Examiners' Report/
Principal Examiner Feedback

Summer 2013

GCE Core Mathematics C1 (6663)
Paper 01R

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Summer 2013
Publications Code UA035659

Core Mathematics C1 (6663R)

Introduction

This paper proved a good test of candidates' knowledge and candidates' understanding of C1 material. There were plenty of easily accessible marks available for candidates who were competent in topics such as the manipulation of surds, differentiation, integration, recurrence relations, arithmetic series, transformations of curves and inequalities. Therefore, a typical E grade candidate had enough opportunity to gain marks across the majority of questions. At the other end of the scale, there was sufficient material, particularly in later questions, to stretch and challenge the most able candidates. The modal mark for all questions except question 8 was full marks.

Work on indices was sometimes problematical and a significant minority of candidates struggled to deal with the algebraic fraction in 10(a) and/or the equation in 10(b) and a significant number of candidates were unable to deal with the work on indices in 5(b). There were a surprising number of errors in the arithmetic when calculating the value of the constant in 10(a).

Report on Individual Questions

Question 1

Almost all (94.6%) candidates scored full marks. The most common error was to substitute $x = 3$ into the expression for y without differentiating. Largely, the only other errors were mistakes made when substituting into a correct derivative.

Question 2

Again the majority of candidates (81%) scored full marks. The most common method was to rationalise the denominator of the first term, simplify the second term and then combine. Many candidates also chose to combine both terms into one fraction first and then rationalise the denominator although a surprising number, who opted for this method, stopped at $6/\sqrt{3}$ thus losing 3 marks.

Question 3

Again candidates were very successful here with 83.4% scoring full marks. Not unexpectedly, the most common errors were omitting the $+c$ and incorrectly integrating the term with the negative index usually to get -3. Almost all candidates obtained the x^3 and complied with the demand to simplify their answer.

Question 4

Most candidates obtained full marks (86.6%).
In part (a) most used $y = mx + c$ correctly to obtain the gradient although a few did not divide by 2 to get the correct form.

In part (b) the majority of lost marks were a result of an incorrect calculation for the perpendicular gradient.

Question 5

In part (a) almost all candidates obtained the correct answer. Performance in part (b) was more variable and discriminated to some extent. By far the most common error was to write 4^{x+1} as $2^{2x + 1}$ in attempt to achieve a common base. Some candidates also multiplied their powers of 2 instead of adding them.

Question 6

Part (a) was almost always correct. In (b) most could obtain the third term correctly although there was the very occasional mistake in expanding $(1 - k)^2$. In part (c) most could solve the quadratic correctly although many resorted to using the quadratic formula rather than factorising the two terms. Part (d) was for many, the first challenge of the paper. The most common mistake was to assume an AP, to then attempt a value for d and then substitute in the sum formula. Some did this even when they had identified a recurring sequence.

Question 7

Candidates were largely successful with part (a) although some thought a sum was required. The majority of candidates could obtain the printed answer. However it is worth pointing out that a significant number of candidates did not show sufficient work that was convincing enough to indicate that they had reached the printed result. There was also some difficulty in obtaining the given answer due to errors in removing brackets from their sum equation.

In part (c), despite the clue to the solution given in part (b), a significant number of candidates chose to attempt to solve the quadratic equation using the quadratic formula.

Question 8

Part (a) was usually solved correctly although some misinterpreted the question and thought the length was four times longer than the width.

The method in (b) is well-rehearsed and most could solve the quadratic inequality and identify the correct range of values. Only a few incorrectly chose the outside region.
A significant number of candidates failed to answer part (c) and stopped at the end of part (b). Significantly, the modal mark for this question was 7 out of 8.

Question 9

For part (a), by far the most popular method was firstly to use the y-intercept to obtain the value of c and then to set up two simultaneous equations using both x-intercepts to find a and b. A minority used the x-intercepts to efficiently write down $\mathrm{f}(x)$ in factorised form and then expand to give the required coefficients. Some candidates also chose to differentiate the given form of C and use the turning points in an attempt to find the coefficients but this was often met with less success.

In part (b), sketches were often correct with some candidates, not unexpectedly, sketching $\mathrm{f}(\frac{1}{2}x)$.

Question 10

This question was probably the least well done on the paper. Some candidates were successful with part (a) and could make no headway in (b) and others could not attempt part (a) and yet were successful in part (b).

In part (a) the main errors were splitting the algebraic fraction incorrectly and problems with integrating negative fractional powers. Some candidates also missed out the constant of integration and were unable to access the last two marks in this part. Some of those who did have a constant of integration, struggled to obtain its value correctly.
Part (b) was more discriminating and many candidates did not know where to start. Even those who eliminated the fraction, failed to spot the quadratic in $\sqrt{x}$. Some chose to square their equation although the resulting algebra was sometimes poor.

Question 11

Given the wording of the question, most candidates chose to eliminate y and obtain a quadratic in x and could proceed to find the correct coordinates. Because of the fractions involved with one of the intersections, candidates using the quadratic formula were often less successful than those who chose to factorise.

In part (b) most could use Pythagoras' theorem correctly for their coordinates but a sizeable minority could not simplify their answer to the given form.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwant to/Pages/grade-boundaries.aspx

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