OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE

MATHEMATICS

Core Mathematics 1

4721/01

Candidates answer on the Printed Answer Book

OCR Supplied Materials:
- Printed Answer Book (inserted)
- List of Formulae (MF1)

Other Materials Required:
None

Thursday 15 May 2008
Morning

Duration: 1 hour 30 minutes

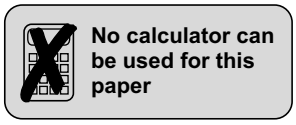
4721010

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.
- Give non-exact numerical answers correct to 3 significant figures unless a different degree of accuracy is specified in the question or is clearly appropriate.
- **You are not permitted to use a calculator in this paper.**

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- **You are reminded of the need for clear presentation in your answers.**
- 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.

1 Express each of the following in the form 4^n:

(i) $\frac{1}{16}$, [1]

(ii) 64, [1]

(iii) 8. [2]

2 **(i)** The curve $y = x^2$ is translated 2 units in the positive x-direction. Find the equation of the curve after it has been translated. [2]

(ii) The curve $y = x^3 - 4$ is reflected in the x-axis. Find the equation of the curve after it has been reflected. [1]

3 Express each of the following in the form $k\sqrt{2}$, where k is an integer:

(i) $\sqrt{200}$, [1]

(ii) $\dfrac{12}{\sqrt{2}}$, [1]

(iii) $5\sqrt{8} - 3\sqrt{2}$. [2]

4 Solve the equation $2x - 7x^{\frac{1}{2}} + 3 = 0$. [5]

5 Find the gradient of the curve $y = 8\sqrt{x} + x$ at the point whose x-coordinate is 9. [5]

6 **(i)** Expand and simplify $(x - 5)(x + 2)(x + 5)$. [3]

(ii) Sketch the curve $y = (x - 5)(x + 2)(x + 5)$, giving the coordinates of the points where the curve crosses the axes. [3]

7 Solve the inequalities

(i) $8 < 3x - 2 < 11$, [3]

(ii) $y^2 + 2y \geqslant 0$. [4]

8 The curve $y = x^3 - kx^2 + x - 3$ has two stationary points.

(i) Find $\dfrac{\mathrm{d}y}{\mathrm{d}x}$. [2]

(ii) Given that there is a stationary point when $x = 1$, find the value of k. [3]

(iii) Determine whether this stationary point is a minimum or maximum point. [2]

(iv) Find the x-coordinate of the other stationary point. [3]

9 **(i)** Find the equation of the circle with radius 10 and centre (2, 1), giving your answer in the form $x^2 + y^2 + ax + by + c = 0$. [3]

(ii) The circle passes through the point $(5, k)$ where $k > 0$. Find the value of k in the form $p + \sqrt{q}$. [3]

(iii) Determine, showing all working, whether the point $(-3, 9)$ lies inside or outside the circle. [3]

(iv) Find an equation of the tangent to the circle at the point (8, 9). [5]

10 **(i)** Express $2x^2 - 6x + 11$ in the form $p(x + q)^2 + r$. [4]

(ii) State the coordinates of the vertex of the curve $y = 2x^2 - 6x + 11$. [2]

(iii) Calculate the discriminant of $2x^2 - 6x + 11$. [2]

(iv) State the number of real roots of the equation $2x^2 - 6x + 11 = 0$. [1]

(v) Find the coordinates of the points of intersection of the curve $y = 2x^2 - 6x + 11$ and the line $7x + y = 14$. [5]

OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE

MATHEMATICS

Core Mathematics 1

4721/01

PRINTED ANSWER BOOK

Candidates answer on the Printed Answer Book

OCR Supplied Materials:
- Question Paper 4721/01
- List of Formulae (MF1)

Other Materials Required:
None

Thursday 15 May 2008
Morning

Duration: 1 hour 30 minutes

Candidate Forename		Candidate Surname	

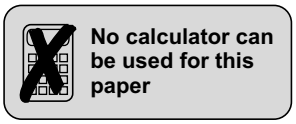
Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- **You are not permitted to use a calculator in this paper.**
- 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.

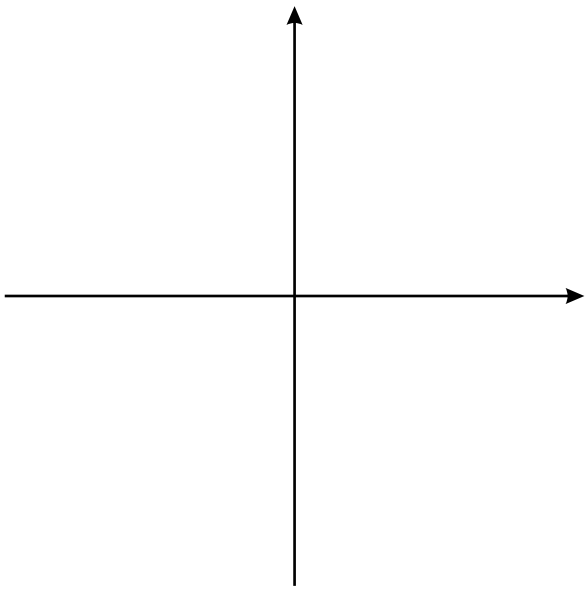
INFORMATION FOR CANDIDATES

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



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

3 (iii)	
4	

5	
6 (i)	
6 (ii)	

7 (i)	
7 (ii)	
8 (i)	
8 (ii)	

8 (iii)	
8 (iv)	
9 (i)	
9 (ii)	

9 (iii)

9 (iv)

10 (i)

10 (ii)

10 (iii)

10 (iv)

10 (v)	

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE

OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE **4721/01**

MATHEMATICS

Core Mathematics 1

THURSDAY 15 MAY 2008 Morning

Time: 1 hour 30 minutes

Additional materials: Answer Booklet (8 pages)
List of Formulae (MF1)

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the spaces provided on the answer booklet.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Answer **all** the questions.
- Give non-exact numerical answers correct to 3 significant figures unless a different degree of accuracy is specified in the question or is clearly appropriate.
- **You are not permitted to use a calculator in this paper.**

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 72.
- **You are reminded of the need for clear presentation in your answers.**

WARNING

You are not allowed to use a calculator in this paper.

This document consists of **4** printed pages.

 [Turn over

1 Express each of the following in the form 4^n:

(i) $\frac{1}{16}$, [1]

(ii) 64, [1]

(iii) 8. [2]

2 **(i)** The curve $y = x^2$ is translated 2 units in the positive x-direction. Find the equation of the curve after it has been translated. [2]

(ii) The curve $y = x^3 - 4$ is reflected in the x-axis. Find the equation of the curve after it has been reflected. [1]

3 Express each of the following in the form $k\sqrt{2}$, where k is an integer:

(i) $\sqrt{200}$, [1]

(ii) $\frac{12}{\sqrt{2}}$, [1]

(iii) $5\sqrt{8} - 3\sqrt{2}$. [2]

4 Solve the equation $2x - 7x^{\frac{1}{2}} + 3 = 0$. [5]

5 Find the gradient of the curve $y = 8\sqrt{x} + x$ at the point whose x-coordinate is 9. [5]

6 **(i)** Expand and simplify $(x - 5)(x + 2)(x + 5)$. [3]

(ii) Sketch the curve $y = (x - 5)(x + 2)(x + 5)$, giving the coordinates of the points where the curve crosses the axes. [3]

7 Solve the inequalities

(i) $8 < 3x - 2 < 11$, [3]

(ii) $y^2 + 2y \geqslant 0$. [4]

8 The curve $y = x^3 - kx^2 + x - 3$ has two stationary points.

(i) Find $\frac{dy}{dx}$. [2]

(ii) Given that there is a stationary point when $x = 1$, find the value of k. [3]

(iii) Determine whether this stationary point is a minimum or maximum point. [2]

(iv) Find the x-coordinate of the other stationary point. [3]

9 **(i)** Find the equation of the circle with radius 10 and centre (2, 1), giving your answer in the form $x^2 + y^2 + ax + by + c = 0$. [3]

(ii) The circle passes through the point (5, k) where $k > 0$. Find the value of k in the form $p + \sqrt{q}$. [3]

(iii) Determine, showing all working, whether the point (−3, 9) lies inside or outside the circle. [3]

(iv) Find an equation of the tangent to the circle at the point (8, 9). [5]

10 **(i)** Express $2x^2 - 6x + 11$ in the form $p(x + q)^2 + r$. [4]

(ii) State the coordinates of the vertex of the curve $y = 2x^2 - 6x + 11$. [2]

(iii) Calculate the discriminant of $2x^2 - 6x + 11$. [2]

(iv) State the number of real roots of the equation $2x^2 - 6x + 11 = 0$. [1]

(v) Find the coordinates of the points of intersection of the curve $y = 2x^2 - 6x + 11$ and the line $7x + y = 14$. [5]