

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 9 January 2008 – Afternoon
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 formulae stored in them.

Examiner's use only

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Team Leader's use only

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Question Number	Leave Blank
1	
2	
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6	
7	
8	
9	
Total	

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) 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 9 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.

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Turn over

1. (a) Find the remainder when

$$x^3 - 2x^2 - 4x + 8$$

is divided by

(i) $x - 3$,

(ii) $x + 2$.

(3)

(b) Hence, or otherwise, find all the solutions to the equation

$$x^3 - 2x^2 - 4x + 8 = 0.$$

(4)



4. (a) Show that the equation

$$3 \sin^2 \theta - 2 \cos^2 \theta = 1$$

can be written as

$$5 \sin^2 \theta = 3. \tag{2}$$

(b) Hence solve, for $0^\circ \leq \theta < 360^\circ$, the equation

$$3 \sin^2 \theta - 2 \cos^2 \theta = 1,$$

giving your answers to 1 decimal place. (7)



Question 4 continued

Lined writing area for the answer to Question 4.

(Total 9 marks)

Q4



5. Given that a and b are positive constants, solve the simultaneous equations

$$a = 3b,$$

$$\log_3 a + \log_3 b = 2.$$

Give your answers as exact numbers.

(6)



6.

Figure 1

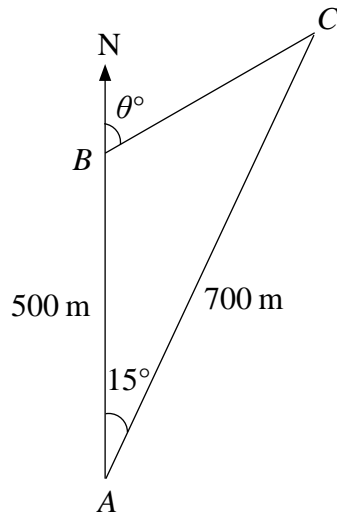


Figure 1 shows 3 yachts *A*, *B* and *C* which are assumed to be in the same horizontal plane. Yacht *B* is 500 m due north of yacht *A* and yacht *C* is 700 m from *A*. The bearing of *C* from *A* is 015°.

- (a) Calculate the distance between yacht *B* and yacht *C*, in metres to 3 significant figures. (3)

The bearing of yacht *C* from yacht *B* is θ° , as shown in Figure 1.

- (b) Calculate the value of θ . (4)



Question 6 continued

Lined area for writing answer to Question 6.

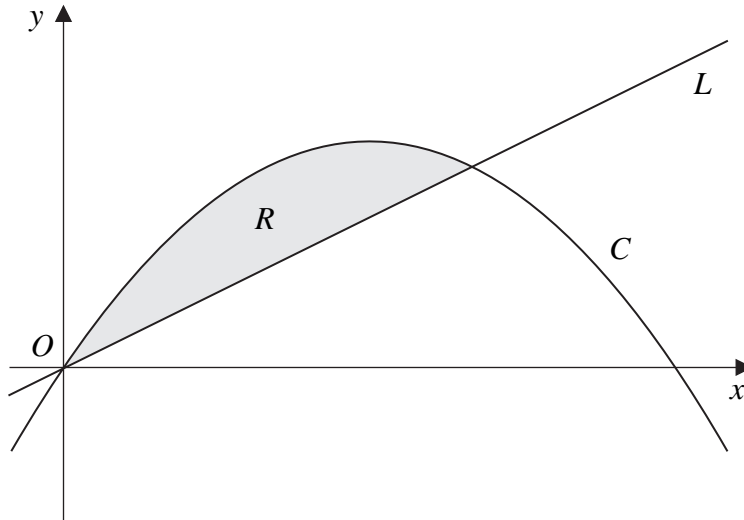
(Total 7 marks)

Q6



7.

Figure 2



In Figure 2 the curve C has equation $y = 6x - x^2$ and the line L has equation $y = 2x$.

(a) Show that the curve C intersects the x -axis at $x = 0$ and $x = 6$. (1)

(b) Show that the line L intersects the curve C at the points $(0, 0)$ and $(4, 8)$. (3)

The region R , bounded by the curve C and the line L , is shown shaded in Figure 2.

(c) Use calculus to find the area of R . (6)



Question 7 continued

Lined writing area consisting of 30 horizontal lines.



8. A circle C has centre $M(6, 4)$ and radius 3.

(a) Write down the equation of the circle in the form

$$(x - a)^2 + (y - b)^2 = r^2.$$

(2)

Figure 3

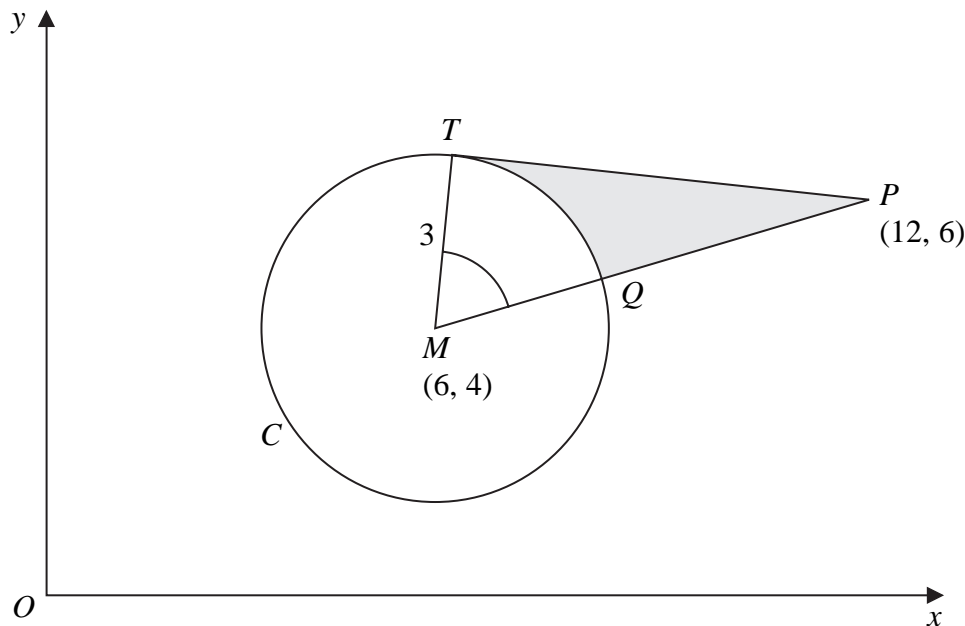


Figure 3 shows the circle C . The point T lies on the circle and the tangent at T passes through the point $P(12, 6)$. The line MP cuts the circle at Q .

(b) Show that the angle TMQ is 1.0766 radians to 4 decimal places.

(4)

The shaded region TPQ is bounded by the straight lines TP , QP and the arc TQ , as shown in Figure 3.

(c) Find the area of the shaded region TPQ . Give your answer to 3 decimal places.

(5)



9.

Figure 4

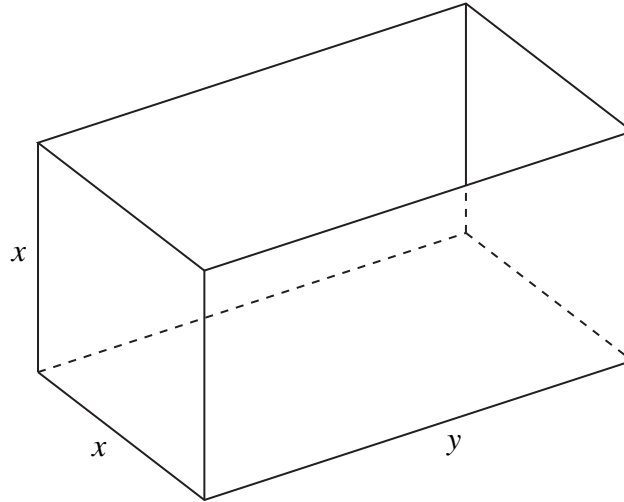


Figure 4 shows an open-topped water tank, in the shape of a cuboid, which is made of sheet metal. The base of the tank is a rectangle x metres by y metres. The height of the tank is x metres.

The capacity of the tank is 100 m^3 .

(a) Show that the area $A \text{ m}^2$ of the sheet metal used to make the tank is given by

$$A = \frac{300}{x} + 2x^2. \quad (4)$$

(b) Use calculus to find the value of x for which A is stationary. (4)

(c) Prove that this value of x gives a minimum value of A . (2)

(d) Calculate the minimum area of sheet metal needed to make the tank. (2)



