

**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.

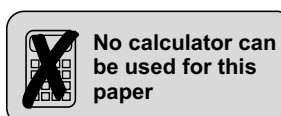
INFORMATION FOR CANDIDATES

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.

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

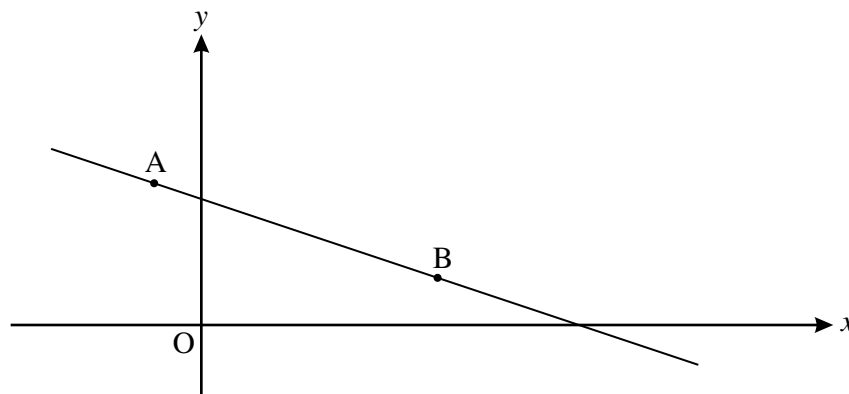
11**Fig. 11**

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

$$y = x^3 + 3x^2 - 10x - 24. \quad [3]$$

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE.



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Introduction to Advanced Mathematics (C1)

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PRINTED ANSWER BOOK

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Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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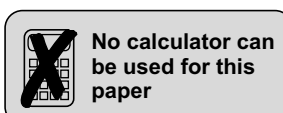
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Section A (36 marks)

1	
2(i)	
2 (ii)	
2 (iii)	

3	
4 (i)	

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

6	
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Section B (36 marks)

10 (i)	

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

11 (iii)	(continued)
11 (iv)	

[illegible]

12 (ii)	
12 (iii)	

12 (iii)	(continued)

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