Edexcel GCE
Core Mathematics C1
Gold Level G1
(Question Paper)

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Paper Reference(s)

6663/01

Edexcel GCE

Core Mathematics C1
Gold Level G1

Time: 1 hour 30 minutes

Materials required for examination papers	**Items included with question**
Mathematical Formulae (Green)	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 C1), the paper reference (6663), 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 10 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
66	58	50	42	34	26

1. Given $y = x^3 + 4x + 1$, find the value of $\frac{dy}{dx}$ when $x = 3$.

(4)

May 2013 (R)

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2. (*a*) Write down the value of $16^{\frac{1}{4}}$.

(1)

(*b*) Simplify $(16x^{12})^{\frac{3}{4}}$.

(2)

January 2008

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3. Find the set of values of x for which

(*a*) $3(x - 2) < 8 - 2x$,

(2)

(*b*) $(2x - 7)(1 + x) < 0$,

(3)

(*c*) both $3(x - 2) < 8 - 2x$ **and** $(2x - 7)(1 + x) < 0$.

(1)

May 2010

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4. A 40-year building programme for new houses began in Oldtown in the year 1951 (Year 1) and finished in 1990 (Year 40).

The numbers of houses built each year form an arithmetic sequence with first term *a* and common difference *d*.

Given that 2400 new houses were built in 1960 and 600 new houses were built in 1990, find

(*a*) the value of *d*,

(3)

(*b*) the value of *a*,

(2)

(*c*) the total number of houses built in Oldtown over the 40-year period.

(3)

June 2009

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5. A sequence $x_1, x_2, x_3, \ldots$ is defined by

$$x_1 = 1,$$
$$x_{n+1} = (x_n)^2 - kx_n, \qquad n \geq 1,$$

where k is a constant.

(*a*) Find an expression for x_2 in terms of k.

(1)

(*b*) Show that $x_3 = 1 - 3k + 2k^2$.

(2)

Given also that $x_3 = 1$,

(*c*) calculate the value of k.

(3)

(*d*) Hence find the value of $\sum_{n=1}^{100} x_n$.

(3)

May 2013 (R)

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6. The equation $kx^2 + 4x + (5 - k) = 0$, where k is a constant, has 2 different real solutions for x.

(*a*) Show that k satisfies

$$k^2 - 5k + 4 > 0.$$

(3)

(*b*) Hence find the set of possible values of k.

(4)

January 2009

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7. The point $P(1, a)$ lies on the curve with equation $y = (x + 1)^2(2 - x)$.

(a) Find the value of a.

(1)

(b) Sketch the curves with the following equations:

(i) $y = (x + 1)^2(2 - x)$,

(ii) $y = \frac{2}{x}$.

On your diagram show clearly the coordinates of any points at which the curves meet the axes.

(5)

(c) With reference to your diagram in part (b), state the number of real solutions to the equation

$$(x + 1)^2(2 - x) = \frac{2}{x}.$$

(1)

January 2009

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8. The curve C has equation $y = kx^3 - x^2 + x - 5$, where k is a constant.

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

(2)

The point A with x-coordinate $-\frac{1}{2}$ lies on C. The tangent to C at A is parallel to the line with equation $2y - 7x + 1 = 0$.

Find

(b) the value of k,

(4)

(c) the value of the y-coordinate of A.

(2)

June 2008

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9. A curve has equation $y = f(x)$. The point P with coordinates (9, 0) lies on the curve.

Given that

$$f'(x) = \frac{x+9}{\sqrt{x}}, \quad x > 0,$$

(a) find $f(x)$.

(6)

(b) Find the x-coordinates of the two points on $y = f(x)$ where the gradient of the curve is equal to 10.

(4)

May 2013 (R)

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10. The curve C has equation

$$y = 9 - 4x - \frac{8}{x}, \quad x > 0.$$

The point P on C has x-coordinate equal to 2.

(a) Show that the equation of the tangent to C at the point P is $y = 1 - 2x$.

(6)

(b) Find an equation of the normal to C at the point P.

(3)

The tangent at P meets the x-axis at A and the normal at P meets the x-axis at B.

(c) Find the area of the triangle APB.

(4)

January 2009

TOTAL FOR PAPER: 75 MARKS

END