

**Edexcel GCE
Core Mathematics C2
Bronze Level B3
(Question paper)**

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Paper Reference(s)

6664/01

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Time: 1 hour 30 minutes

Materials required for examination papers

Mathematical Formulae (Green)

Items included with question

Nil

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulas stored in them.

Instructions to Candidates

Write the name of the examining body (Edexcel), your centre number, candidate number, the unit title (Core Mathematics C2), the paper reference (6664), your surname, initials and signature.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.

Full marks may be obtained for answers to ALL questions.

There are 11 questions in this question paper. The total mark for this paper is 75.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.

You must show sufficient working to make your methods clear to the Examiner. Answers without working may gain no credit.

Suggested grade boundaries for this paper:

A*	A	B	C	D	E
72	65	57	50	43	36

1. $f(x) = x^4 + x^3 + 2x^2 + ax + b,$

where a and b are constants.

When $f(x)$ is divided by $(x - 1)$, the remainder is 7.

(a) Show that $a + b = 3.$ (2)

When $f(x)$ is divided by $(x + 2)$, the remainder is $-8.$

(b) Find the value of a and the value of $b.$ (5)

January 2011

2. (a) Show that the equation

$$5 \sin x = 1 + 2 \cos^2 x$$

can be written in the form

$$2 \sin^2 x + 5 \sin x - 3 = 0.$$
 (2)

(b) Solve, for $0 \leq x < 360^\circ,$

$$2 \sin^2 x + 5 \sin x - 3 = 0.$$
 (4)

January 2010

3. Find, giving your answer to 3 significant figures where appropriate, the value of x for which

(a) $5^x = 10,$ (2)

(b) $\log_3(x - 2) = -1.$ (2)

May 2011

4. (a) Find the first 4 terms, in ascending powers of x , of the binomial expansion of $(1 + ax)^7,$ where a is a constant. Give each term in its simplest form. (4)

Given that the coefficient of x^2 in this expansion is 525,

(b) find the possible values of $a.$ (2)

June 2010

5. The third term of a geometric sequence is 324 and the sixth term is 96.

(a) Show that the common ratio of the sequence is $\frac{2}{3}$.

(2)

(b) Find the first term of the sequence.

(2)

(c) Find the sum of the first 15 terms of the sequence.

(3)

(d) Find the sum to infinity of the sequence.

(2)

June 2009

6. Given that $2 \log_2 (x + 15) - \log_2 x = 6$,

(a) show that $x^2 - 34x + 225 = 0$.

(5)

(b) Hence, or otherwise, solve the equation $2 \log_2 (x + 15) - \log_2 x = 6$.

(2)

January 2013

7. (a) Show that the equation

$$3 \sin^2 x + 7 \sin x = \cos^2 x - 4$$

can be written in the form

$$4 \sin^2 x + 7 \sin x + 3 = 0.$$

(2)

(b) Hence solve, for $0 \leq x < 360^\circ$,

$$3 \sin^2 x + 7 \sin x = \cos^2 x - 4$$

giving your answers to 1 decimal place where appropriate.

(5)

January 2011

8. The curve C has equation $y = 6 - 3x - \frac{4}{x^3}$, $x \neq 0$.

(a) Use calculus to show that the curve has a turning point P when $x = \sqrt{2}$. (4)

(b) Find the x -coordinate of the other turning point Q on the curve. (1)

(c) Find $\frac{d^2y}{dx^2}$. (1)

(d) Hence or otherwise, state with justification, the nature of each of these turning points P and Q . (3)

January 2013

9. The first three terms of a geometric series are $(k + 4)$, k and $(2k - 15)$ respectively, where k is a positive constant.

(a) Show that $k^2 - 7k - 60 = 0$. (4)

(b) Hence show that $k = 12$. (2)

(c) Find the common ratio of this series. (2)

(d) Find the sum to infinity of this series. (2)

January 2009

10. The volume $V \text{ cm}^3$ of a box, of height $x \text{ cm}$, is given by

$$V = 4x(5 - x)^2, \quad 0 < x < 5.$$

(a) Find $\frac{dV}{dx}$.

(4)

(b) Hence find the maximum volume of the box.

(4)

(c) Use calculus to justify that the volume that you found in part (b) is a maximum.

(2)

January 2011

TOTAL FOR PAPER: 75 MARKS

END