Centre No.			Paper Reference			Surname	Initial(s)				
Candidate No.			6	6	7	5	/	0	1	Signature	

Paper Referencc(s)

6675/01

Edexcel GCE

Further Pure Mathematics FP2 Advanced/Advanced Subsidiary

Wednesday 18 June 2008 - Morning

Time: 1 hour 30 minutes

Materials required for examination

Items included with question papers

Nil

Mathematical Formulae (Green)

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 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. Write your answers in the spaces provided in this question paper. 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.

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Total

Examiner's use only

Team Leader's use only

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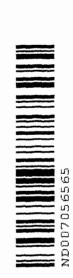
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$$\int_{5}^{6} \frac{3+x}{\sqrt{(x^{2}-9)}} dx = 3\ln\left(\frac{2+\sqrt{3}}{3}\right) + 3\sqrt{3} - 4.$$

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$$y = \operatorname{arsinh}(x^3), \qquad x \geqslant 0.$$

$$x \geqslant 0$$
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The point *P* on *C* has *x*-coordinate $\sqrt{2}$.

(a) Show that an equation of the tangent to C at P is

$$y = 2x - 2\sqrt{2} + \ln(3 + 2\sqrt{2}).$$

(5)

The tangent to C at the point Q is parallel to the tangent to C at P.

((b)	Find the	x-coordinate	of O .	giving	vour	answer	to 2	decimal	places.
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$$I_n = \int_0^{\pi} e^x \sin^n x \, dx, \qquad n \geqslant 0,$$

(a) show that, for $n \ge 2$,

$$I_n = \frac{n(n-1)}{n^2 + 1} I_{n-2}.$$
 (8)

(b)	Find the exact value of I_4 .		
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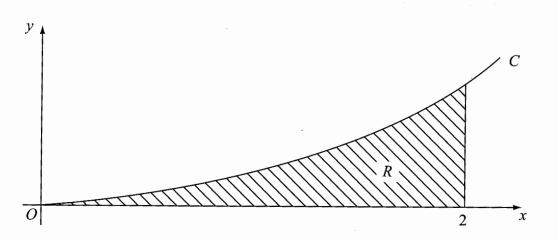


Figure 1

Figure 1 shows the curve C with equation

$$y = \frac{1}{10} \cosh x \arctan (\sinh x),$$
 $x \ge 0.$

The shaded region R is bounded by C, the x-axis and the line x = 2.

(a) Find $\int \cosh x \arctan (\sinh x) dx$.

(5)

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(b) Hence show that, to 2 significant figures, the area of R is 0.34

(2)

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7. The hyperbola H has equation

$$\frac{x^2}{16} - \frac{y^2}{9} = 1.$$

(a) Show that an equation for the normal to H at a point P (4 sec t, 3 tan t) is

$$4x\sin t + 3y = 25\tan t.$$

(6)

The point S, which lies on the positive x-axis, is a focus of H. Given that PS is parallel to the y-axis and that the y-coordinate of P is positive,

(b) find the values of the coordinates of P.

(5)

Given that the normal to H at this point P intersects the x-axis at the point R,

(c) find the area of triangle PRS.

(3)

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	Q7
(Total 14 marks)	



8. The curve C has parametric equations

$$x = 3(t + \sin t),$$
 $y = 3(1 - \cos t),$ $0 \le t < \pi.$

(a) Show that $\frac{dy}{dx} = \tan \frac{t}{2}$.

(3)

The arc length s of C is measured from the origin O.

(b) Show that $s = 12 \sin \frac{t}{2}$.

(4)

(c) Hence write down the intrinsic equation of C in the form $s = f(\psi)$.

(1)

The point P lies on C and the arc OP of C has length L. The arc OP is rotated through 2π radians about the x-axis.

(d) Show that the area of the curved surface generated is given by

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Question 8 continued



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TOTAL FOR PAPER: 75 MARKS	
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