

ADVANCED SUBSIDIARY GCE

MATHEMATICS (MEI)

Introduction to Advanced Mathematics (C1)

4751/01

Candidates answer on the Printed Answer Book

OCR Supplied Materials:

- Printed Answer Book (inserted)
- MEI Examination Formulae and Tables (MF2)

Other Materials Required:

None

Thursday 15 May 2008
Morning

Duration: 1 hour 30 minutes

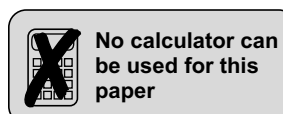


INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the spaces provided on the Printed Answer Book.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Write your answer to each question in the space provided. If you need more space for an answer use additional paper; label your answer clearly and attach the additional paper securely to the Printed Answer Book.
- Do **not** write in the bar codes.
- You are **not** permitted to use a calculator in this paper.
- Final answers should be given to a degree of accuracy appropriate to the context.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- You are advised that an answer may receive **no marks** unless you show sufficient detail of the working to indicate that a correct method is being used.
- The total number of marks for this paper is **72**.
- This document consists of **4** pages. Any blank pages are indicated.



Answer all questions on the Printed Answer Book provided.

Section A (36 marks)

- 1 Solve the inequality $3x - 1 > 5 - x$. [2]
- 2 (i) Find the points of intersection of the line $2x + 3y = 12$ with the axes. [2]
 (ii) Find also the gradient of this line. [2]
- 3 (i) Solve the equation $2x^2 + 3x = 0$. [2]
 (ii) Find the set of values of k for which the equation $2x^2 + 3x - k = 0$ has no real roots. [3]
- 4 Given that n is a positive integer, write down whether the following statements are always true (T), always false (F) or could be either true or false (E).
 (i) $2n + 1$ is an odd integer
 (ii) $3n + 1$ is an even integer
 (iii) n is odd $\Rightarrow n^2$ is odd
 (iv) n^2 is odd $\Rightarrow n^3$ is even [3]
- 5 Make x the subject of the equation $y = \frac{x + 3}{x - 2}$. [4]
- 6 (i) Find the value of $\left(\frac{1}{25}\right)^{-\frac{1}{2}}$. [2]
 (ii) Simplify $\frac{(2x^2y^3z)^5}{4y^2z}$. [3]
- 7 (i) Express $\frac{1}{5 + \sqrt{3}}$ in the form $\frac{a + b\sqrt{3}}{c}$, where a , b and c are integers. [2]
 (ii) Expand and simplify $(3 - 2\sqrt{7})^2$. [3]
- 8 Find the coefficient of x^3 in the binomial expansion of $(5 - 2x)^5$. [4]
- 9 Solve the equation $y^2 - 7y + 12 = 0$.
 Hence solve the equation $x^4 - 7x^2 + 12 = 0$. [4]

Section B (36 marks)

- 10** (i) Express $x^2 - 6x + 2$ in the form $(x - a)^2 - b$. [3]
- (ii) State the coordinates of the turning point on the graph of $y = x^2 - 6x + 2$. [2]
- (iii) Sketch the graph of $y = x^2 - 6x + 2$. You need not state the coordinates of the points where the graph intersects the x -axis. [2]
- (iv) Solve the simultaneous equations $y = x^2 - 6x + 2$ and $y = 2x - 14$. Hence show that the line $y = 2x - 14$ is a tangent to the curve $y = x^2 - 6x + 2$. [5]
- 11** You are given that $f(x) = 2x^3 + 7x^2 - 7x - 12$.
- (i) Verify that $x = -4$ is a root of $f(x) = 0$. [2]
- (ii) Hence express $f(x)$ in fully factorised form. [4]
- (iii) Sketch the graph of $y = f(x)$. [3]
- (iv) Show that $f(x - 4) = 2x^3 - 17x^2 + 33x$. [3]
- 12** (i) Find the equation of the line passing through A $(-1, 1)$ and B $(3, 9)$. [3]
- (ii) Show that the equation of the perpendicular bisector of AB is $2y + x = 11$. [4]
- (iii) A circle has centre $(5, 3)$, so that its equation is $(x - 5)^2 + (y - 3)^2 = k$. Given that the circle passes through A, show that $k = 40$. Show that the circle also passes through B. [2]
- (iv) Find the x -coordinates of the points where this circle crosses the x -axis. Give your answers in surd form. [3]

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Introduction to Advanced Mathematics (C1)

4751/01

PRINTED ANSWER BOOK

Candidates answer on the Printed Answer Book

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Morning

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Candidate Forename		Candidate Surname	
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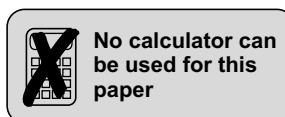
Centre Number						Candidate Number				
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INFORMATION FOR CANDIDATES

- This document consists of **12** pages. Any blank pages are indicated.



Section A (36 marks)

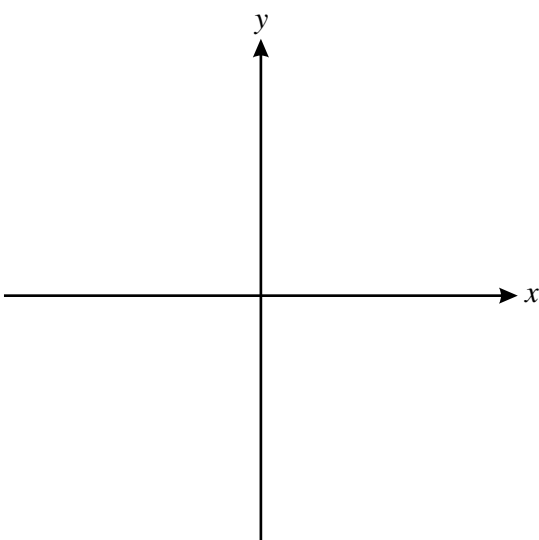
1	
2 (i)	
2 (ii)	

3 (i)	
3 (ii)	
4 (i)	
4 (ii)	
4 (iii)	
4 (iv)	

5	
6 (i)	
6 (ii)	
7 (i)	

7 (ii)	
8	
9	

Section B (36 marks)

10 (i)	
10 (ii)	
10 (iii)	 <p>A blank Cartesian coordinate system is shown, consisting of a horizontal x-axis and a vertical y-axis intersecting at the origin. Both axes have arrows at their ends. The x-axis is labeled with 'x' at its right end, and the y-axis is labeled with 'y' at its top end.</p>

10 (iv)	

11 (i)	
11 (ii)	

12 (i)	
12 (ii)	

12 (iii)	
12 (iv)	

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