GCSE

Mathematics A

General Certificate of Secondary Education **J562**

OCR Report to Centres

January 2013

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

OCR will not enter into any discussion or correspondence in connection with this report.

CONTENTS

General Certificate of Secondary Education

Mathematics A (J562)

OCR REPORT TO CENTRES

Content	Page
Overview	1
A501/01 Mathematics Unit A (Foundation Tier)	2
A501/02 Mathematics Unit A (Higher Tier)	4
A502/01 Mathematics Unit B (Foundation Tier)	7
A502/02 Mathematics Unit B (Higher Tier)	10
A503/01 Mathematics Unit C (Foundation Tier)	14
A503/02 Mathematics Unit C (Higher Tier)	19

Overview

General Comments

The standard of work on all papers continues to be high. There were few cases where candidates had been entered for the wrong tier of assessment.

Pleasingly, there was an improvement in the quality of presentation. In general, scripts were clear and easy to read with work being logically set out. However, the presentation of work in longer, multi-step questions is still an area needing some attention, where candidates need to think ahead and plan the layout of their work.

After reading a question carefully, and before starting their answer, candidates should always look at the answer line. The number of marks available for the question is a clear indication of the number of steps of work that will be needed to reach the answer. Where appropriate, the answer line also indicates the units required. This can help direct candidates' work or may give an indication of the accuracy required in their answer.

Candidates appeared to be more familiar with the requirements of questions set in context and related their answer appropriately to that context. Though the approach to QWC questions has improved, answers to these still need 'fleshing out' with more working shown and clear explanation and conclusion given. Without these, full marks will not be awarded, even when the final answer is correct.

Drawing at Higher tier was very good with equipment used accurately and carefully. At Foundation tier, drawing was less good with pencil, ruler and rubber not always used. Calculator work continued to impress. However, there were still those who preferred to use 'pencil and paper' procedures (often incorrectly) even when a calculator was allowed. Work on fractions improved at both tiers. Some poor levels of general arithmetic still prevailed.

Centres need to be aware that this was the last January examination series for GCSE Mathematics A before we move towards the new regime in 2014 where a paper from each of the three units must be taken in the same exam series.

Centres requiring further information about this specification and details of support materials should get in touch with the Customer Contact Centre at OCR.

A501/01 Mathematics Unit A (Foundation Tier)

General Comments

Overall, performance on this paper was very much on a par with that in the previous November series. Candidates were well prepared and were able to demonstrate their knowledge.

Candidates appeared to have had sufficient time to complete the paper. Very few did not attempt every question.

It is pleasing to note that there was a slight improvement in the quality of handwriting, with most scripts being clear and easy to read. This ensured that method marks could be awarded even when the final answer was incorrect.

Comments on Individual Questions

1 The whole of this question was generally well answered. However, there were still candidates who ignored the given list and tried to use their own numbers.

In part (b), 7 and 16 was a common wrong answer.

In part (c), 7 or 56 was often seen.

56 was a common wrong answer in part (e).

2 In part (a), most candidates had the correct answer of 240 with 250 the next most common response.

Part (b) caused problems with some candidates giving 10:40 and others giving 12:05 or 11 o'clock. Fortunately, only a few gave 11:5 as their answer.

3 This question was done quite well. This series, more candidates indicated the points with a dot or a cross as well as a letter.

4 This question was not done well by many candidates – 'obtuse' and 'reflex' were often confused. Angle *b* was often incorrectly described as being 'acute'.

5 It was uncommon to see full marks earned in this question.

In part (a), 'clinic', 'hospital' or 'church' were common wrong answers along with the names of various streets.

In part (b)(i), 'south' was the usual wrong answer.
A large number of candidates gave 'right' as the first direction in part (b)(ii).

6 In part (a), the vast majority of candidates had trouble dealing with the decimal part of 6.7. Answers of 120.7 or 127 were seen often, usually without 6.7 x 20 shown. Not all candidates used a calculator to perform the multiplication.

Few candidates scored all 5 marks in part (b).

In part (b)(i), some candidates failed to answer the question after calculating the total as 401.

In part (b)(ii), a number of candidates did the addition again and failed to press the = key before dividing by 5 and so obtained the answer of 368.2.

In part (b)(iii), calculations of the median were common.

Part (c) proved difficult for the majority of candidates. 50 and 16.6... were common wrong answers. There were few conversions to ml seen.

7 A common wrong answer in part (a) was 28.

In part (b), many candidates failed to explicitly give the frequency of 0 for the 70–79 group.

The bar chart in part (c) was done well by most candidates.

8 It was pleasing to see many candidates showing clear working. Weaker candidates used repeated subtraction rather than division. Also, some candidates misread the question and gave the answer A as the medicine lasting longest rather than the one that was used up first. Most managed to obtain the first 3 marks for medicines A and B. Correct working for medicine C was comparatively rare. Some candidates treated all weeks the same rather than looking at week 1 separately.

9 There was much confusion about using medians, and a fair number of candidates used means. Sometimes the ‘stem’ was ignored and just the ‘leaves’ used, so medians of 7 and 3 rather than 157 and 153 were often seen. Again, some did not fully answer the question by saying ‘no’ or its equivalent.

10 This whole algebra question caused problems for many candidates. The B1 marks were often awarded in parts (a) and (b).

In part (a), the common wrong answer was $8a - 4$.

In part (b), most candidates struggled, with 40 or $40cr$ or $c + r = 40$ often seen.

Many responses were seen without any algebraic manipulation in part (c). However, one improvement on previous papers was that embedded answers were rare. A common wrong answer was $x = 3$ but those who showed $5x = 15$ were able to earn 1 mark.

Correct answers to parts (d) and (e) were rare.

11 It was rare to see arcs used so the positioning of the top right vertex was often wrong. Although many candidates got the correct basic shape, marks were usually lost due to an incorrect 77° angle – this was more likely to be too small rather than too large.

12 Few marks were awarded in part (a). A common error was a numerator of $3.6 + 13.2^2 = 177.84$ and the denominator often given as 8.41. Many candidates found it difficult to do the correct operations in the correct order.

In part (b), it was common to see just a list of all factors or of factor pairs. Some factors were usually seen but progression to a product was rare. Even if a correct factor tree was seen, candidates did not appreciate that a product was needed. Those candidates who did use a factor tree often had incorrect working eg 30 split into 15 and 15.

13 This question was not well done by most candidates. Some attempts at using the formula to generate terms led to 1 mark being earned, but the SC2 mark was rarely given as those who got that far usually answered the question correctly.

A501/02 Mathematics Unit A (Higher Tier)

General Comments

The standard of the entries was generally good with many candidates having a reasonable attempt at most questions. A small number of candidates had been entered who were without the necessary knowledge and skills to solve the problems posed and consequently they achieved very low scores.

This is the last January series for GCSE as the switch to a linear specification takes place, and this change was reflected in the fact that there were fewer candidates than usual for a January series.

The first few questions on the paper were answered well by most candidates, with questions 7 onwards providing the discrimination for the good candidates. The questions on trigonometry and functions were those omitted most frequently by candidates.

All candidates had time to finish the paper, although weaker candidates often tailed off their attempts towards the end of the paper.

Comments on Individual Questions

1 Nearly all candidates made a good attempt at this scale drawing. There were inaccuracies from some in their measurements and only a minority used a pair of compasses, showing their arcs, to obtain the fourth vertex. A number could not use their protractor to draw the correct angle.

2 Most candidates knew how to apply the order of operations on their calculator and obtained the correct answer in part (a). Answers given arising from incorrect order of operations were 2.881… and 8.3800….

In part (b), inserting brackets was usually done correctly

In (c)(i) many used a factor tree successfully to find all the prime factors. Most gave their answers as a product, but a small number wrote their answers as a list or as a sum. There were a few errors in some factor trees.

Some candidates had a clear idea of how to obtain a least common multiple in the second part of (c) and, if they used a Venn diagram carefully or a list of multiples of 120 and 42 diligently, were often successful. Others mistakenly found the highest common factor or the highest common prime factor, in which case they often obtained a part mark for finding the prime factors of 42.

3 This question on basic algebra was often done well. Most candidates could multiply out the single bracket in part (a) and factorised the simple algebraic expression in part (b).

In part (c) nearly all candidates used an algebraic approach to solve this linear equation. The few who used a trial and improvement approach were rarely successful. There were many correct answers, but a few made an error in one step and often obtained $2x = 9$ or $12x = 13$ etc, from which they usually obtained 2 out of the 3 marks.

4 Most candidates had a good understanding of ratio and consequently found the correct answer in part (a)(i).

Similarly in part (a)(ii) many obtained the correct answer. Incorrect methods shown by some were $360 \div 5 \times 8 = 576$ or $360 \times 8 = 2880$.

For calculating the estimate of the mean in part (b) there were many correct answers, often coming from complete working shown in their method. A few used the end points or the class width rather than the mid points of the class interval. A small number misunderstood the table and divided their sum by the number of classes rather than the total frequency ($1780 \div 6$) or just found the sum of the midpoints and then $360 \div 30$.

5 In part (a) many found the correct expression for C, and most gave the answer as a formula, as required.

Part (b) was generally answered successfully with most candidates obtaining the correct answer, whether or not they had a correct formula in part (a).

6 Most candidates made a good attempt at this question and many obtained full marks. Some got as far as $5 \times 200 - 2 = 998$, but then could not interpret an answer for the number of terms.

7 In part (a), fully correct answers were very rare as many candidates did not realise that the square root of 9 had both positive and negative values. However, they very often gained credit for giving an answer of $x = 3$. Usually a formal method of solution was used with only a few trialling values. Some simply gave their answer in an embedded form, $4 \times 3^2 = 36$. A very common incorrect method was $\sqrt{36} = 6$ followed by $6 \div 4$, leading to an answer of 1.5.

Weaker candidates displayed a variety of flawed algebraic steps when changing the subject of the formula in part (b) and scored 0, whilst stronger candidates often worked confidently and scored the full 2 marks. The correct answer was sometimes seen following two consecutive errors: a first line of working of $6c = \sqrt{A}$ followed by $6c^2 = A$; this gained no credit.

8 Weaker candidates failed to appreciate the need to use Pythagoras' theorem, whilst some added 42^2 and 20.4^2 instead of subtracting and so obtained a width greater than the hypotenuse. Those who obtained the correct width but did not indicate how much wider the television was, did not gain full marks. However, many candidates completed the question correctly and gained all 4 marks.

9 The first part of this trigonometry question was answered well by the better candidates, with many using an appropriate ratio and angle combination. The quality of notation was also generally good. However, a significant number of these candidates did not find a value to the necessary accuracy of greater than 2 decimal places before rounding to the given answer.

In part (b) only the best candidates tended to make good progress. Those achieving most or full marks often presented methodical working, with clear and correct notation, that identified the sides or angles being used. Few candidates, regardless of whether they had found a correct angle for DBC or BCD, went on to complete the question by finding the bearing. Some, who did not go on to use trigonometry, were able to pick up one or two marks by calculating sides CD and/or BD. Weaker candidates, who did not know how to proceed, often resorted to measuring the angle on the diagram, despite the instruction to calculate the angle; they received no credit unless correct calculations supported the answer.

10 In part (a), a common problem in constructing the boxplot was the misreading of the scale which led to values being wrongly positioned. Often the longest time and upper quartile were wrongly calculated/ plotted, but a few did gain marks for correct calculations of these values, even though they were plotted incorrectly. The vast majority gained some credit on this question with weaker candidates often showing incorrect values on a boxplot of the correct format.

Part (b)(i) and (ii) were very poorly answered. Most candidates failed to support their statements with values, or merely gave those that had been stated for 2010 in the question. There were a large number of candidates who incorrectly used a measure of spread to answer the question about 'on average', and to a lesser extent, used the median to compare variation. Part (b)(iii) was answered a little more successfully.

11 The question using function notation was found to be demanding. Some good candidates were well-prepared for this kind of question, but most were unable to create the necessary equation, with $a = 6$ being a common guess. Many thought that if f(2) = 9 then f(4) would be double this value, so 18. Those who did find $a = 7.5$ usually also found f(4) correctly.

A502/01 Mathematics Unit B (Foundation Tier)

General Comments

The paper appeared to be accessible to candidates with many scoring marks on the final question. Very few candidates scored total marks that were in single figures but a significant proportion scored 50 marks or more. The number of questions not attempted by candidates appeared to be fewer than usual.

A disappointing number of candidates demonstrated poor knowledge of table facts. $480 \div 6$ and 7×6 were often wrongly stated and few knew that $\sqrt{169}$ was 13. They frequently attempted to work this out, often incorrectly. Simple fractions, however, were reasonably well understood. Candidates would do well to practise basic numeracy for this paper.

Candidates generally scored well on graphical questions, though the standard of drawing remains low. Rulers and sharp pencils are advisable.

Names of quadrilaterals are not well known, with even "rectangle" being given as "square" on occasions. Candidates tend to use geometric terms imprecisely although many scored quite well on QWC questions. The term "similar" is better understood than "congruent".

Comments on Individual Questions

1 Parts (a) and (b) were often well answered, although few candidates saw a link between the two parts of (b) despite the hint in the question. If they did, it was sometimes poorly used with the answers 6, 8 or 60 being given for part (b)(ii).

Part (c) was usually well answered, although the inability to work out 7×6 correctly often lost one mark. Some candidates added 4, 6 and 10 to give the answer 20 and scored no marks. A few, having achieved 20, 30 and 42, failed to show addition but simply wrote a wrong answer near 92.

2 Parts (a)(i) and (ii) were usually well answered although shading half the squares in part (a)(i) was a common error, as was giving $\frac{3}{10}$ in part (a)(ii).

Many candidates gained full marks in parts (b) and (c) although it was not uncommon to see $\frac{14}{30}$ only in part (b) and 25 in part (c).

3 Part (a) was answered reasonably well although it was not unusual to see "square" followed by "cube root". Some candidates vacillated between the two with crossings out and additions.

In part (b)(i), 6 was a common wrong answer along with $2 \times 2 \times 2$ or $2 + 2 + 2$ or 2 cubed written on the answer line.

In part (b)(ii), 13 was seen reasonably often amongst better candidates but there were many answers of 84.5 and other incorrect responses. Candidates should be able to recall squares of integers from 11 to 15 and their corresponding square roots (Unit B Foundation specification 4.i b).

4 Some completely correct answers were seen to part (a) although even the rectangle was not immune to being misnamed a square. The parallelogram was often misrepresented as a rhombus and the trapezium could be almost anything, though rarely a square.

In part (b), the acute angle was usually correct though not always with the correct spelling. Right angle and obtuse were common errors. A few measured the angle and answers of 34 or 35 were sometimes seen.

In part (c), two marks were commonly gained although candidates' inability to subtract 155 from 180 cost many one mark. The lack of working may well have cost some candidates the method mark but a significant proportion did show some method.

In part (d), the first QWC question, a significant number of candidates scored 2 marks from 3. A mark was often lost for imprecise use of language such as, "A triangle is 180° so two of them put together are 360°". Candidates should use geometrical language correctly and discuss "angles in a triangle add up to 180°.....". Other common wrong assertions were that the diagonal cut the shape in half or that the shape had four right angles. A few used the formula for the sum of the interior angles of a polygon but scored no marks as this was not deemed an explanation. A significant number simply restated the question by stating "all quadrilaterals have 360 degrees".

5 Part (a) was often wrong.

Part (b) was often correct, although some candidates only ringed one letter despite being told there were two.

6 This question was usually well answered.

In part (a)(i), many candidates could find 10% although some multiplied by 10.

In part (a)(ii), few candidates seemed to regard 25% as $\frac{1}{4}$ but tried to work out 10%, 20% and 5%. There is nothing wrong with this method but many were unsuccessful with numerical errors common.

Part (b) was well answered, although 87.00, 88 and 90 were common wrong answers.

7 Parts (a) and (b) were often well answered although the use of a ruler was not so common.

Part (c) was the second QWC question. It was fairly well answered though few candidates gained full marks. Some simply looked at £100 and €120 and responded that it was cheaper in pounds by £20. They had no concept of changing currency. Many scored a mark for using 1.11 and went on to calculate 1.11 × 100, sometimes achieving 111. However, they did not realise that this was €111 and so the phone was €9 cheaper if paid for in pounds. A common 3 mark answer was that it was £9 cheaper if paid for in pounds. It was sometimes hard to distinguish between £ and € symbols used by candidates. As a general point, candidates should be encouraged to include units in their working so as better to understand what they have calculated. A few candidates tried to convert euros to pounds by attempting 120 ÷ 1.11, despite having no calculator. Very few were able to do this successfully.

8 Many succinct methods, followed by correct answers, were seen. However, a significant number of candidates thought that angle ABC was 75° and not angle ABE. Some thought that angle EAD was a right angle and some knew they were dealing with alternate angles but could not use the fact. A number of candidates failed to annotate the diagram or indicate that the angle of 75° that was being used was EBA. 105° was a common wrong answer. Candidates are advised to annotate geometric solutions and use notation such as angle EBA and not just angle B. Many candidates did not show full or even partial methods here.

9 This was well answered, with very few reversed coordinates in part (a).

Too few candidates used a ruler accurately in part (b). Fairly uncommon wrong answers were a reflection in the *x*-axis (gaining 1 mark) or a rotation (gaining no marks). A more common error was to draw the shape inaccurately and "stretch" the reflection beyond the tolerance of ±2 mm at each vertex.

10 Many candidates completed the table accurately in part (a)(i) and went on to plot these points and draw a line in two straight segments in part (a)(ii). Ruled lines were expected for full marks. Not all candidates achieved this. Candidates who gave wrong values in the table still gained a mark for plotting four of their points, or for a complete straight section drawn accurately. Some candidates did not draw the full length of the line.

Part (b) was less well answered and many were unable to work out points for Alec's earnings. Many failed to appreciate that a second table for Alec's data would be beneficial. Lines appeared all over the grid, commonly from the end of the horizontal section of Lizzie's line or from the origin. These lines too were expected to be ruled to score both marks.

Candidates who had one point of intersection were allowed to score a follow through mark in part (b)(ii) if it was correctly identified.

11 Part (a) was usually well answered although the common error was to misuse the scale and think that one vertical division represented 1 second. Candidates who did this often plotted points beyond the tolerance allowed and they lost one or both marks.

"No correlation" was generally correctly selected in part (b).

12 The correct answer (0, 4) was commonly given. However, a reasonably common wrong answer was (1, $^{-}6$).

In part (b), it was clear that many candidates were unsure and so this was not well answered. Some errors were 2*x*, 2 : 1, steep, positive and $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$, although a blank space was common.

In part (c), some candidates gained a mark for an equation with the correct *x* coefficient or constant. A few correct answers were seen but many errors were made. Equations were not always stated and sometimes just a constant was given. The single most common response was to leave the answer space blank. However, it was pleasing to see some candidates gaining marks on a quite difficult part of the specification (Unit B Foundation specification 6.3 a and b).

A502/02 Mathematics Unit B (Higher Tier)

General Comments

The paper proved quite accessible with few candidates scoring below 20 marks and many scoring over 50. There was no evidence of candidates being short of time.

Candidates generally used a ruler in graph and transformation questions. Candidates should be reminded to write their solutions using black ink, but to use HB pencil on diagrams and graphs. Mostly, working was clearly shown allowing part marks to be awarded even when the answer was incorrect.

Quality of Written Communication was assessed in question 13, requiring a proof using vectors. This was a context that was unfamiliar to many, and weaker candidates either omitted the question or wrote confused things related to lengths of lines using Pythagoras or gradients. There were some very competent solutions and the best candidates realised the need to show their methods and to draw a conclusion in a proof.

Functional elements of mathematics were addressed in some questions and candidates had to interpret the real life relevance of the calculations or diagrams they produced. This was done most successfully in question 6 where candidates could understand the context, use the word formulas and interpret the significance of the crossing point. Question 2 proved more difficult, with weaker candidates thinking that 12.5 books was a realistic answer or using mixed units in calculations.

Questions that were particularly well answered include 1 (scatter graph), 2 (real life arithmetic), 6 (linear graphs) and 8 (angles in triangles and parallel lines).

Comments on Individual Questions

1 In part (a) most candidates were able to correctly plot the 4 points.

Virtually all candidates recognised the data had no correlation in part (b).

2 In part (a) there were many correct answers of 12. The correct method was often seen with an answer of 12.5 or with one numerical error only, so could score 3 marks. Many candidates were able to convert the measurements, to give the same units, and to start the question correctly by finding how much space 21 books occupied or how many books in total were required for 670 mm. Some were then unable to go any further, leaving the answer as 25 or 33. Division of 67 or 25 by 2 sometimes resulted in errors in the decimal part of the answer such as 33.05 or 12.1. Intermediate steps shown in the working of the solution enabled method marks to be awarded.

There were a lot of answers in part (b) that scored full marks. Common errors included adding the three numbers to get 15.47 or 17.47. Some candidates used rounding and reached 16.50 and then 3.50 but often subtracted 0.03 rather than adding thus reaching an answer of 3.47.

3 For many candidates this question proved to be one of the hardest on the paper.

Most candidates drew the correct ruled line in part (a). The most common error was to connect (0, 12) and (8, 0). A significant number of candidates made no further attempt at this question, even after a correct answer to part (a).

In part (b), many candidates gained at least 1 mark. The most common errors were: ± the reciprocal; not to realise the gradient was negative or to spoil their answer by including additional information such as *x* or writing the equation of the line. A common method among the correct solutions was to work out the absolute value of the gradient and then include the negative sign only on the answer line.

Many candidates gained full marks in part (c) for correctly following through from their gradient in part (b), while others gained 1 mark for either the correct use of their gradient or the *y*-intercept. A common error was to forget to include *x* in the answer.

Only the more able candidates got the answer to part (d) correct. The most common errors were to find the reciprocal or the negative of their answer to part (a).

4 Part (a) was very well answered. Where there was an error, it tended to be a misreading of the scale on the vertical axis.

In part (b), most candidates were able to score at least two marks. There were a few problems with the adding of the weekly totals, with week 1 causing the most errors. Those with correct additions usually went on to reach 192 or 30 but there was a mixture of final answers including 192 and 32. A significant minority used 37 as their number in week 1 and most of these were able to score the Special Case mark.

5 Candidates who grouped this inequality as $5n – 2n > – 13 – 2$ were likely to make it to the final correct answer. Those who tried the $15 > – 3n$ route rarely made it to the correct answer, failing to reverse the inequality sign. A number of candidates tried to solve this by making it an equation and sometimes were correct in their final inequality answer but rarely so. A common error was to calculate –13 – 2 as –11. The weakest candidates tried a trial and error approach which, while often successful with equations, rarely scored any credit here.

6 On the whole, part (a) was well done.

In part (b), plots were generally accurate but the 2 line segments were not always drawn using a ruler. Occasionally, the plots were joined with a dotted line or not joined at all. A single ruled line should have been drawn rather than joining the plots by using line segments from one plot to the adjacent one.

There were many correct ruled lines drawn in part (b)(i). A common error, however, was to start at the end of the horizontal line from part (a), and draw a line increasing by £3 per 10 envelopes.

The answer to part (b)(ii) was nearly always correct or was a correct follow-through from their two graphs. Candidates should appreciate that if their solution does not fit on the grid given then they have made an error at some point. A few candidates gave the 'earnings' value rather than the number of envelopes.

7 There were a lot of good responses in part (a) with candidates clearly understanding the need for a common denominator. Some struggled with the multiplication or subtraction eg 32 – 25 = 8. Only the weakest candidates subtracted the numerators and denominators, thus ending up with $\frac{1}{3}$. This method appeared quite frequently:

	4	5
5	×	25
8	32	40

Very few of those that used this method could go on to get the correct answer, as the candidates appeared to have little idea of what relevance their table had to the actual fractions. Similarly only a handful could use their table to write down a correct subtraction $\left(\frac{32}{40}-\frac{25}{40}\right)$ thus scoring a method mark.

There were some very good responses in part (b). A significant minority used a common denominator before multiplying which makes the arithmetic that much more complex and therefore prone to error. A few did not convert to improper fractions and simply multiplied the fraction parts of the mixed numbers prefixing this with either 1 or 2. Some converted the problem to decimals and then tried to convert back to fractions at the end; this was usually unsuccessful. In nearly all cases if a question is given in fractions it will be easier to work in fractions.

8 There were a good number of correct solutions to this question, with most candidates using the base angles of the isosceles triangle to arrive at angle *p*. Some extended DA and used the properties of a straight line to get angle *p*. Some mistakenly used angle ABC as 75° and a few took the triangle ABE to be equilateral. A significant number of candidates unnecessarily gave reasons and explanations as if this was a QWC question.

9 Part (a) was generally well answered. The common wrong answers were 7 or 154. A few changed the '$c + t =$' part of their answer.

With the exception of the weakest, most candidates attempted to solve part (b) by equating coefficients. Most realised the need to subtract the equations, so the majority earned at least the two method marks. There was a large number of well written fully correct answers. There were also many poorly presented answers with working scattered all over the answer space.

10 In part (a), there were two main errors in finding the angle. There was 126° from those who thought opposite angles were equal and there was 61° from those who assumed that QRS was a right angle. For correct answers of 54° the examiners were looking for precision in stating the appropriate theorem wanting ‘opp angles’, ‘cyclic quad’ and at least an implication of ‘sum to 180’. Vague statements about ‘quadrilaterals in a circle’ etc did not score.

In part (b), those who knew that the angle at the centre of a circle is twice the angle at the circumference were successful. The common wrong answer was 51.

11 This question proved challenging to many, with few gaining all 4 marks.

In part (a), the correct answer of $^-2$ was rarely seen, with the most common responses being a scale factor of 2 or $\pm\frac{1}{2}$.

In part (b), a minority of candidates drew the correct shape without construction lines, while others used rays to work out where the correct points should be. Those using rays were usually successful. Many candidates used the correct scale factor with the wrong centre, a very common wrong answer used (4, 4) as the top point of a correctly scaled triangle rather than as the centre of enlargement. Most diagrams were carefully drawn with ruled lines.

12 Only the stronger candidates completed part (a) successfully. A number had $\sqrt{36}$ in their working but often gave the answer as 6. Those trying to use $\sqrt{12}$ as $\sqrt{4}\times\sqrt{3}$ often omitted to use the overall square root.

In part (b), the better candidates knew that top and bottom needed multiplying by $\sqrt{5}$ and some went on to give the correct answer. Some offered no solution and the numbers 25 and 2.5 featured in a number of wrong methods.

13 A significant minority of candidates left this QWC question totally blank.

However, a large number of answers had the correct principles and some excellent clear, concise solutions. When candidates responded they generally stated the vector AD correctly. The best solutions then recognised the need to find expressions for the 4 sides of PQRS making their methods clear, for example AD = AB + BC + CD or PS = $-\mathbf{e} + \mathbf{e} + \mathbf{f} + \mathbf{g}$. They then used vectors for opposite sides to show both parallel and equal length. There was then an expectation that candidates would draw together their reasoning with a conclusion describing how their statements show that PQRS must be a parallelogram. Some weaker candidates described angles, often looking for non-existent right angles and even using Pythagoras. Others were trying to show that PQ and QR are parallel.

A503/01 Mathematics Unit C (Foundation Tier)

General Comments

This was the first January session for the A503 Unit C for the Mathematics J562 GCSE qualification. The majority of candidates were well prepared for the exam and it was encouraging to see a number of good scripts at this level. All candidates were able to access at least some of the questions and achieve some degree of success on the exam.

Work was generally well presented and logically set out in most cases. The longer questions gave candidates the opportunity to demonstrate their reasoning and communication skills and on the QWC question many showed clear logical working and were able to communicate their solutions appropriately and to the accuracy required for money problems.

The questions on simple number calculation, coordinates, reading timetables, solving simple equations, vocabulary of probability, simple substitution into expressions, using a calculator and interpreting real life graphs were the better answered questions. The questions involving bearings, collecting like terms, unitary ratio, using the probability scale, conversions and reasoning with metric measures, rounding to significant figures, probability from an outcomes table, views and surface area of a prism and calculating probability proved to be more challenging.

Candidates should be encouraged to check the units given in the answer space of questions involving money. A few lost marks unnecessarily by giving answers in pence when an answer in pounds was required.

A calculator was allowed for this unit and there was more evidence this session that candidates were using a calculator but still a few were making unnecessary arithmetic errors which lost marks.

Comments on Individual Questions

1 Part (a), a question on using the vocabulary of probability to describe different events, proved difficult for some although most were successful in selecting ‘evens’.

There were mixed answers to part (b) with a substantial number of candidates choosing ‘likely’ instead of ‘unlikely’.

Almost all candidates chose the correct option ‘impossible’ for part (c).

Part (d) was the least well answered of all the parts in this question. The most common incorrect answer was ‘likely’.

2 Part (a)(i) was very well answered with almost all candidates giving 63 as the answer.

Part (a)(ii) was also very well answered although a small number did not note the units required in this question and gave an answer of 0.18p instead of 18p.

Almost all candidates scored 3 marks in part (b).

3 The majority of candidates understood the term area in part (a)(i) and were able to find the area of the shape correctly.

Fewer were successful in part (a)(ii) where common incorrect answers were 12 and 13. Some confused the terms perimeter and area and reversed the answers to part (a)(i) and part (a)(ii).

The most common answer in part (b)(i) was to draw a 4 by 3 rectangle which satisfied both criteria of an area of 12 cm^2 and a perimeter of less than 16 cm or to draw a 6 by 2 rectangle which satisfied one of the criteria. A few drew shapes other than rectangles.

Part (b)(ii) proved to be an effective discriminator. Only a few candidates were successful in drawing a rectangle with a perimeter that was numerically equal to its area. Those that drew a 4 by 4 square sometimes questioned whether this was a rectangle.

4 Part (a)(i) was almost always answered correctly.

Part (a)(ii) was well answered but some candidates gave (0, 4) as the answer, reversing the coordinates.

Only a few understood the term bearing in part (b) and interpreted it as an angle to be measured. Of those that did recognise this, some were unable to measure the angle correctly from the North line at Renford and gave answers such as 25°. The most common error was to measure the distance between the two places and give this as the bearing.

Part (c) was challenging for many candidates, with problems interpreting a bearing of 270°. A number appeared to make a random guess at the position of Acton. Those that marked any position on the map were given a follow through mark for writing the coordinates of their position of Acton correctly.

5 Answers to this question were surprisingly weak. Candidates had real problems linking the written information with the arrows on the number line.

Although a number were successful in both parts of (a)(i), many candidates were unable to relate the numbers given for the hair-slides with the decimal values on the probability line. There were 10 hair-slides in total which made for very straightforward conversions of probabilities to decimals. Common incorrect answers were C and F, presumably by relating the number of hair-slides given in the question to the position of the arrow along the probability line.

Part (a)(ii) was poorly answered with a variety of incorrect answers. Many candidates even extended the line given to the right of F and then marked the probability of a green hair-slide, G, as greater than 1.

Only a minority of candidates answered part (b) correctly. Although many were able to show the new values for blue and green when the extra hair-slides were added, they were then unable to convert this to a correct decimal probability for the green hair-slide.

6 Parts (a)(i) and (ii) were very well answered with almost all candidates giving the correct answers 13 and 7.

Part (a)(iii) was less well answered. A common error was an answer of 5 from 20 divided by 4 instead of 80 from 20 × 4.

Most candidates were successful in collecting the terms to give an answer of 15*a* in part (b)(i). A few gave an answer of 15 and others made errors in dealing with the negative term.

There were mixed responses to part (b)(ii). Few candidates scored full marks, but a number scored 1 mark for a partially correct expression where either the terms in *x* or the number terms had been collected correctly. A common error was in dealing with the $^{-}6x$ term. Some collected all the terms into one.

7 This proved a difficult question for many candidates. Those who were successful invariably worked out the cost of one kg of potatoes before multiplying it by 5. A number of candidates approximated the cost to either £0.30 or £0.31 before multiplying by 5 leading to an inaccurate final answer. Some attempted ‘non-calculator methods’ without showing the full working such as finding the cost of 4 kg then 2 kg then 1 kg and then trying to add the cost of 4 kg to the cost of 1 kg. This method often contained arithmetic errors.

8 Many candidates were familiar with the correct method to find the volume of the cuboid in part (a). A very common error was to add the three dimensions.

In part (b), very few candidates were successful in converting their answer to part (a) from mm^3 to cm^3. There was some evidence that a few candidates had learned the conversion. The most successful method was to recalculate the volume with the lengths 2.5 cm, 2 cm and 4 cm. The most common error was to divide the answer to part (a) by 10.

9 The majority of candidates were able to interpret the timetable correctly in part (a)(i) to give an answer of 5 trains leaving in the afternoon. Some gave answers of 4 or 7.

In part (a)(ii), the majority were able to give the correct time of arrival from the timetable. The most common incorrect answer was 13 08.

Although many candidates were successful in part (a)(iii), a very common error was to give an answer of 93 minutes instead of 53 minutes from using a calculator and doing 12 33 – 11 40.

A minority were able to give the correct time interval of 3 hours and 2 minutes in part (b). The most common error was in not identifying the time of the correct return train from Nant Gwernal to Tywyn Wharf. Many used 16 50 instead of 15 35.

Most candidates understood the requirements of part (c) and attempted to find the cost for 2 adults and 1 child before finding the difference between this cost and the cost of a family ticket. A very common error was to give an answer of 50p, overlooking the pound sign given in the answer space. Some worked out the cost of 2 adults and 2 children and missed the fact that children under 5 were free. A few having obtained £29 made arithmetic errors with the subtraction of £28.50 and gave £0.10 or £1.50. Some misunderstood ‘return’ and doubled their £29 and the cost of the family ticket.

10 Part (a)(i), a question on correct use of a calculator, was generally answered well although the answer 15 was sometimes seen.

Part (a)(ii) was less well answered. A very common incorrect answer was 8.087… as candidates evaluated $\sqrt{62.41+3}$.

The majority of candidates correctly gave an answer of 3.3 in part (a)(iii). The common incorrect answer was 18.18, where candidates did not use brackets or evaluate the numerator of the fraction before dividing.

Part (b)(i) was often correctly answered. An error made by a number of candidates was the inclusion of zeros after the rounded value eg 347.00.

Only the better candidates answered part (b)(ii) correctly. The inclusion of zeros after the rounded value was again the common error.

Only a minority of candidates were successful in rounding to one significant figure. There were a number of incorrect answers in part (b)(iii) including 350, 347, 3, 300.00 and 400.

11 A few candidates were successful in reaching the correct answer of £780. The vast majority misinterpreted the information however and found one tenth of the remaining amount after the cost of the laptop had been deducted from the winnings to give the answer as £810.

12 Candidates used the correct algebraic conventions in giving their answer to part (a)(i). The common errors were to give answers of 9*a* or 20.

Part (a)(ii) was also very well answered. The common error was to give an answer of 3.

All three parts of (b), a question on substitution, were well answered. In the part (b)(i) a few candidates gave an answer of 18. In part (b)(ii), a common error was to give an answer of 67 from $8^2 + 3$ instead of $2 \times 4^2 + 3$. Part (b)(iii) was well answered.

Part (c) was less well answered than the previous parts. The common errors were 2, $^-2$, $^-10$ or 3.

13 Part (a)(i) was often correct but 0.5, 5 and 5000 were also seen.

Millimetres, gallons or pints were often seen as the answer to part (a)(ii).

A significant number of candidates did not reach either 4.9 or 4900 in part (a)(iii) and others confused kg and grams in their addition eg 8041 or 804.1 was sometimes seen.

Candidates invariably confused metres, centimetres and millimetres in part (a)(iv).

There were many correct solutions in part (b) with working clearly shown. Most candidates attempted to convert 4 feet 7 inches to cm as their strategy but some forgot to convert the 48 inches (from the 4 feet) into centimetres and reached 65.5 cm. A smaller number correctly converted the 130 cm to 52 inches but omitted to compare this with 55 inches or made an error when converting this to feet and inches by giving 4 feet 3 inches instead of 4 feet 4 inches. A few correctly converted Jackie's height to centimetres but then made no conclusion.

14 There were some excellent solutions with clear and concise working. Many candidates corrected their converted currencies to the nearest whole number instead of working to the 2 decimal places required when working with currency. Others lost accuracy in their correction to 2 decimal places and some multiplied instead of dividing by the appropriate exchange rate to give both costs in pounds. A few candidates gave incomplete solutions by omitting the unit of currency in which they were working.

15 Arrangements were well understood.

Part (a) was often correctly answered. A few candidates included CC and/or FF and/or SS in their selections, while others gave repeats of selections already made.

Part (b) was answered poorly. A denominator of 12 was commonly seen in the working as was an answer of $\frac{1}{3}$ without working, which may have come from $\frac{4}{12}$. An answer of $\frac{2}{6}$ was also at least as common as the correct answer.

16 Almost all candidates interpreted the graph correctly in part (a)(i) and gave the answer 40.

Part (a)(ii) was, in general, well answered although a number of candidates gave an incorrect answer of 25.

Many candidates were successful in giving the correct answer of 3 in part (a)(iii). Those that correctly divided their wrong answer to part (a)(ii) by 3 were also given credit.

Both part (b)(i) and part (b)(ii) were well answered. Candidates generally indicated that the vehicle was stopped in part (b)(i) and was refuelling in part (b)(ii). A few did not interpret the graph correctly and gave answers such as ‘going up a hill’ in part (b)(ii).

17 In part (a)(i), the majority of candidates recognised that the plan view of the triangular prism would be a rectangle but often drew a rectangle of the wrong width. A 10 by 5 rectangle was quite common. Only a few candidates recognised and drew the ridge line along the length of the rectangle. Weaker candidates did not understand the term ‘plan’ and attempted to draw the complete prism on the grid or drew a rectangle with additional shapes and lines attached.

Many candidates recognised that the side view of the prism was a rectangle in part (a)(ii). A few realised that it was a 10 by 4 rectangle but as many drew a 10 by 5 rectangle. A few drew triangles for the side view. Some also drew parallelograms and trapeziums.

In part (b) the fully correct solution of 184 cm^2 was only occasionally seen. Many candidates were able to score method marks however for a correct method in finding one or more faces of the prism. Sometimes the 6 by 10 rectangle was omitted or replaced by another 5 by 10 rectangle. Others omitted one triangular face or incorrectly used 24 cm^2 as the area of one of the triangles. Some were unable to select the correct base and height to use to find the area of the triangular face. A number of candidates found the volume of the prism instead of the surface area and some of the weaker candidates just wrote a value in the answer space with no working at all.

18 There were mixed responses to part (a). Some candidates who knew the correct method, and used the fact that the sum of the probabilities must equal 1, made errors with the arithmetic and 1 – (0.4 + 0.17 + 0.35) often became 0.8 or 0.44. Candidates should be encouraged to use a calculator with these questions to avoid this type of error and also to write down all their working to ensure method marks can be awarded.

More candidates were successful with part (b) than with part (a) and many obtained the solution 0.57 or equivalent. Some candidates made arithmetic errors such as 0.4 + 0.17 = 0.21 by not using a calculator.

There were many correct solutions in part (c) with candidates clearly showing that to work out the expected number of adults the product of the probability and the total number of adults must be found. There were also those who knew to find 0.35 × 2500, but then attempted a non-calculator method to find this product, usually without success. Some candidates incorrectly found 2500 ÷ 0.35. A significant number of candidates did not use 0.35 at all.

A503/02 Mathematics Unit C (Higher Tier)

General Comments

A good range of questions of varying difficulty allowed all candidates to make a positive start to the paper whilst providing a real challenge, even for the better mathematicians, towards the end of the paper. Many had been well prepared, with a sound understanding of the specification content, and were able to show what they knew and that they were capable of applying that knowledge. Few were entered at the wrong tier.

In general, candidates approached each question by thoroughly reading what was required. However, the presentation of work, particularly in answer to multi-step questions, is a cause for concern. Many did not plan their answers and ended up with their working scattered over the answer space. This made the awarding of marks for a correct method used difficult. It would benefit candidates to think about how they will structure their answer before they put pen to paper; this should be for all questions, not just QWC questions.

The answer to a QWC question must include full working with, perhaps, written explanations of what the candidate is doing and why. In longer questions, many candidates were rounding intermediate answers and consequently arriving at an inaccurate final answer. This should be avoided. Sensibly, unwanted work and answers were deleted, overwriting of numbers and lines in diagrams was avoided and the checking of answers was evident.

Diagrams were drawn precisely and carefully. Calculators were used efficiently and accurately, although there were instances where candidates used 'pencil and paper' methods when a calculator method was more appropriate.

Even at this level, work on simple algebra highlighted misunderstandings. More time should be spent on the formal algebraic methods. Better candidates were able to show a pleasing command of the higher level algebraic processes. Probability was well understood and approached with confidence. Number work was good. Though work on Shape, Space and Measures continued to improve, problems did arise where knowledge had to be applied to more complex situations.

Candidates had sufficient time to complete the paper, with most attempting every question.

Comments on Individual Questions

1 Very few candidates made any mistakes in part (a)(i). It was surprising, however, how many did not use a logical approach to the listing; this sometimes led to pairs being repeated. A small number did not read the question fully and incorrectly gave FF, SS and CC as part of their list, not realising there was only one cake of each type.

Many incorrectly thought that the table showed 12 separate entries rather than 6 pairs. The answer to part (a)(ii) was invariably 4/12 leading to 1/3. Only better candidates considered the table as pairs of values.

In part (b), when candidates realised they needed to multiply the probabilities, the correct answer usually followed. More often they attempted to add probabilities, though this was often unsuccessful. $1/6 \times 5 = 5/30$ was common.

2 Drawing each of the views in part (a) was done well. A few candidates did not draw the 'ridge' line down the middle of the rectangle in part (a)(i) (though others drew just the ridge and no rectangle) and in part (a)(ii) the size of the rectangle was often incorrect. A 10 by 5 rectangle was seen as often as the correct 10 by 4 rectangle. Very few candidates did not draw rectangles; these drew nets or isometric drawings of the solid.

Some candidates answered part (b) very well, showing all steps of their working and explaining as they went along. However, many made errors. Some assumed that there were three 5 by 10 rectangles instead of two 5 by 10 and one 6 by 10. Others omitted the area of the base and often the 'hidden' triangle. Many could not calculate the area of the triangle successfully, while others that could went on to find the volume of the solid rather than the surface area.

3 Many candidates correctly answered part (a). The calculation needed was well known as were the units of the answer. Though some misread the vertical scale, they were still able to show an understanding of what was required.

Most knew they had to compare gradients in part (b) and did so correctly. Very few had problems with interpreting the graph. A very small number, however, thought that they were dealing with a speed/time graph and talked of constant speed and accelerating in the two parts.

4 All parts of this question were answered well. Many candidates had all three parts fully correct. Some were just writing down the answers, and when these were incorrect (eg 0.8 in part (a)) no marks could be awarded for a correct method used. Very few candidates did not use a correct fraction, decimal or percentage form for their answers.

5 Most candidates realised what was required. Work, however, was incomplete or inaccurate. Few scored full marks as they failed to show the two diagrams, their working and their answers. Candidates should be reminded that all working, however trivial, must be clearly shown, particularly in QWC questions. A significant number only considered one arrangement while others found a third, assuming that $x + 5 = 2y$. Weaker candidates found the perimeter of one rectangle and multiplied this by 3.

6 The compound interest formula was well known and could be applied accurately. A few used the multiplier 1.6 or 1.006 instead of 1.06. Not many used a year by year approach; those that did often made numerical errors. Others mistakenly used simple interest instead of compound interest.

7 Although there were many correct answers in part (a), it was evident that a large number of candidates did not understand the term 'mixed number' with many writing their answer as an improper fraction. A surprising number ignored the instruction to 'use your calculator' or perhaps did not know how to use the fraction facility on their calculator. 1 was a common wrong answer where candidates multiplied together the constituent parts of each of the fractions.

Errors in part (b) were very rare.

8 Very few candidates struggled with part (a). Some candidates took out a common factor of 6 or 8.

Part (b)(i) was mostly correct but $^{-}25$ was a more common answer than the correct one, 7, in part (b)(ii).

There were a good number of correct answers in part (c). Those who had come across 'difference of two squares' had little problem here. $x(x – 9)$, $(x – 3)^2$ and $1(x^2 – 9)$ were common wrong answers.

9 In part (a), many did not know an appropriate conversion factor. Those that did, often went on to a correct conclusion. Many quoted a sometimes correct link between stones and kilograms; only rarely was this woven correctly into their solution.

Part (b) was usually correct though there were those who failed to appreciate that the upper bound is 0.5 above the given value.

Most candidates used a correct upper bound for the weight of one suitcase in part (c). Weaker candidates just found 17 × 21 with no reference to finding the largest possible total weight.

10 In part (a), most obtained the correct answer by dividing 28 by 1.1 though some split the 28 cm into four lengths before applying the division. In these cases, many failed to divide all 4 sides by 1.1. A number thought that × 0.9 was exactly equivalent to ÷ 1.1.

In answering part (b), very few knew how to find the volume of the larger bottle, with most just multiplying the volume of the small bottle by 1.1. Better students arrived at 399.3 but many of these failed to go on to give an answer to an appropriate degree of accuracy. Some tried to split the volume of the small bottle into a product of three lengths before multiplying each by 1.1; these were usually unsuccessful.

11 There were many fully correct answers in part (a). A large number left the final term as $1x$ though this was not penalised. Weaker candidates made slips leading to $2x^2$ rather than x^3 and $-4x$ rather than $-3x^2$. Others tried to combine the three terms into one or two terms for their answer.

A surprising number got $-10x + 12$ when multiplying out the second bracket in part (b).

In part (c), the method for multiplying two brackets was well known and very often done correctly. Both middle and high ability candidates had little problem finding the correct answer.

12 In all three parts, it was apparent that many of the candidates understood standard form as they often wrote the correct equivalent decimal in their working. Even then, many could not interpret this as a value on the number line. There was some confusion amongst others with negative powers leading to negative numbers and large negative powers leading to large negative numbers.

13 In part (a), most quoted the correct formula, made the correct substitutions and calculated the correct answer. Some errors in the final answer did occur as candidates forgot to use 1/3 or took 0.3 for 1/3.

Only a small proportion of candidates chose to use the tangent ratio to find the angle in part (b). Those who spotted this found the calculation straightforward. It was common to see the use of Pythagoras' theorem to obtain the slant height of the cone followed by the use of either the sine rule or the cosine rule. This method often led to an answer outside the acceptable range due to premature approximation at an intermediate stage.

14 With a few exceptions, most candidates completed the tree diagram correctly in part (a).

Though there were many correct answers in part (b), some candidates overlooked that there were two possible combinations which satisfied the requirements. Weaker candidates added probabilities instead of multiplying and vice versa.

15 This question was not well done. The majority had little idea of how to start in part (a). Some knew that 21 should be involved somewhere but could not identify where. Others did not know how to transfer from proportionality to equality. Many contrived a formula that was a linear equation even though an inverse statement was given in the question.

Those who managed a correct formula in part (a) often went on to correct answers in parts (b) and (c).

16 Values were, in general, calculated correctly. The most common error was to give $y = 0$ when $x = 0$.

In part (b), points were usually plotted correctly though ($^-1$, 0.25) and ($^-0.5$, 0.5) were often plotted as ($^-1$, $^-0.25$) and ($^-0.5$, $^-0.5$). The curve was mostly drawn accurately with very few candidates joining points with a ruler.

Answers in part (c) were nearly always correct. A small number gave an embedded answer which was not accepted. Less aware candidates gave an answer of 3, remarking that $4^3 = 12$.

17 In part (a), most correctly tried to use the cosine rule, though there were many errors both in substitution and in rearrangement of the formula. However, only the better candidates realised that the question was asking them to work out the angle and not use it. Alternative methods were to try to use the sine rule or even right-angled triangle trigonometric formulae. These usually had no success.

Candidates were far more successful in part (b). A correct formula and correct substitution were seen frequently. Some candidates substituted all sorts of incorrect combinations of the given values, including the value of a side used as an angle. A few used the sine rule to calculate one of the other angles and then used that to find the area. This often led to inaccurate answers due to premature approximation at intermediate stages. A common wrong method by weaker students was to use $\frac{1}{2} \times 8 \times 5$ or $\frac{1}{2} \times 8 \times 10$.

18 It was clear in part (a) that many of the candidates did not know how to 'complete the square'. Those that did make an attempt often gave an incorrect expression for $(x + a)^2$ such as $(x + 6)^2$ or $(x + 3x)^2$ or even $x(x + 6)$. Those who did give $(x + 3)^2$ usually also gave the correct value for b.

Those who correctly answered part (a) often went on to give a full, clear solution in part (b). Some, however, did forget the ± when finding the square root. Sensibly, many who could not find solutions using the required method did revert to the original quadratic equation and use the quadratic formula to find their solutions. These were rewarded if found accurately. Some candidates incorrectly removed the negative signs when the solutions were both negative.

19 There were some neat, logical, well explained and accurate answers to this question. Unfortunately, many candidates scattered their work around the answer space. It was common to see candidates forgetting to include the 'hidden' area of wax on the bottom of the slice. Others incorrectly included the area of the sides of the slice. Weaker candidates could find the area of the sector but not the curved area of the end. A number had difficulty making use of the angle in the sector. Some mistakenly found the volume of the slice. Candidates must provide enough clear working so that method marks can be awarded.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk