Edexcel GCE
Core Mathematics C2
Bronze Level B4

(Question paper)

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 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
71	64	57	50	44	38

1. The first three terms of a geometric series are

$$18, 12 \text{ and } p$$

respectively, where p is a constant.

Find

(*a*) the value of the common ratio of the series,

(1)

(*b*) the value of p,

(1)

(*c*) the sum of the first 15 terms of the series, giving your answer to 3 decimal places.

(2)

May 2013

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2. A circle C has centre $(-1, 7)$ and passes through the point $(0, 0)$. Find an equation for C.

(4)

January 2012

3.
$$y = \sqrt{(5^x + 2)}$$

(*a*) Copy and complete the table below, giving the values of y to 3 decimal places.

x	0	0.5	1	1.5	2
y			2.646	3.630	

(2)

(*b*) Use the trapezium rule, with all the values of y from your table, to find an approximation for the value of $\displaystyle\int_0^2 \sqrt{(5^x + 2)}\ \mathrm{d}x$.

(4)

June 2008

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4.   (*a*) Find the first 4 terms of the binomial expansion, in ascending powers of *x*, of

$$\left(1+\frac{x}{4}\right)^8,$$

giving each term in its simplest form.

(4)

(*b*) Use your expansion to estimate the value of $(1.025)^8$, giving your answer to 4 decimal places.

(3)

January 2012

5.   (*a*) Complete the table below, giving values of $\sqrt{(2^x + 1)}$ to 3 decimal places.

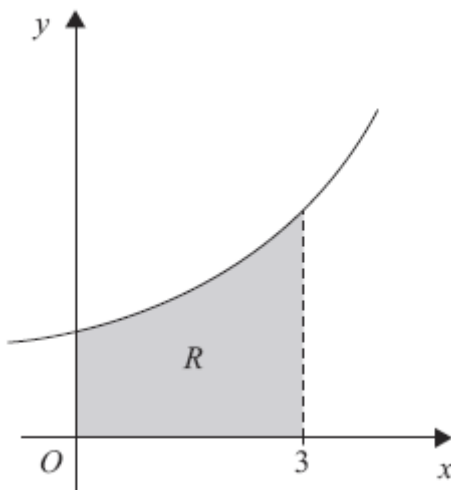| *x*	0	0.5	1	1.5	2	2.5	3
$\sqrt{(2^x + 1)}$	1.414	1.554	1.732	1.957			3

(2)

Figure 1

Figure 1 shows the region *R* which is bounded by the curve with equation $y = \sqrt{(2^x + 1)}$, the *x*-axis and the lines $x = 0$ and $x = 3$

(*b*) Use the trapezium rule, with all the values from your table, to find an approximation for the area of *R*.

(4)

(*c*) By reference to the curve in Figure 1 state, giving a reason, whether your approximation in part (*b*) is an overestimate or an underestimate for the area of *R*.

(2)

June 2009

6. Given that $\begin{pmatrix} 40 \\ 4 \end{pmatrix} = \dfrac{40!}{4!b!}$,

(a) write down the value of b.

(1)

In the binomial expansion of $(1 + x)^{40}$, the coefficients of x^4 and x^5 are p and q respectively.

(b) Find the value of $\dfrac{q}{p}$.

(3)

January 2011

7. The second and third terms of a geometric series are 192 and 144 respectively.

For this series, find

(a) the common ratio,

(2)

(b) the first term,

(2)

(c) the sum to infinity,

(2)

(d) the smallest value of n for which the sum of the first n terms of the series exceeds 1000.
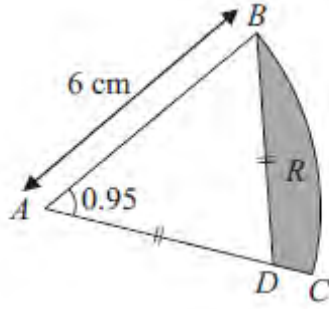
(4)

May 2011

8.

Figure 2

Figure 2 shows *ABC*, a sector of a circle of radius 6 cm with centre *A*. Given that the size of angle *BAC* is 0.95 radians, find

(*a*) the length of the arc *BC*,

(2)

(*b*) the area of the sector *ABC*.

(2)

The point *D* lies on the line *AC* and is such that *AD* = *BD*. The region *R*, shown shaded in Figure 2, is bounded by the lines *CD*, *DB* and the arc *BC*.

(*c*) Show that the length of *AD* is 5.16 cm to 3 significant figures.

(2)

Find

(*d*) the perimeter of *R*,

(2)

(*e*) the area of *R*, giving your answer to 2 significant figures.

(4)

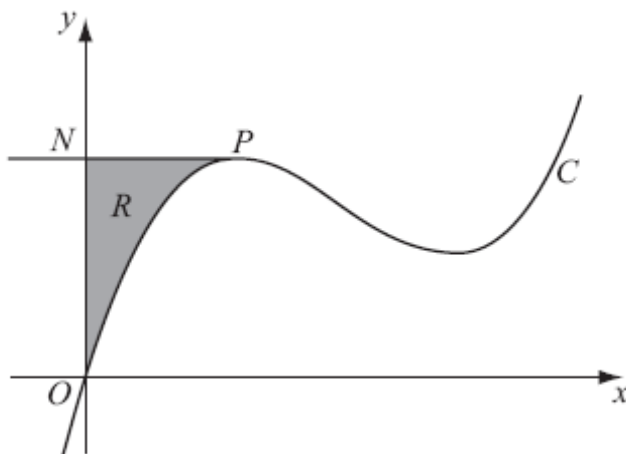**January 2012**

9.

Figure 3

Figure 3 shows a sketch of part of the curve C with equation

$$y = x^3 - 10x^2 + kx,$$

where k is a constant.

The point P on C is the maximum turning point.

Given that the x-coordinate of P is 2,

(*a*) show that $k = 28$.

(3)

The line through P parallel to the x-axis cuts the y-axis at the point N.
The region R is bounded by C, the y-axis and PN, as shown shaded in Figure 3.

(*b*) Use calculus to find the exact area of R.

(6)
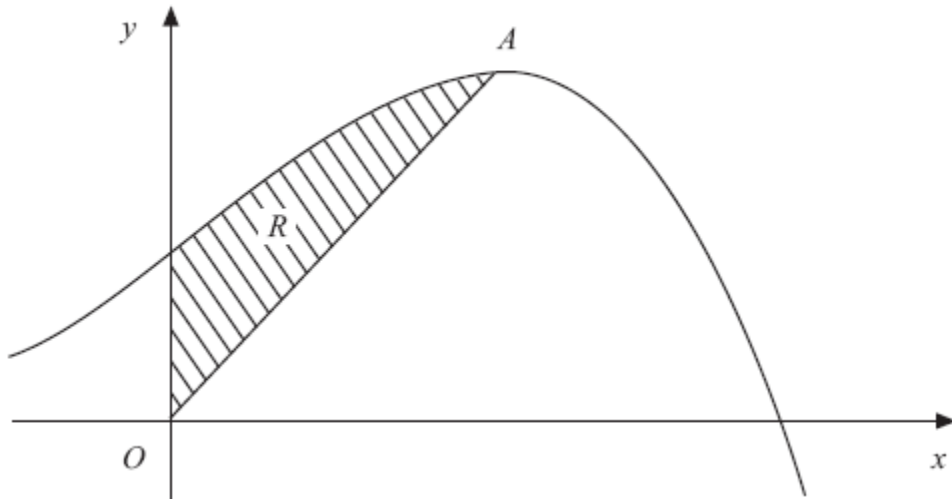
June 2010

10.

Figure 4

Figure 4 shows a sketch of part of the curve with equation $y = 10 + 8x + x^2 - x^3$.

The curve has a maximum turning point A.

(*a*) Using calculus, show that the *x*-coordinate of A is 2.

(3)

The region R, shown shaded in Figure 4, is bounded by the curve, the *y*-axis and the line from O to A, where O is the origin.

(*b*) Using calculus, find the exact area of R.

(8)

June 2008

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TOTAL FOR PAPER: 75 MARKS

END