Paper Reference(s)

6664/01

Edexcel GCE

Core Mathematics C2

Silver Level S3

Time: 1 hour 30 minutes

Materials required for examination	Items included with question papers
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 9 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	51	44	37

1. Find the first 3 terms, in ascending powers of x, of the binomial expansion of

$$\left(2 - \frac{x}{4}\right)^{10},$$

giving each term in its simplest form.

(4)

May 2015

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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 $0 \leq x < 360°$,

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

(4)

January 2010

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3. $$\mathrm{f}(x) = 6x^3 + 3x^2 + Ax + B, \text{ where } A \text{ and } B \text{ are constants.}$$

Given that when $\mathrm{f}(x)$ is divided by $(x + 1)$ the remainder is 45,

(*a*) show that $B - A = 48$.

(2)

Given also that $(2x + 1)$ is a factor of $\mathrm{f}(x)$,

(*b*) find the value of A and the value of B.

(4)

(*c*) Factorise $\mathrm{f}(x)$ fully.

(3)

May 2015

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4. (*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)

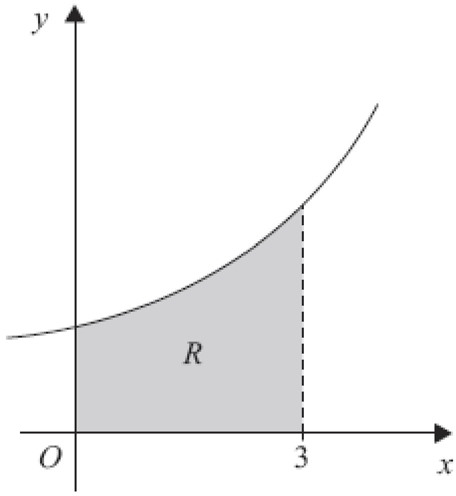

Figure 1

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

5. 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

6.

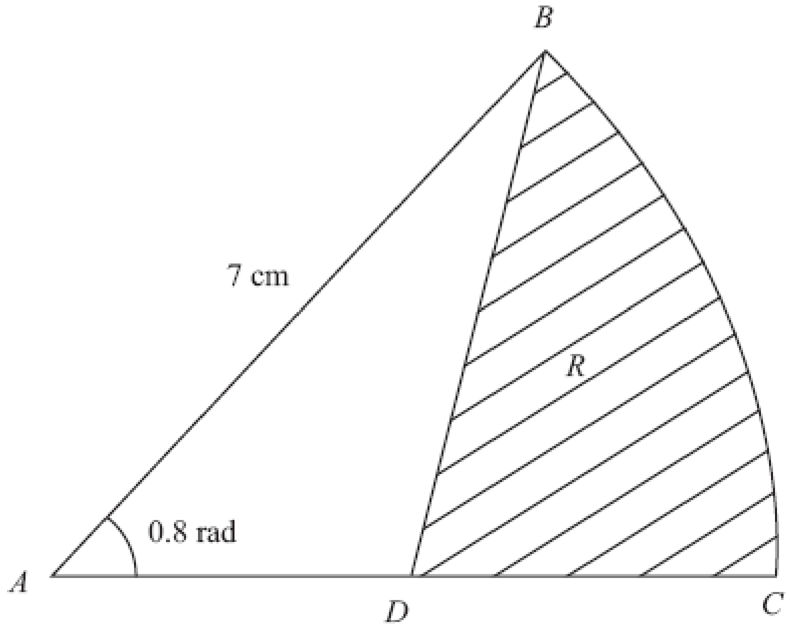

Figure 2

Figure 2 shows *ABC*, a sector of a circle with centre *A* and radius 7 cm.

Given that the size of $\angle BAC$ is exactly 0.8 radians, find

(*a*) the length of the arc *BC*,
(2)

(*b*) the area of the sector *ABC*.
(2)

The point *D* is the mid-point of *AC*. The region *R*, shown shaded in Figure 2, is bounded by *CD*, *DB* and the arc *BC*.

Find

(*c*) the perimeter of *R*, giving your answer to 3 significant figures,
(4)

(*d*) the area of *R*, giving your answer to 3 significant figures.
(4)

June 2008

7.

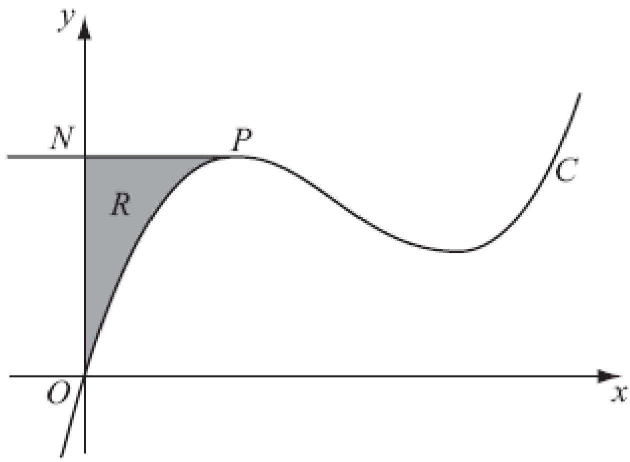

Figure 3

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)

May 2010

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8. (a) Sketch the graph of

$$y = 3^x, x \in \mathbb{R},$$

showing the coordinates of any points at which the graph crosses the axes.

(2)

(b) Use algebra to solve the equation $3^{2x} - 9(3^x) + 18 = 0$, giving your answers to 2 decimal places where appropriate.

(5)

May 2014

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9. The adult population of a town is 25 000 at the end of Year 1.

A model predicts that the adult population of the town will increase by 3% each year, forming a geometric sequence.

(*a*) Show that the predicted adult population at the end of Year 2 is 25 750.

(1)

(*b*) Write down the common ratio of the geometric sequence.

(1)

The model predicts that Year N will be the first year in which the adult population of the town exceeds 40 000.

(*c*) Show that

$$(N-1)\log 1.03 > \log 1.6$$

(3)

(*d*) Find the value of N.

(2)

At the end of each year, each member of the adult population of the town will give £1 to a charity fund.

Assuming the population model,

(*e*) find the total amount that will be given to the charity fund for the 10 years from the end of Year 1 to the end of Year 10, giving your answer to the nearest £1000.

(3)

May 2010

TOTAL FOR PAPER: 75 MARKS

END

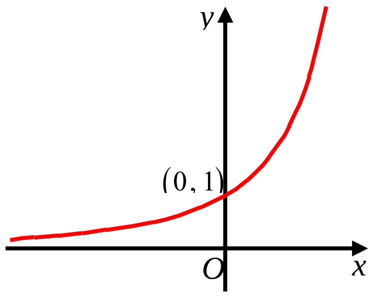
Question number	Scheme	Marks
1	$\left(2-\frac{x}{4}\right)^{10}$	
	$2^{10}+\underline{\underline{\binom{10}{1}}}2^9\left(-\frac{1}{4}x\right)+\underline{\underline{\binom{10}{2}}}2^8\left(-\frac{1}{4}x\right)^2+\ldots$	M1
	$=\underline{1024}-1280x+720x^2$	B1 A1
		A1
		[4]
2 (a)	$5\sin x=1+2\left(1-\sin^2 x\right)$	M1
	$2\sin^2 x+5\sin x-3=0$ **(*)**	A1cso
		(2)
(b)	$(2s-1)(s+3)=0$ **giving** s =	M1
	$[\sin x=-3$ has no solution$]$ **so** $\sin x=\frac{1}{2}$	A1
	$\therefore\quad x=30,\ 150$	B1, B1ft
		(4)
		[6]
3 (a)	$f(x)=6x^3+3x^2+Ax+B$	
	Attempting $f(1)=45$ or $f(-1)=45$	M1
	$f(-1)=-6+3-A+B=45$ or $-3-A+B=45\Rightarrow B-A=48$ * (allow $48=B-A$)	A1 * **cso**
		(2)
(b)	Attempting $f(-\frac{1}{2})=0$	M1
	$6(-\frac{1}{2})^3+3(-\frac{1}{2})^2+A(-\frac{1}{2})+B=0$ or $-\frac{1}{2}A+B=0$ or $A=2B$	A1 o.e.
	Solve to obtain $B=-48$ and $A=-96$	M1 A1
		(4)
(c)	Obtain	
	$(3x^2-48),(x^2-16),(6x^2-96),\left(3x^2+\frac{A}{2}\right),(3x^2+B),\left(x^2+\frac{A}{6}\right)$ or $\left(x^2+\frac{B}{3}\right)$	B1ft
	as factor or as quotient after division by $(2x+1)$.	
	Factorises $(3x^2-48),(x^2-16),(48-3x^2),(16-x^2)$ or $(6x^2-96)$	M1
	$=3(2x+1)(x+4)(x-4)$	A1cso
		(3)
		[9]

Question number	Scheme	Marks
4 (a)	$x = 2$ gives 2.236 (allow AWRT) Accept √5	B1
	$x = 2.5$ gives 2.580 (allow AWRT) Accept 2.58	B1
		(2)
(b)	$\left(\frac{1}{2}\times\frac{1}{2}\right)$, $\left[(1.414+3)+2(1.554+1.732+1.957+2.236+2.580)\right]$	B1 [M1A1ft]
	= 6.133 (AWRT 6.13, even following minor slips)	A1
		(4)
(c)	Overestimate	B1
	'Since the trapezia lie <u>above the curve</u>', or an equivalent explanation, or sketch of (one or more) trapezia above the curve on a diagram (or on the given diagram, in which case there should be reference to this). (Note that there must be some reference to a trapezium or trapezia in the explanation or diagram).	dB1
		(2)
		[8]

Question number	Scheme		Marks
5 (a)	$ar = 192$ and $ar^2 = 144$		
	$r = \frac{144}{192}$	Attempt to eliminate a.	M1
	$r = \frac{3}{4}$ or 0.75	$\frac{3}{4}$ or 0.75	A1
			(2)
(b)	$a(0.75) = 192$		M1
	$a \left\{= \frac{192}{0.75}\right\} = 256$	256	A1
			(2)
(c)	$S_\infty = \frac{256}{1-0.75}$	Applies $\frac{a}{1-r}$ correctly using both their a **and** their $\lvert r \rvert < 1$.	M1
	So, $\{S_\infty =\}$ 1024	1024	A1 cao
			(2)
(d)	$\frac{256(1-(0.75)^n)}{1-0.75} > 1000$	Applies S_n with their a and r and "uses" 1000 at any point in their working. (Allow with = or <).	M1
	$(0.75)^n < 1 - \frac{1000(0.25)}{256}$ $\left\{= \frac{6}{256}\right\}$	Attempt to isolate $+(r)^n$ from S_n formula. (Allow with = or >).	M1
	$n\log(0.75) < \log\left(\frac{6}{256}\right)$	Uses the power law of logarithms correctly. (Allow with = or >).	M1
	$n > \frac{\log\left(\frac{6}{256}\right)}{\log(0.75)} = 13.0471042... \Rightarrow n =$	$n = 14$	A1 cso
			(4)
			[10]

Question number	Scheme	Marks
6 (a)	$r\theta = 7 \times 0.8 = 5.6$ (cm)	M1 A1
		(2)
(b)	$\frac{1}{2}r^2\theta = \frac{1}{2} \times 7^2 \times 0.8 = 19.6$ (cm^2)	M1 A1
		(2)
(c)	$BD^2 = 7^2 + (\text{their } AD)^2 - (2 \times 7 \times (\text{their } AD) \times \cos 0.8)$	M1
	$BD^2 = 7^2 + 3.5^2 - (2 \times 7 \times 3.5 \times \cos 0.8)$ (or awrt 46° for the angle)	A1
	Perimeter = (their *DC*) + "5.6" + "5.21" = 14.3 (cm)	M1 A1
		(4)
(d)	$\Delta\, ABD = \frac{1}{2} \times 7 \times (\text{their } AD) \times \sin 0.8$ (ft their *AD*) (= 8.78…)	M1 A1 ft
	Area = "19.6" – "8.78…" = 10.8 (cm^2)	M1 A1
		(4)
		[12]

Question number	Scheme	Marks
7 (a)	$\frac{dy}{dx} = 3x^2 - 20x + k$ (Differentiation is required)	M1 A1
	At $x = 2$, $\frac{dy}{dx} = 0$, so $12 - 40 + k = 0$ $k = 28$ (*)	A1 cso
	<u>N.B. The '= 0' must be seen at some stage to score the final mark.</u>	
	<u>Alternatively</u>: (using $k = 28$) $\frac{dy}{dx} = 3x^2 - 20x + 28$ (M1 A1) 'Assuming' $k = 28$ only scores the final cso mark if there is justification that $\frac{dy}{dx} = 0$ at $x = 2$ represents the <u>maximum</u> turning point.	**(3)**
(b)	$\int (x^3 - 10x^2 + 28x)\,dx = \frac{x^4}{4} - \frac{10x^3}{3} + \frac{28x^2}{2}$ Allow $\frac{kx^2}{2}$ for $\frac{28x^2}{2}$	M1 A1
	$\left[\frac{x^4}{4} - \frac{10x^3}{3} + 14x^2\right]_0^2 = \ldots$ $\left(= 4 - \frac{80}{3} + 56 = \frac{100}{3}\right)$	M1
	(With limits 0 to 2, substitute the limit 2 into a 'changed function')	
	y-coordinate of $P = 8 - 40 + 56 = 24$ <u>Allow if seen in part (a)</u> (The B1 for 24 may be scored by implication from later working) Area of rectangle $= 2 \times$ (their y - coordinate of P)	B1
	Area of $R =$ (their 48) $- \left(\text{their } \frac{100}{3}\right)$ $= \frac{44}{3}$ $\left(14\frac{2}{3} \text{ or } 14.\dot{6}\right)$	M1 A1
	If the subtraction is the 'wrong way round', the final A mark is lost.	**(6)** **[9]**

Question number	Scheme	Marks
8 (a)	Graph of $y = 3^x$ and solving $3^{2x} - 9(3^x) + 18 = 0$	
		B1 B1
		(2)
(b)	$\left(3^x\right)^2 - 9\left(3^x\right) + 18 = 0$	
	or	M1
	$y = 3^x \Rightarrow y^2 - 9y + 18 = 0$	
	$\{ (y-6)(y-3) = 0$ or $\left(3^x - 6\right)\left(3^x - 3\right) = 0 \}$	
	$y = 6,\ \ y = 3$ or $3^x = 6,\ 3^x = 3$	A1
	$\left\{3^x = 6 \Rightarrow\right\}\ x\log 3 = \log 6$	
	or $x = \dfrac{\log 6}{\log 3}$ or $x = \log_3 6$	dM1
	$x = 1.63092...$	A1cso
	$x = 1$	B1
		(5)
		[7]

Question number	Scheme	Marks
9 (a)	$25\,000 \times 1.03 = 25750$ $\left\{25000 + 750 = 25750, \text{ or } 25000\dfrac{(1-0.03^2)}{1-0.03} = 25750\right\}$ (*)	B1 **(1)**
(b)	$r = 1.03$ Allow $\dfrac{103}{100}$ or $1\dfrac{3}{100}$ but no other alternatives	B1 **(1)**
(c)	$25\,000 r^{N-1} > 40\,000$ (Either letter r or their r value) Allow '=' or '<'	M1
	$r^M > 1.6 \Rightarrow \log r^M > \log 1.6$ Allow '=' or '<' (<u>See below</u>)	
	OR (by change of base), $\log_{1.03} 1.6 < M \Rightarrow \dfrac{\log 1.6}{\log 1.03} < M$	M1
	$(N-1)\log 1.03 > \log 1.6$ (Correct bracketing required) (*)	A1 cso
	Accept work for part (c) seen in part (d)	**(3)**
(d)	Attempt to evaluate $\dfrac{\log 1.6}{\log 1.03} + 1$ {or $25000(1.03)^{15}$ <u>and</u> $25000(1.03)^{16}$ }	M1
	$N = 17$ (<u>not</u> 16.9 and not e.g. $N \geq 17$) Allow '17th year' Accept work for part (d) seen in part (c)	A1 **(2)**
(e)	Using formula $\dfrac{a(1-r^n)}{1-r}$ with values of a and r, and $n = 9$, 10 or 11	M1
	$\dfrac{25\,000(1-1.03^{10})}{1-1.03}$	A1
	287 000 (<u>must</u> be rounded to the nearest 1 000) Allow 287000.00	A1 **(3)** **[10]**

Examiner reports

Question 1
Most candidates answered this question correctly. Others lost just one mark for one of the coefficients of x or x^2. The most common mistake was using $\frac{x}{4}$ rather than $-\frac{x}{4}$, and some other candidates failed to square the minus sign. About 10% failed to fully simplify their answers, leaving them in the form $1024 - 5120\frac{x}{4} + 11520\frac{x^2}{16}$. A tiny proportion failed to get the mark for the constant 1024. Candidates who extracted the 2^{10} from the bracket usually did well and many went on to produce a fully correct simplified answer. A very small number attempted to use Pascal's Triangle to get the coefficients but rarely found the 10 and the 45.

Question 2
(a) Most candidates correctly substituted $1-\sin^2 x$ for $\cos^2 x$, but some lost the accuracy mark through incorrect manipulation of their equation or failure to put "equals zero".

(b) Most factorised or used the formula correctly and earned the first two marks. The most common errors again involved wrong signs. Most candidates correctly obtained the two answers 30 and 150 degrees. Some however gave the second angle as 210, others as 330 and another significant group gave three answers. Those who had made sign errors were able to get a follow through mark for giving a second angle consistent with their first.

Question 3
In part (a) candidates choosing to use f(–1) = 45 had far greater success than those who opted for long division. Most attempts at long division didn't achieve a quotient in the required form. Even where the correct quotient was obtained, there was then often difficulty in proceeding correctly with the remainder.

Part (b) was answered well and most candidates applied $f(-\frac{1}{2}) = 0$ correctly. Common errors included the substitution of $x = \frac{1}{2}$ or dealing with the substitution incorrectly, resulting in $0.5A + B = 0$. This was usually followed by the incorrect $A = -32$ and $B = 16$. Many candidates were unable to solve their resulting simultaneous equations and made several attempts while others resorted to solving with a calculator, showing no working. There was little evidence of checking solutions to simultaneous equations by substitution.

Candidates choosing to use division of polynomials in this part of the question didn't usually obtain full marks as they mostly didn't complete the process.

The candidates who answered part (b) correctly, usually managed to reach $f(x) = (2x \quad 1)(3x^2 - 48)$ in part (c). Many did not continue to factorise from there. Others divided $(3x^2 - 48)$ by 3, giving $(x^2 - 16)$ but then didn't continue to $(x - 4)(x + 4)$, and/or forgot to include the factor 3 in their final factorisation. Various methods of factorisation were seen, the most popular and successful one being long division. Calculators were sometimes used but many of those responses omitted the factor 3.

The most common incorrect final answers seen were:
$f(x) = (2x + 1)(3x + 12)(x - 4)$, $f(x) = (2x + 1)(3x - 12)(x + 4)$ and $f(x)=(2x + 1)(x + 4)(x - 4)$.

Question 4

Part (a) was answered correctly by the majority of candidates, although $\sqrt{2^{2.5}+1}$ was sometimes evaluated as $\sqrt{2.5^2+1}$.
The trapezium rule was often accurately used in part (b), but the common mistake in the value of h $\left(h=\frac{3}{7} \text{ instead of } h=\frac{3}{6}\right)$ was frequently seen. Some candidates had confused bracketing, leaving out the main brackets and multiplying only the first two terms by $0.5h$. The equivalent method of adding the areas of separate trapezia was occasionally seen.

In part (c), some of the candidates' responses clearly indicated a lack of understanding of why the trapezium rule gave an overestimate in this case. To score the final mark, a convincing explanation (with reference to trapezia) was required. Those candidates who supported their reasoning with a simple sketch were usually more successful.

Question 5

Most candidates were able to answer parts (a), (b) and (c) and gain full marks. A small minority found the common difference in part (a), used it in part (b) and attempted to use it with the correct formula in part (c). These candidates obviously did not recognise that $|r|<1$ was a requirement for the sum to infinity. The same was true for the relatively few candidates who found $r=\frac{4}{3}$ in part (a).

Most candidates used the correct summation formula in part (d). Although many of these candidates arrived at the correct answer of $n=14$, they lost the final mark for incorrect inequality work. A significant number of these candidates were not able to deal with the sign reversals when multiplying $-(0.75)^n$ by -1 or when dividing by $\log 0.75$ which many failed to realise was negative. Those candidates using equalities throughout were generally more successful in gaining full marks. Common errors in this part included candidates who combined $256(0.75)^n$ to give 192^n, and candidates who tried to take the log of a negative number. Some candidates gave their final answer n as a decimal, failing to realise that it had to be an integer.

In part (d), a number of candidates used the formula for the n^{th} term starting from $n=1$, and continued to add each term until arriving at 1000 whilst others used a method "trial and improvement" by using the summation formula. A number of these solutions, however, were incomplete without both the sum of the first 13 terms and the first 14 terms being given.

Question 6

Many fully correct solutions to this question were seen. Those candidates who were unwilling to work in radians, however, made things more difficult for themselves (and sometimes lost accuracy) by converting angles into degrees.

In parts (a) and (b), those who knew the correct formulae scored easy marks while those who used formulae for the circumference and the area of a circle sometimes produced muddled working. A few thought that the angle should be 0.8π.

In finding the perimeter in part (c), most candidates realised that they needed to find the lengths DC and BD. It was surprising to see 4.5 occurring occasionally for DC as half of 7. In finding BD, most made a good attempt to use the cosine formula, although calculation slips were not uncommon. Some assumed that BD was perpendicular to AC and worked with Pythagoras' Theorem or basic triangle trigonometry, scoring no more than one mark in this part. In part (d) some candidates tried, with varying degrees of success, to use $\frac{1}{2}bh$ and some produced lengthy methods involving the sine rule. Occasionally the required area was interpreted as a segment and the segment area formula was used directly. Without any method for the area of an appropriate triangle, this scored no marks. Some did use the segment together with the area of triangle BDC, and although this was lengthy, the correct answer was often achieved.

Question 7

To establish the x-coordinate of the maximum turning point in part (a), it was necessary to differentiate and to use $\frac{\mathrm{d}y}{\mathrm{d}x} = 0$. Most candidates realised the need to differentiate, but the use of the zero was not always clearly shown.

Methods for finding the area in part (b) were often fully correct, although numerical slips were common. Weaker candidates often managed to integrate and to use the limits 0 and 2, but were then uncertain what else (if anything) to do. There were some attempts using y coordinates as limits. While the most popular method was to simply subtract the area under the curve from the area of the appropriate rectangle, integrating $24-(x^3-10x^2+28x)$ between 0 and 2 was also frequently seen. Occasional slips included confusing 24 (the y-coordinate of P) with 28, subtracting 'the wrong way round' and failing to give the final answer as an exact number.

Question 8

Many students scored full marks for the graph in part (a) but a wide variety of graphs were seen. Negative exponential graphs, the reciprocal function, parabolas and straight lines were fairly common. Some were very close to the x-axis, making it difficult to see if there were crossing or not and others appeared to have been erased and/or smudged which made them difficult to read. Mistakes were usually due to the curve passing through 3 on the y-axis, stopping at the y-axis or crossing the x-axis.

A number of students did not even attempt the graph in part (a) but did go on to make an attempt, sometimes successfully, in part (b).

Part (b) was well answered by the majority of students. The use of $y = 3^x$ leading to a quadratic in y was the most common approach with letters other than y used occasionally. $x = 3^x$ was also frequently seen. Direct factorisation in e^x was less common. Once the quadratic was identified there were very few cases of incorrect solutions but there were a number of students who stopped at the point of solving the quadratic and did not go on to find values for x. The most common errors in this part of the question were in attempting to use logs, for example $2x\log 3 - x\log 27 + \log 18 = 0$ or forming the quadratic $3y^2 - 9y - 18 = 0$. Many students believed that $9(3^x) = 27x$.

Question 9

Parts (a) and (b) of this geometric sequence question were usually correctly answered, although 0.03 instead of 1.03 was occasionally seen as the common ratio.

In part (c), lack of confidence in logarithms was often apparent. Some candidates failed to get started, omitting the vital step $25000r^{N-1} > 40000$, while others tried to use the sum formula rather than the term formula. Often the working was insufficiently convincing to justify the progression to $(N-1)\log 1.03 > \log 1.6$. Showing each step in the working is important when, as here, the answer is given.

There was much more success in part (d), where the result of part (c) had to be used (although other methods such as 'trial and improvement' were possible). Manipulation of the inequality often gave $N > 16.9$, but it was disappointing that many candidates lost a mark by giving 16.9 rather than 17 as the value of N.

The majority of candidates interpreted the requirement of part (e) correctly as the sum of a geometric series. A few used ar^{n-1} instead of the sum formula, but in general there were good attempts to find the total sum of money. It was, of course, possible to avoid the sum formula by calculating year by year amounts, then adding, but those who used this inefficient approach tended to make mistakes. Rounding to the nearest £1000 was required, but some candidates ignored this or rounded incorrectly, losing the final mark.

Statistics for C2 Practice Paper Silver Level S3

Qu	Max score	Modal score	Mean %	Mean score for students achieving grade: ALL	A*	A	B	C	D	E	U
1	4	4	85	3.39	3.94	3.85	3.72	3.57	3.39	3.15	2.21
2	6		82	4.93		5.82	5.53	5.02	3.83	2.88	1.56
3	9	8	73	6.56	8.41	7.94	7.37	6.90	6.37	5.71	3.61
4	8		71	5.67		6.98	6.38	5.95	5.38	4.78	3.26
5	10		74	7.41	9.61	9.24	8.57	7.95	7.15	6.09	3.13
6	12		67	8.03		11.33	10.05	8.46	6.47	4.50	1.78
7	9		66	5.92	8.89	8.53	7.66	6.50	5.03	3.41	1.24
8	7		64	4.47	6.83	6.40	5.57	4.75	3.86	2.88	1.40
9	10		60	6.01	8.90	8.52	7.24	6.08	4.92	3.87	2.43
	75		**69.85**	**52.39**	**46.58**	**68.61**	**62.09**	**55.18**	**46.40**	**37.27**	**20.62**