

Write your name here

Surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--	--

Further Pure Mathematics F2

Advanced/Advanced Subsidiary

Wednesday 3 June 2015 – Morning
Time: 1 hour 30 minutes

Paper Reference

WFM02/01

You must have:

Mathematical Formulae and Statistical Tables (Blue)

Total Marks

--

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

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B). Coloured pencils and highlighter pens must not be used.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information

- The total mark for this paper is 75.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

P44832A

©2015 Pearson Education Ltd.

5/1/1



PEARSON

Question 4 continued

Handwriting practice lines consisting of 33 horizontal lines spaced evenly down the page.

(Total 9 marks)

Q4

--



5. Given that $y = \cot x$,

(a) show that

$$\frac{d^2y}{dx^2} = 2 \cot x + 2 \cot^3 x \quad (3)$$

(b) Hence show that

$$\frac{d^3y}{dx^3} = p \cot^4 x + q \cot^2 x + r$$

where p, q and r are integers to be found. (3)

(c) Find the Taylor series expansion of $\cot x$ in ascending powers of $\left(x - \frac{\pi}{3}\right)$ up to and including the term in $\left(x - \frac{\pi}{3}\right)^3$. (3)



Question 7 continued

Handwriting practice area with 28 horizontal lines.



Question 7 continued

Lined area for writing the answer to Question 7.

(Total 8 marks)

Q7



8. (a) Show that

$$\left(z + \frac{1}{z}\right)^3 \left(z - \frac{1}{z}\right)^3 = z^6 - \frac{1}{z^6} - k\left(z^2 - \frac{1}{z^2}\right)$$

where k is a constant to be found.

(3)

Given that $z = \cos\theta + i\sin\theta$, where θ is real,

(b) show that

(i) $z^n + \frac{1}{z^n} = 2\cos n\theta$

(ii) $z^n - \frac{1}{z^n} = 2i\sin n\theta$

(3)

(c) Hence show that

$$\cos^3\theta \sin^3\theta = \frac{1}{32} (3\sin 2\theta - \sin 6\theta)$$

(4)

(d) Find the exact value of

$$\int_0^{\frac{\pi}{8}} \cos^3\theta \sin^3\theta d\theta$$

(4)



Question 8 continued

Lined area for writing the answer to Question 8 continued.

Q8

--	--

(Total 14 marks)

TOTAL FOR PAPER: 75 MARKS

END

