

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

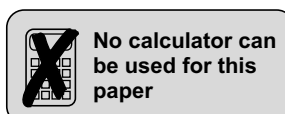


INSTRUCTIONS TO CANDIDATES

- 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) $\frac{12}{\sqrt{2}}$, [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) $y^2 + 2y \geq 0$. [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]

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MATHEMATICS

Core Mathematics 1

4721/01

PRINTED ANSWER BOOK

Candidates answer on the Printed Answer Book

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- List of Formulae (MF1)

Other Materials Required:

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Morning

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Candidate Forename		Candidate Surname	
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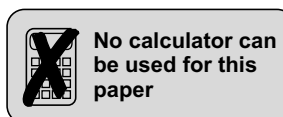
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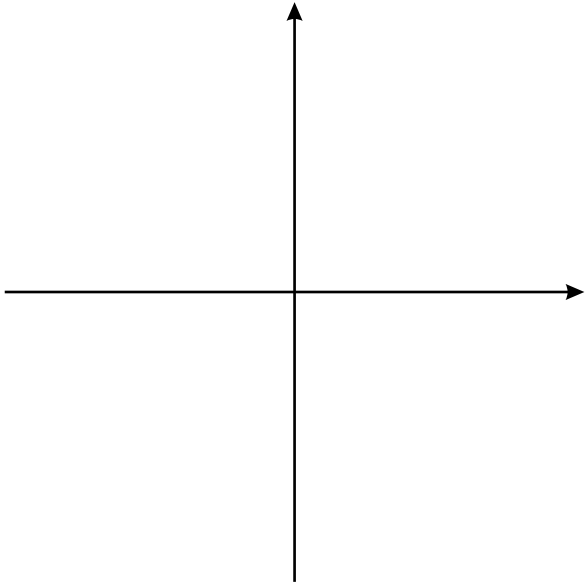
INFORMATION FOR CANDIDATES

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



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1 (ii)	
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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)	

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