 continued

Lined writing area for Question 6 continued.

(Total 9 marks)

Q6



7. (i) Use logarithms to solve the equation $8^{2x+1} = 24$, giving your answer to 3 decimal places.

(3)

(ii) Find the values of y such that

$$\log_2(11y - 3) - \log_2 3 - 2 \log_2 y = 1, \quad y > \frac{3}{11}$$

(6)



8. (i) Solve, for $0 \leq \theta < \pi$, the equation

$$\sin 3\theta - \sqrt{3} \cos 3\theta = 0$$

giving your answers in terms of π .

(3)

- (ii) Given that

$$4\sin^2 x + \cos x = 4 - k, \quad 0 \leq k \leq 3$$

- (a) find $\cos x$ in terms of k .

(3)

- (b) When $k = 3$, find the values of x in the range $0 \leq x < 360^\circ$

(3)



9. A solid glass cylinder, which is used in an expensive laser amplifier, has a volume of $75\pi\text{ cm}^3$.

The cost of polishing the surface area of this glass cylinder is £2 per cm^2 for the curved surface area and £3 per cm^2 for the circular top and base areas.

Given that the radius of the cylinder is r cm,

(a) show that the cost of the polishing, $\pounds C$, is given by

$$C = 6\pi r^2 + \frac{300\pi}{r} \tag{4}$$

(b) Use calculus to find the minimum cost of the polishing, giving your answer to the nearest pound. (5)

(c) Justify that the answer that you have obtained in part (b) is a minimum. (1)



