

**ADVANCED SUBSIDIARY GCE
MATHEMATICS (MEI)**

Introduction to Advanced Mathematics (C1)

4751

QUESTION PAPER

Candidates answer on the Printed Answer Book

OCR Supplied Materials:

- Printed Answer Book 4751
- MEI Examination Formulae and Tables (MF2)

Other Materials Required:

None

**Monday 24 May 2010
Afternoon**

Duration: 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

These instructions are the same on the Printed Answer Book and the Question Paper.

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the spaces provided on the Printed Answer Book.
- **The questions are on the inserted Question Paper.**
- **Write your answer to each question in the space provided in the Printed Answer Book.** Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).
- 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.
- 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.

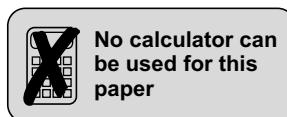
INFORMATION FOR CANDIDATES

This information is the same on the Printed Answer Book and the Question Paper.

- The number of marks is given in brackets [] at the end of each question or part question on the Question Paper.
- 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**.
- The Printed Answer Book consists of **12** pages. The Question Paper consists of **4** pages. Any blank pages are indicated.

INSTRUCTION TO EXAMS OFFICER / INVIGILATOR

- Do not send this Question Paper for marking; it should be retained in the centre or destroyed.



Section A (36 marks)

- 1** Find the equation of the line which is parallel to $y = 3x + 1$ and which passes through the point with coordinates $(4, 5)$. [3]
- 2** (i) Simplify $(5a^2b)^3 \times 2b^4$. [2]
(ii) Evaluate $(\frac{1}{16})^{-1}$. [1]
(iii) Evaluate $(16)^{\frac{3}{2}}$. [2]
- 3** Make y the subject of the formula $a = \frac{\sqrt{y} - 5}{c}$. [3]
- 4** Solve the following inequalities.
- (i) $2(1 - x) > 6x + 5$ [3]
(ii) $(2x - 1)(x + 4) < 0$ [2]
- 5** (i) Express $\sqrt{48} + \sqrt{27}$ in the form $a\sqrt{3}$. [2]
(ii) Simplify $\frac{5\sqrt{2}}{3 - \sqrt{2}}$. Give your answer in the form $\frac{b + c\sqrt{2}}{d}$. [3]
- 6** You are given that
 - the coefficient of x^3 in the expansion of $(5 + 2x^2)(x^3 + kx + m)$ is 29,
 - when $x^3 + kx + m$ is divided by $(x - 3)$, the remainder is 59.
Find the values of k and m . [5]
- 7** Expand $(1 + \frac{1}{2}x)^4$, simplifying the coefficients. [4]
- 8** Express $5x^2 + 20x + 6$ in the form $a(x + b)^2 + c$. [4]
- 9** Show that the following statement is false.

$$x - 5 = 0 \Leftrightarrow x^2 = 25$$
[2]

Section B (36 marks)

- 10** (i) Solve, by factorising, the equation $2x^2 - x - 3 = 0$. [3]
- (ii) Sketch the graph of $y = 2x^2 - x - 3$. [3]
- (iii) Show that the equation $x^2 - 5x + 10 = 0$ has no real roots. [2]
- (iv) Find the x -coordinates of the points of intersection of the graphs of $y = 2x^2 - x - 3$ and $y = x^2 - 5x + 10$. Give your answer in the form $a \pm \sqrt{b}$. [4]

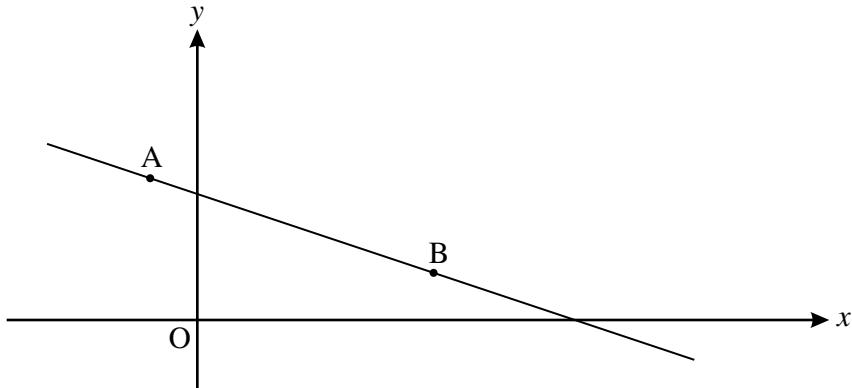
11**Fig. 11**

Fig. 11 shows the line through the points A (-1, 3) and B (5, 1).

- (i) Find the equation of the line through A and B. [3]
- (ii) Show that the area of the triangle bounded by the axes and the line through A and B is $\frac{32}{3}$ square units. [2]
- (iii) Show that the equation of the perpendicular bisector of AB is $y = 3x - 4$. [3]
- (iv) A circle passing through A and B has its centre on the line $x = 3$. Find the centre of the circle and hence find the radius and equation of the circle. [4]
- 12** You are given that $f(x) = x^3 + 6x^2 - x - 30$.

- (i) Use the factor theorem to find a root of $f(x) = 0$ and hence factorise $f(x)$ completely. [6]
- (ii) Sketch the graph of $y = f(x)$. [3]
- (iii) The graph of $y = f(x)$ is translated by $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$.

Show that the equation of the translated graph may be written as

$$y = x^3 + 3x^2 - 10x - 24.$$

[3]

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE.



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

**ADVANCED SUBSIDIARY GCE
MATHEMATICS (MEI)**

Introduction to Advanced Mathematics (C1)

4751

PRINTED ANSWER BOOK

Candidates answer on this Printed Answer Book

OCR Supplied Materials:

- Question Paper 4751 (inserted)
- MEI Examination Formulae and Tables (MF2)

Other Materials Required:

None

Monday 24 May 2010

Afternoon

Duration: 1 hour 30 minutes



Candidate Forename		Candidate Surname	
--------------------	--	-------------------	--

Centre Number						Candidate Number				
---------------	--	--	--	--	--	------------------	--	--	--	--

INSTRUCTIONS TO CANDIDATES

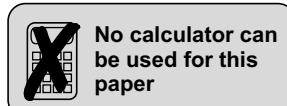
These instructions are the same on the Printed Answer Book and the Question Paper.

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the spaces provided on the Printed Answer Book.
- **The questions are on the inserted Question Paper.**
- **Write your answer to each question in the space provided in the Printed Answer Book.** Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).
- 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.
- 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

This information is the same on the Printed Answer Book and the Question Paper.

- The number of marks is given in brackets [] at the end of each question or part question on the Question Paper.
- 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**.
- The Printed Answer Book consists of **12** pages. The Question Paper consists of **4** pages. Any blank pages are indicated.



Section A (36 marks)

4 (ii)	
5 (i)	
5 (ii)	

8	
9	

Section B (36 marks)

10 (i)	

10 (ii)	
10 (iii)	
10 (iv)	

11 (i)	
11 (ii)	
11 (iii)	

11 (iii)	(continued)
11 (iv)	

12 (i)

12 (ii)

12 (iii)



Copyright Information
OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For more information about the program, contact Ms. Gail M. E. Flaherty, Office of Special Education, CPAGE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a branch of the University of Cambridge.