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GCSE

Mathematics C

General Certificate of Secondary Education **J517**

Report on the Units

March 2008

J517/R/08M

Oxford Cambridge and RSA Examinations

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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

CONTENTS

GCSE Mathematics C (J517)

REPORT ON THE UNITS

Chief Examiner's Report

General Comments

After the marathon of coping with three different Maths C specifications in January, it was a relief to examiners as well as centres to be back to merely two! Centres should note that we will continue to have units for both J516 and J517 specifications for the next two sessions of module entry. Those aggregating in June 2008 or January 2009 need to take the J516 specification, for which coursework is also required. Those aggregating from June 2009 take the J517 units, which have an increased weighting to allow for the fact that coursework is not assessed at GCSE from June 2009.

This March was the second session for which J517 modules were available. There is more AO1 and more AO4 assessed on these units compared with J516 corresponding units. The effect this session was that all pairs of modules had 46 to 48 marks in common, with the remaining marks being used to assess more data-handling and more reasoning on J517.

As expected, the main entry at this time of year was for candidates in the second year of their GCSE course, entering for J516 modules, although there was also a significant entry for J517 modules from those centres that use the flexibility of the specification to enter first year candidates. It was noticeable that achievement from the J517 cohort was better than that of the corresponding J516 cohort, in line with data for years 10 and 11 on past papers in March.

The slight trend in centres entering their candidates for higher modules than in past years that I noted in January has continued, and the changing entry patterns also reflect the change in the tier structure. In this March session there was an increase at M9 and M10 compared with past years (these papers were available on J516 only – M9 is available on J517 for the first time in June 2008). There was a decrease at M8 on J516 compared with past years. This changing pattern reflects the fact that M8 is no longer the top module for an Intermediate tier. Candidates who have been entered for Higher, who previously may have been a good Intermediate candidate, at this stage of their J516 courses may be trying M9 whereas in the previous era they would have stopped at M8. Foundation tier J516 candidates will mostly be stopping at M7 or lower, since M8 contains Higher tier material – and of course weaker J516 Higher tier candidates may also have taken M7.

The grade boundaries on M7, for both J516 and J517, continued this time to be lower than other modules – this perhaps reflects the difficulty that teachers have in preparing candidates adequately for this module given its increased content under the two-tier structure.

B272: Module M2

General Comments

A balanced range of scores was seen from candidates for this paper. The majority of candidates were able to complete each section in the available time; a few candidates however appeared to have been entered at the incorrect level as they had attempted very few questions.

Candidates were best able to answer the questions on data and shape. The weakest areas were handling units, both money and grams/kilograms, and also questions which required written explanations.

Working out was often lacking. Some candidates appeared not to have access to a ruler or a calculator.

Comments on Individual Questions

Section A

1 **(a)** Most candidates scored at least 1 mark for two correct entries.

(b) Many candidates had the correct answer.

2 **(a)** Few candidates scored all 3 marks. Many scored 1 mark for 72, but few actually showed the subtraction. Having reached 72 very few candidates showed the division by 6 and thus failed to score the second method mark.

3 **(a)(i)** Generally correct.

ii) Generally correct. 85 was a common incorrect answer.

(b)(i) The correct answer was seen less here. Common errors were 2/5 or 1/25.

(ii) This was often correct regardless of the answer to part (i).

4 **(a)(i)** Many candidates gave the correct answer. Of those who did not, Launceston and Milton Abbot were the most common incorrect answers

(ii) This was not as well answered as part (i). Many candidates confused East and West, while others wrote East South.

(b) Many candidates scored 1 mark for having one of the instructions correct. The first sentence was more often correct than the second.

5 Many candidates did not gain the marks for this question as they failed to consider the units of their answers. The majority of candidates were able to correctly add together their three amounts and scored 1 mark. The place values of the pence column caused problems for many candidates.

6 Only the better candidates scored the mark for this question. Many candidates appeared to understand that they needed to compare the two heights and attempted to do so, but inaccurately. 6 was a common incorrect answer.

7 **(a)** Many candidates were able to measure the angle within the tolerance and scored the mark. Common errors were failing to use a protractor correctly and 140° was a common answer.

(b) The majority of candidates had at least one answer correct.

8 **(a)** Many candidates were able to extract '80' from the table but several then ignored the £ sign and wrote 80. Some however did realise the significance of the £ sign and gave the answer in the correct form.

(b) Many candidates were unable to answer this question. A common error was to add £1·80, £1·20 and £1·50. Few gained the part mark for correctly selecting only the two correct fares.

Section B

9 **(a)** Generally well answered.

(b) Generally well answered.

10 A lack of working prevented many candidates from scoring a method mark. 11 was often seen but did not score any marks as there was no evidence of division.

11 The majority of candidates had understood what was required. However, many failed to use rulers to draw straight lines. Several candidates failed to score the marks as their diagrams lacked accuracy.

12 **(a)** Generally well answered. Weaker candidates had a problem with understanding the ordering of negative numbers and gave the negative temperatures in numerical order ignoring the negative sign.

(b) The correct answer was often seen.

(c) This was less well answered than part (b).

13 **(a)** Only the better candidates were able to draw the correct pattern.

(b) This was well answered with the majority of candidates getting the answer from the table. Few appeared to realise the link between their drawing and this question, although some were awarded the follow through mark.

(c)(i) Few candidates were able to give the correct answer.

(ii) Several candidates were able to recognise and correctly describe the pattern. Common errors were to give '5' or 'the five times table'. Weaker candidates often did not attempt the question.

(d) Several candidates did not attempt this question. Few scored the mark. Many made a statement but did not give an explanation.

14 **(a)(i)** Many candidates gave the correct answer. From those who did not, 3 was often seen.

(ii) Many candidates had correctly identified the number as 3 and scored 1 mark. Some candidates went on to say there were ‘four 3’s’ or ’more 3’s’ but few correctly stated half the numbers were 3 as a result very few candidates scored 2 marks.

(b)(i) Many candidates gave the correct answer. A common error was to confuse the mode and median. Many had listed the numbers in order in this part but had then given 2 as the answer.

(ii) Candidates who did not give the correct answer often gave the mode or calculated the mean. Many candidates failed to score the method mark as they had failed to list the numbers in order in this part and it was not clear that their list was an attempt to work out the median.

15 **(a)** Many candidates gave the answer 6 rather than 0·6. Many candidates did not score the method mark as they did not show evidence of subtraction. The majority of candidates did not give their answer in grams.

(b) Most candidates scored 1 mark for correctly identifying 3 nets.

B273: Module M3

General Comments

About two thirds of candidates achieved more than half the available marks. Overall they achieved roughly 3 more marks on Section A than Section B. A similar differential was observed to be the case for all capabilities but slightly less so in the case of the less capable.

There was no evidence that candidates experienced time problems or difficulties reading the question rubrics. The vast majority of questions were attempted with Question 8 having the greatest overall number of omissions. Many candidates who were allowed a reader or scribe were reported not to have used this support.

Numbers were usually clear and understandable but some candidates lost marks by attempting to "over write" answers leaving the actual answer in doubt. Candidates should be aware that, if they change their mind, they must cross out the wrong answer and write the new one clearly in its place.

A noticeable number of candidates failed to show any clear working and, therefore, possibly lost some credit by failing to provide evidence of using a correct method (this was particularly noticeable on question 4 parts (b), (c) and (d)). In most cases, but not all, candidates appeared to have a calculator to use for section B.

Many candidates were confused by terminology such as "the square of", which was often interpreted as "the square root of", as evidenced by the very low facility of question 8(a). Operations involving decimals also proved challenging (question 6 parts (b) and (c)). The very poor performance on questions 4(b) and 10(b) illustrated how very few candidates were comfortable converting between metric units.

Most candidates were secure dealing with percentages (question 1), reading timetables, bar charts and decimal scales (questions 2, 3 and 9(f)), solving linear equations (question 5) and spatial interpretation (question 10(d)).

Comments on Individual Questions

Section A

1 **(a)(i)** Moderately well answered part question but with about half of candidates failing to gain any credit. Estimates within the range were usually good but answers based on the "dropped down a loo" sector being 90° or a quarter were all too common.

(ii) A poorly answered part question. Only just over a quarter of candidates were successful.

(b) Well answered with almost one third of the least capable gaining credit.

2 **(a)** One of the best answered questions on the paper. There was no perceptible pattern to the wrong responses. Almost three quarters of the least capable gained full credit.

(b) Well answered; about two thirds of candidates were successful. Almost half the least capable gained full credit.

3 A well answered question by all capabilities overall. When there were errors these tended to occur in the second part, “11 million” was a common wrong response - a result perhaps of misreading the question, which did not ask for the crimes in 1981.

4 **(a)(i)** This part question was found challenging by all capabilities with about two thirds of all candidates failing to gain any credit. A common (possibly incomplete) answer was “1000”.

(ii) Almost as poorly answered as the previous part question. Commonly occurring wrong answers were “4” and “40”.

(b) A rather poorly answered question, with few candidates gaining full credit and about two thirds failing to gain any. Nevertheless partial credit was available and many candidates took advantage of this with answers of 1210. As in previous years, conversion between metric units, in this case millilitres to litres, was found very difficult.

(c) Candidates tended to gain full credit or none for this part question, although partial credit was available. A well answered question. A variety of informal methods to calculate “14 × 5” were seen but not all were successful or fully understood by candidates.

(d) Many candidates were unable to clearly structure a solution to this question and may well have lost partial credit as a result. Almost half of candidates failed to gain any credit. The least capable found this part question too great a challenge.

(e) Most candidates were able to gain partial credit for this question. Usually one or two of the designs confused the candidates but there was no obvious pattern to this.

5 Quite well answered; embedded answers were awarded full credit. A common wrong answer was “6” – evidence of a classic algebraic misconception. About one third of the least able were successful.

6 **(a)** Most candidates gained some credit but almost a quarter none. Many candidates gained 1 mark or “2” or “3” seen.

(b) A very poorly answered part question with over two thirds of candidates failing to gain any credit. Common errors ranged from the classic misconceptions with “3·720” and “3·7000” to “472”, “300·72” and “300·7002”.

7 About a third of candidates gained full credit but many achieved partial credit with a limb length of “6” or “9” units.

Section B

8 **(a)** This was one of the worst answered questions on the paper. Most mistakes were clearly the result of candidates interpreting the question as “the square root of 16,” so “4” was a vey common response. Well over three quarters of candidates gained no credit and only about one third of the most capable gained any.

(b) Over half of candidates were successful with this part question.

(c) Just over a third of candidates gained credit. As perhaps might be expected “5” was a very common wrong response.

(d) Over a quarter of candidates failed to attempt this question. Overall just over a third gained full credit – not a well answered question.

9 (a)(i) Somewhat surprisingly, given previous performance on similar questions, this was found something of a challenge by many candidates with full credit being achieved by less than one third. A very common wrong response was "15·5".

(ii) Found about as difficult as the first part; answers in excess of "100" were not uncommon. Some candidates gained partial credit for the answer without the explanation. Few candidates managed a successful explanation – less than a quarter.

(iii) This part question was often well answered with over half of candidates gaining full credit.

(b) Wrong answers were commonly seen without any working losing possible method marks for candidates. Some wrote "3600 ÷ 4·7" (gaining partial credit) but then gave unrealistic final answers indicating, perhaps, lack of calculators. Over two thirds of candidates failed to gain any credit. This question had one of the highest omission rates.

(c) Less than one fifth gained full credit; many attempted to subtract the two numbers but then omitted "to halve the difference and add". Evidence of adding the two speeds was sufficient to gain partial credit. Responses were seen that showed attempts to add, multiply and subtract both given speeds.

(d) Somewhat surprisingly this question attracted less than a quarter correct answers. Wrong response tended to be somewhat bizarre, ranging up to 400 m.

(e) Many candidates successfully measured the length of the car but experienced problems using the scale. As in other questions evidence of this may have not been presented by some candidates resulting in lost partial credit. Credit was quite often gained by the statement of the appropriate units. However as in previous sessions, a small but noticeable number of candidates added "units" rather than "m" or "metres".

(f)(i) A very well answered part question; well over three quarters gained full credit.

(ii) Quite well answered; a common wrong response was"500·4" or "5004". About 50% of candidates gained full credit.

10 (a) Well answered with over half gaining full credit.

(b) The worst answered part question on the paper - less than 1 in 10 candidates were successful. Most answers showed a very insecure knowledge of decimal units. Commonly observed wrong responses were "4·2", "42", "420", "4200" and "42000".

(c)(i) Moderately well answered; wrong answers usually involved a denominator of "7". In common with previous years a small proportion of candidates gave "probability words" as their answers.

(ii) Significantly better answered than the previous part question with well over three quarter of candidates successful.

(d) Both part questions were often well done. Some candidates who were less than successful overall tended to gain credit here. Well over half the candidates gained full credit for both parts.

B274: Module M4

General Comments

Candidates were able to attempt most questions. The performance on Section B was significantly better than on Section A where many were let down by poor arithmetic. Explanations were generally poor with many candidates giving general statements without numerical support.

Comments on Individual Questions

Section A

1 **(a)** Very few scored full marks but the majority managed to score 1 mark for two correct responses. Weak candidates often just counted the number of arrow heads.

(b) Many candidates did not appreciate that the centre of rotation was the large dot in the centre, so often shaded six more squares in the top left quadrant. The most popular answer came from reflecting the two shaded squares in the vertical axis then reflecting the result in the horizontal axis. This gained 1 mark for one correct quadrant.

2 **(a)** Many candidates were confused between the terms ‘factor’ and ‘multiple’. Many correct answers of 4 or 6 were seen probably because these numbers were at the beginning of the list.

(b) ‘6 is a multiple of 12’ was very common. The answer of 48 was more common than 60.

(c) All the numbers on the given list were chosen at some point. The answers 4, 9, 21 and 42 were common.

3 **(a)** Most realised that long multiplication was required. Those using tabular methods were more successful than those going for the traditional method. The latter usually forgot the zero on 2660. Weak candidates covered the page with a mass of figures, or wrote the answer 169 after choosing to multiply pairs of digits. Those using correct methods often left the answer as £3059 – some very expensive DVDs!

(b) Many candidates thought they could earn 3 marks by merely stating that the large pack was better value without using calculation to support their argument. The most successful candidates worked out that, using the small pack, 25 DVDs cost £6·75 so the large pack was better. Very few were successful in working out the cost of one DVD from each pack. Many candidates said that two small packs cost £5·40 so it would cost 80p for 5 DVDs in the large pack. This explanation was not considered sufficient.

4 **(a)** The correct answer of 0·2 was very rare. The most popular answer was 1·5.

(b) Much better. Thirty per cent was often seen.

(c) There were more correct answers than in part (a) but many gave 4/10 or 1/4.

5 Numerical answers were often given for parts (a) and (b) yet algebraic answers were seen for part (c).

(a) Some candidates were careless in writing multiplication signs. It was often difficult to differentiate between × and +. Most candidates intended to write $x \times y$.

(b) Very few gained 2 marks. Even those who wrote a correct expression for the perimeter usually omitted to write P = ... to make a formula.

(c) Those who appreciated that the length of the spiral was 9 × 4 often failed to reach the answer of 36. Many gave the answer as 4*t*.

6 **(a)** Many gained the mark for the correct 30 kg.

(b) Most scored at least one mark for two correct multiples of 5 but few were accurate in all four quantities.

7 **(a)** Most candidates read the bar chart correctly to give 5.

(b) Well answered.

Section B

8 **(a)** Very few candidates found a point *C* which satisfied all three criteria. Many gained 1 mark for a triangle with height 6. Some thought that *C* was at (2, 6) after seeing the digits 2 and 6 in the question. There was a mark available for writing down the coordinates of their *C* but many reversed these coordinates.

(b) Many candidates were able to plot *D* at (-5, 4) but a significant number plotted at (4, -5). The common error for *E* was to reflect in the wrong axis.

9 **(a)** Most candidates scored 2 marks for completing the table.

(b) The main error was to describe the term-to-term rule ‘add 2’ or ‘go up in twos until you reach 20’ instead of ‘multiply (the pattern number) by 2’.

(c) Many candidates gave the correct answer of 34 but then proceeded to repeat the rule with 50 to reach 104.

10 **(a)** Many simply observed that there were more mints than toffees. The explanation was expected to include the information that there were 40 sweets altogether and that 10 of these were toffees.

(b) This was more successful than part (a).

11 **(a)** Many worked out that *x* was 74° but few were able to give an adequate explanation involving the word ‘triangle’.

(b) Many wrote that *y* could not be 114° because it looked smaller or said it could be 114° since the angles of an isosceles triangle added up to 360°. Others said ‘no, because the other angles were 33°’. A correct argument involved pointing out that the sum of the angles would be more than 180°.
Many candidates obtained the correct answer of 33° but many used 360°.

12 **(a)** Those who understood the term ‘mean’ were usually successful. There was evidence of misuse of a calculator since the answer of 462·3 occurred on a significant number of occasions. A special case mark of 2 was awarded for this. A number of candidates reached 537 correctly but left this as the answer or multiplied by 10. Weaker candidates often tried to find the median or gave the range.

(b) Very few candidates showed more than one route – indeed, many candidates showed very little working in order for a route to be interpreted. The common error was to return to Bromsgrove in the middle of the journey. There were many incomplete routes. Even those who gave, for example, B to R to D to S to B often forgot to add the 13 miles to get back to B. Some candidates visited the three required destinations, returning to B after each one. Some misinterpreted the question completely and found the nearest place, Droitwich.

B275: Module M5

General Comments

Candidates had time to complete both sections of the paper. Most candidates appeared to have access to a calculator and ruler, but fewer made use of angle measurers or pie chart scales.

Again, many candidates failed to show their working out, causing them to lose available method marks. Candidates are getting better at explaining their reasoning, but must ensure that they use the correct mathematical language. Candidates performed better on algebra questions than on any others.

Comments on Individual Questions

Section A

1 (a) This was generally well answered with most candidates scoring at least 1 mark. Common errors were repeating some of the outcomes in order to complete all of the rows in the table, or putting girls in the boys' column. The weakest candidates listed all of the girls in one column and all of the boys in the other, thus just using each letter once and scoring 0.

(b) Most candidates answered reasonably well with the correct answer seen frequently, although common errors were 2/6, 1/3 or 4/12. Almost all answers were given as fractions, although there were a few answers in the incorrect form, usually ratios.

2 (a)(i) Correct answers were very rarely seen. Some candidates scored for correctly measuring the line as 4·5 cm but then did not go on to attempt to use the scale, and a significant number scored for estimating the length as 1 km. Many candidates failed to measure the line accurately, giving a length of either 4 or 5 cm. Some candidates misunderstood the scale and calculated 4·5 × 5 = 22·5.

(ii) **(iii)** Both bearings were very poorly answered with many candidates appearing to guess or to measure lengths rather than angles. Performance on (ii) was slightly better than on (iii).

(b) Many candidates just moved the decimal point in the answer rather than trying to round, and answers of 4430·919 were common. Those candidates who had some idea about rounding to one decimal place often gave answers of 443·9 or 443·0.

(c) Rounding to one significant figure was found even more difficult than rounding to one decimal place. Answers of 24000000 and 25000000 were common.

(d) Most candidates showed some working in this part and many were able to gain at least one mark. Candidates often worked out that the answer was between 5 and 6 months, more often by working through the 18 times table rather than by attempting to round. Those candidates who rounded the numbers usually got to 20 and 100, but many then went on to multiply rather than divide these.

3 (a) This was reasonably well done although common errors were 1/3, 5/15, or attempts at halving both numerator and denominator.

(b) Those candidates who showed working were usually correct; if there was no working seen they were generally wrong.

(c) Many candidates managed to multiply correctly, but then did not always simplify their answer. Some candidates found a common denominator before multiplying, but could then not work out 20 × 20, leading to an answer of 20/40. Other common errors were from adding the fractions or from working out 2 × 1 as either 1 or 3.

4 (a) Well answered, but weaker candidates gave an answer of 15.

(b) Well answered, but weaker candidates gave an answer of 8.

(c) This two-stage equation was found harder than the other two, as many candidates did not use formal algebraic methods. Many candidates showed 25 – 7 = 18, but did not score unless this was seen as part of an equation. The division of 18 by 4 was found very difficult, with answers of 4·2 common. Some correctly reversed flow diagrams were seen, but these often did not lead to the correct final answer.

5 This was not a very successful question. Relatively few candidates showed understanding of the connection between fractions and percentages, despite the fact that it was 'out of 50'. Many candidates attempted 50 – 12 with 38 a very common answer. Answers of 25% were also seen as well as attempts to find 10%, 20% etc, but this generally led nowhere. Some candidates gained M1 for showing the fraction 12/50.

6 (a) Many candidates recognised that the symmetry condition had not been met, but some were not specific about a square having more than two lines of symmetry. Some candidates mentioned equal angles or sides.

(b) Many candidates made a reasonable attempt at sketching a rhombus, although there were some very rough sketches which made it hard to identify the intention. Rectangles were also commonly seen, where the candidate had identified the correct symmetry properties, although they had not checked the other properties. Many candidates correctly named rhombus in (ii), but diamond was also common, which did not score. Common errors in names were rectangle, trapezium and kite, which did not always follow from their sketch.

Section B

7 (a) Many candidates answered correctly, although a significant minority drew a 4 by 2 rectangle instead of 4 by 3.

(b) This was fairly well answered, although candidates sometimes measured the complete length and width of the net rather than the cuboid.

(c) This was quite well answered, with many candidates following through correctly, using their incorrect dimensions from (b). Some candidates appeared to be attempting to work out the surface area rather than volume. Even though the units were specifically requested, very few candidates stated any units at all and those that did often gave cm^2 rather than cm^3.

8 **(a)** This was reasonably attempted; however there was little evidence of calculation of angles or percentages. Weaker candidates appeared to attempt to use the numbers of members provided as angles or percentages. Of those that did attempt it correctly, the 90° sector was most often correct, with other sectors often inaccurate, possibly indicating no access to an angle measurer or pie chart scale. A significant number did not realise that labels should be the words rather than the numbers.

(b) This was very poorly attempted and many candidates did not attempt this at all. It was common to see no structured working, making it difficult to award any marks. A few stronger candidates reached the correct answer with no difficulty, but a larger number of candidates managed to calculate 2/5 of 480 but not 35%. A number of candidates converted 2/5 to 40% and got to an answer of 5%, but then did no further working.

9 Both parts were well answered, although it is becoming increasingly common to see the incorrect notation 3'375 being used. Common errors were multiplying or dividing by the index numbers in each part, leading to answers of 36 and 45, or 9 and 5. Candidates were generally consistent in their errors here.

10 **(a)** This was reasonably well answered, although many candidates gave answers of 7, 9 or 5, 8 or 5, 7, probably from trying to produce a number pattern rather than substituting into the equation given.

(b) Many candidates followed through by plotting their points correctly, but could only gain full credit for a completely correct straight line. A minority of candidates failed to join up their plotted points, but those that did join them generally used a ruler. A disappointing number of attempts at bar charts were seen which were given no credit.

11 **(a)** This was very well answered, although some failed to simplify their answer so did not score. Most candidates knew that they had to add to find the perimeter.

(b) Many candidates could collect the terms correctly to get $13x$ and $4y$, although some then failed to show the + sign. If a single term was correct, it was generally the $13x$, as the single y caused confusion for some candidates. A small number of candidates multiplied the numbers to get $40x + 3y$.

(c) Many candidates had a reasonable idea of what was required, although numerical errors were sometimes seen. When the 10 and 12 had been calculated it was common to see these then being multiplied, or an answer of $12a + 10b$, retaining the a and b. Answers of $4a + 5b$, $7a + 7b$ or 34 + 25 were also seen.

12 Candidates were more successful in part (a) than part (b) but had to mention the correct person and the mean or range in their explanation. A significant minority of candidates referred to combining the two statistics so failed to score. Many realised that consistency was related to the range, but chose Mark, as they felt that the higher range meant he was more consistent.

B276: Module M6

General Comments

Examiners felt that the paper was set at an appropriate level. The standard of performance on this module varied considerably. Some candidates coped well and were for the most part able to attempt a good proportion of the paper and achieve the target grade. Regrettably, there was a much greater number of candidates who failed to achieve the target grade and were seemingly unprepared for some of the topics. These candidates fared very badly, often with scores less than 10. The majority of the marks were in the range 10 to 30 with rather more scoring under 20 than scoring over 30. In general, good scripts were characterised by the presence of some working, allowing examiners to award method marks even when the final answer was incorrect. The standard of basic skills in arithmetic left much to be desired on many scripts. For example, the ability to work with simple fractions was noticeably lacking.

All candidates had time to complete the two sections of the paper.

Comments on Individual Questions

Section A

1 (a)(i) Very few candidates were able to give a correct answer to this question. The most likely answer was 0·6 with 0·5 also regularly seen.

(ii) Over 40% of candidates were able to achieve success on this part with answers of 0·43. A small number picked up a mark for achieving an answer involving 43 with the decimal point incorrectly placed, or for an answer starting with 0·4 but failing to cope with the remainder. A significant number attempted the division in two parts, $2 \div 5 = 0{\cdot}4$ and $0{\cdot}15 \div 5$ wrongly worked out as 0·3 leading to a final answer of 0·7.

(b) Many candidates showed a confused understanding of fractions with just over 25% earning all three marks. The most frequent error was to subtract numerators and denominators to give 8/4 which was sometimes cancelled to give 2. Others attempted to subtract the reciprocal of 1/6. Many of those who did attempt to write both fractions with a common denominator lost the marks by just changing the denominators and not the numerators. Others lost the marks because of poor arithmetic, 1/6 = 6/30 for example. Even those who obtained correct equivalent fractions did not always subtract them correctly or remember to cancel down the final answer to its simplest form.

2 (a)(i) About half of all candidates found the correct range for the data. Others wrote 24 - 65 as their answer. A significant number confused mode, median, mean and range.

(ii) Slightly fewer candidates achieved success in this part. Some wrote out all the values themselves which often led to the correct answer whilst some gave their answer as 2. Others gave an answer of 40 (the middle value of 20, 30, 40, 50, 60) or 44 (the middle value of the central row). For those who did not obtain the correct answer it was rare to award a method mark for marking off from both ends of the diagram.

(b) Very few had any idea how to interpret median or range. Stating that one was bigger or smaller than the other was the most common answer. Many thought that a bigger median or range meant faster swimmers. Others interpreted a smaller range as a smaller amount of swimmers in the group.

(c) Less than half achieved success in this part. Even those candidates who realised that 1 - 0·15 was needed could not always subtract correctly, 0·75, 0·95 and 9·95 were seen.

3 (a) About two-thirds of candidates were able to calculate the correct value. Common errors included $5^2 = 10$ leading to 6 and $5^2 - 4 = 1^2$.

(b) It was rare for examiners to award this mark. The vast majority of candidates found it difficult to express clearly what was wrong with the working and many decided that the position of the brackets was wrong. Others thought that Darren had subtracted 4 twice. A common statement was 'two minuses make a plus' but without mentioning multiplication of two negative numbers or some mention of 9 rather than $^{-}9$ the mark could not be awarded.

4 (a) Less than 10% of candidates mentioned that the triangle was isosceles to earn this mark. Many explained their calculation or said the triangle was equilateral.

(b) Many candidates were able to gain a mark for $y = 55°$ but few could explain that x and y were corresponding angles. Most just mentioned parallel lines or said it was the same as x. Those who attempted to use alternate angles and angles on a line rarely mentioned both reasons.

5 (a) Almost all candidates could give a sensible statement about the relationship between the engine size and the top speed.

(b)(i) Under a half of candidates drew an acceptable line of best fit. Although a few curves and zigzag lines were in evidence the majority produced a ruled line with a positive gradient. Most of those that were not acceptable were steeper than required.

(ii) The majority of candidates could read correctly from their line of best fit, with only a small number misreading the scale.

6 A majority of candidates picked up at least two marks on this construction. The most likely error was an inability to draw 112° accurately. Some candidates had used the size of angle B from the given sketch.

7 (a) Around 75% of candidates were able to identify the correct section. Common errors included regions covering more than one section.

(b) About one-third of candidates earned this mark. The most common wrong answer was EF, the section where the car was stationary.

Section B

8 (a) The majority of candidates were able to pick up this mark. Others either left the table blank or just filled in the table as a sequence, with 2, 3, 4, 5, 6 the most common followed by 0, 3, 6, 9, 12.

(b) Candidates were able to plot the points using the table with few exceptions. Unfortunately many with the correct points did not pick up the second mark by failing to draw a ruled line through the correct points.

9 **(a)(i)** A significant number of correct answers were seen but in the majority of cases little algebra was seen. Where algebra was used $2x = 8 + 3$ was a common error. Others took $2x$ to mean $2 + x$ and an answer of 3 was frequently seen.

(ii) Fewer correct answers were seen in this part. As in (i) there was little evidence of algebra being used. For those using algebra, dealing with the 2 and the $2x$ proved beyond many and $3x = 21$ leading to $x = 7$ was a common wrong answer. Around a half of candidates failed to earn any marks.

(b) About one-third of candidates earned this mark. Many could correctly expand the brackets and obtain $10x - 15$ but then went on to simplify further leading to $^{-}5x$. Others treated it as an equation.

10 **(a)** About a half of all candidates earned this mark. However many either failed to square root 11·56 or applied the square root to 24·1 only. A significant number of no responses were seen.

(b) A significant number could evaluate the expression but struggled to give an answer to two decimal places. Common errors included truncating their answer, rounding to a different degree of accuracy or just giving the calculator answer. A significant number rounded more than one digit and 4·57 was common.

(c) About one in ten candidates could write the time in hours and minutes. 0·4 hours often appeared as 4, 40, 15 or 25 minutes.

11 This proved to be a difficult question for almost all candidates with few fully correct answers seen. The most common wrong answers involved finding the total perimeter or the total surface area of the solid. Those with some idea of what was required earned at least one mark for finding the volume of a relevant cuboid. It was common to find that the wrong dimensions were used when calculating the volume of a second cuboid. Many gave no units with their answer.

12 **(a)** Although this was one of the better questions for candidates picking up marks, a significant number lost the second mark for an answer of 997·5. Some used a two step method, approximated after the first step, and lost the final accuracy mark.

(b) Around 70% of candidates picked up both marks. Many used the cost per square metre from (a). It was rare to award just 1 mark as most who knew what to do could correctly work out the answer.

13 This proved to be another difficult question for the majority of candidates. Few used the given formula for the area of a trapezium. Of those who did use it many forgot to include the 1/2. Others added 6·3 rather than multiplying by 6·3. However, the majority simply multiplied or added the three given dimensions. Many earned a mark for dividing their area by 4·5. Some simply worked with the perimeters of both shapes. Around 60% earned no marks for this question.

B277: Module M7

General Comments

Most candidates were well-prepared for this module. They had good knowledge of many topics. However their ability to manipulate equations and inequalities remains a weakness.

In Section A, geometrical equipment was required and many candidates did not have access to this necessary equipment. The arithmetic often contained errors.

In Section B questions were set which required the use of a calculator and many did not appear to use one. In using a calculator too many rounded or truncated their figures at intermediary stages during the calculations.

Comments on Individual Questions

Section A

1 The most common error was to attempt 600 ÷ 4 to get 150. There were many who wrote 600 ÷ 5 but could not successfully complete this division.

2 **(a)** A common approach was to multiply out all the powers so that 5^3 was replaced by 125. Some remembered that there were rules but used them incorrectly so that the following working was seen: $5^{6\times4\div3} = 5^8$. On some scripts $5^3 = 15$ was seen and used.

(b) A lot of incorrect division was seen resulting in extra 2s and/or 5s seen as well as 3 and 11. Some factor trees had additive bonds rather than multiplicative factors.

3 **(a)** The correct angle was often chosen but many reasons involved the triangle and angles on a straight line but with no use of the parallel lines. Those that did often gave corresponding angles as their reason. Some gave the angle as 52° and then said that it was the same as the other 52° angle. The other problem was that many thought that the triangle was isosceles and they used this property to calculate both angle *x* and angle *y*.

(b) The calculation 180 – 52 was often done incorrectly. Many candidates used the property of isosceles triangles to calculate angle *y*. The answer of 89° was often seen from the third angle on the straight line. A few thought that there were 360° in a triangle.

4 **(a)** Many answers were seen including 6, from 1 +2 +3, 0, from ¯1 + ¯2 + 3, and also ¯1 and ¯2.

(b) The plotting was usually done well except the points at $x = ¯4$ and $x = 2$. Many curves were ruled and some had multiple lines joining two points.

(c) Some candidates tried to rearrange the equation and solve it using manipulative algebraic techniques. There were others who marked ¯2·7 on the diagram but read the value as ¯3·3.

5 **(a)** There was either a lack of geometrical equipment or a lack of knowledge in using such equipment. It was common practice to see a ruled line with one pair of supporting arcs above. This is not the correct method as these attempts probably needed the midpoint to be measured with a ruler.

(b) It was not always clear where the points T_1 and T_2 were meant to be, as some placed them in regions rather than as points. They were often placed along the line AB. Some drew an arc of radius 6 cm but they did not use it.

6 **(a)** A very common first step was $5x = 12 - A$. Some candidates put the operations in the wrong order so they wrote $x = \frac{A}{5} - 12$.

(b) It was very common to see only three or four terms. So $2x + 5$, $4x + 1x$ and $x^2 + 4/5$ were seen. It was very common to see 5 instead of 4. It was surprising to see $x + 4$ written as $4x$ and $x \times x$ written as $2x$.

7 Many found this question difficult. They would answer 17, the next term, or 29, the ninth term. Some gave the term-to-term rule +3 or $n + 3$. Those who knew that the rule started $3n$ ($3x$) then included +, -1 or -2 rather than +2.

Section B

8 There were many correct answers to this question. However the percentage was often worked out of 120 so $\frac{70}{120} \times 86$ was seen or 70% of 86 seen as a calculation. There were others who decided that the pass mark was either 50% or 86% and made their decision based on that figure.

9 It was quite common to see the squares added instead of subtracted. Instead of squaring some doubled each length. The square root was often omitted and very occasionally the simple subtraction 12·6 - 7·5 was attempted.

10 **(a)(i)** Many suggested that it was positive correlation and others did not use the correct term. Most used either the term weak or strong to describe it.

(ii) The line of best fit was not always ruled and it was often too low with almost all the plotted points above the line. Despite drawing a line, there were many who did not use it and they gave the answer as 7500. There were some who gave the answer incorrectly, eg 85 instead of 8500 and a few read the graph the wrong way round.

(b) A very common answer was 120/4 = 30 then an answer of 30 000 would be given. It was very surprising to see the number of correct methods which resulted in the wrong answer. It raised the suspicion that calculators were not always available. Some did not use the midpoints and settled on 13 000 etc or the end points of each group. Another method seen was adding the midpoints and dividing by 4.

11 It was expected that most candidates would use the unitary method and probably divide 612 by 36·4 first. They would have been greatly hindered by the lack of a calculator. Many attempted the halving method and many solutions were done by estimation. Simple solutions involved 16·8 – 15 or subtracting 960 - 612 and 64 - 36·4 and then dividing these answers. Some divided 960 by 64 without realising that not all this fuel will be used.

12 Many candidates did not appear to understand that only the integer values were required, even though this is a common question to set. A common answer was to write all the integers from $^{-}4$ to $^{+}8$. They failed to use the 2*n*. Some gave fractional answers, usually halves such as 2·5.

13 **(a)** The only real alternative answer was 3/22. Some attempted to convert their answer into a percentage. There were some candidates who still use incorrect symbols such as colon (:) or incorrect language such as 'in'.

(b) A common attempt was to calculate 560 ÷ 3. Many used their answer from part (a) and they were rewarded if their answer was correctly calculated. However there were many who gave 3/22 as their answer to part (a) and then to use 3/25 in this part. The attempts to divide 560 by 25 were sometimes shortened to give an answer of 22·4 and forgetting to multiply by 3. A calculator would have been helpful in this question.

14 The volume was often wrongly found by adding the three dimensions, giving 4 as the answer. They usually attempted to multiply 21·5 by 4 or divided 21·5 by 4. Some candidates attempted to work out the surface area of the six faces. A small number calculated the volume by cubing each dimension and then either adding or multiplying these numbers. A calculator would have been necessary in this question.

B278: Module M8

General Comments

Candidates performed better on B278 (mainly year 10) than on B248, the parallel paper. Most candidates attempted all questions and showed their method of solution. Simultaneous equations and fractions questions were well answered but questions involving descriptions or explanations were poorly answered. The moving averages question proved particularly challenging. Most candidates had sufficient time for both sections but there was some evidence that candidates spent excessive time using inefficient methods to solve the percentage problems and then were rushed at the end of the paper.

Comments on Individual Questions

Section A

1 **(a)** Most candidates answered this correctly. The only error was to rotate clockwise rather than anticlockwise.

(b) Candidates were slightly less successful in this part as sometimes the incorrect centre was used, either (0, 0) or (0, -3).

(c) Most candidates scored 1 mark for describing the move but only the more able candidates used the term translation and a vector.

2 **(a)** Most candidates scored at least one mark for this part but full marks were rare. The median was often correct but various errors arose with the IQR. Few candidates wrote down the lower and upper quartiles and so method marks could not be awarded when errors in subtraction or reading the scale led to wrong answers such as 36 000 from 40 000 – 14 000 and 28 000 from 40 000 – 12 000. A substantial number of candidates read from 30% and 70%.

(b) The majority of candidates correctly identified company A but explanations were frequently inadequate, often referring to the IQR or the range.

3 Many candidates failed to spot that they only needed to add the two equations to eliminate y. Those who attempted to eliminate x by multiplying then subtracting often made errors. Other common errors were $4y = 36$ and $2x = 36$.

4 Candidates who changed the mixed numbers into improper fractions were generally successful, although some errors when multiplying were evident. Those who chose to keep with the mixed numbers tended to be unable to cope with 5/20 – 12/20.

5 This question was poorly answered even by the best candidates. There was little evidence of reasoning being applied when choosing the correct equation. Many failed to correctly distinguish between the quadratic and cubic equation.

6 **(a)** The majority of candidates answered this correctly. Wrong answers included 6×10^{15} and 6^8.

(b) Candidates who wrote the numbers in ordinary form, added and then transferred to standard form generally scored at least 1 mark. Common wrong answers included 11×10^3, 11×10^5, 11×10^6 and $2{\cdot}4 \times 10^5$.

7 The wording of this question allowed candidates to 'shade in' or 'shade out'. However some candidates failed to label the region R and did not identify their boundaries. Some candidates were confused by the axes. The inequality $y \leq x + 1$ caused more problems than the other two.

8 About half the candidates chose the correct expression but many were unable to provide an adequate explanation. Many just stated that 3 letters were used.

Section B

9 (a) Over half of the candidates answered this correctly but many incorrectly assumed that ABDE was a square and so gave AE = $2x + 3$.

(b) The majority of candidates correctly rearranged the formula. Common first step errors included $8 - P = 7x$ and $P/7 = x + 8$.

10 Less than half the candidates answered this correctly and few scored part marks. Often candidates just increased £340 by 60%. Common incorrect answers were 544 from 340 × 1·6, 567 from 340/0·6 and 476 from 1·4 × 340.

11 (a) This was answered correctly by 3/4 of the candidates.

(b) Candidates were less successful in this part with many starting again, sometimes using trial and improvement or attempting to solve as a linear equation. Some of those who attempted to use the factors gave -3 and 2 as solutions, or just gave one of the correct solutions, generally 3.

12 About half the candidates gained full marks. Part marks were gained by candidates solving an equation rather than an inequality.

13 About half the candidates answered this correctly, including giving an integral answer. Most others scored a mark for multiplying by 1·14 but some used 3 or 5 years rather than 2 and weaker candidates multiplied by 1·56. Some candidates found 10% then 1% then 4% to find 14%. Invariably errors arose in their work and sometimes it was evident that these candidates had spent so long on this question that they had insufficient time to complete the paper.

14 Over half the candidates gained full marks for this question. Some others gained 1 mark by recognising that that needed to multiply the fractions but errors then arose.

15 (a) Few candidates scored the mark in this part. Many merely stated that the triangle was right angled. Those that recognised that they needed to involve a 'circle fact' rarely expressed it correctly. Inadequate comments included "tangent meets circle at 90 degrees."

(b) Most candidates recognised that they needed to use the tangent ratio but only about half gained full marks. Errors included tan B = 8/5 and tan 90 = 5/8.

(c) About half the candidates answered this correctly. Some failed to recognise that Pythagoras should be used and opted to use trigonometric ratios but errors inevitably arose.

16 This question was poorly answered. Many just read from the graph. Others performed calculations with moving averages from the graph, others realised they needed to use the temperatures 'around' the moving average but worked with 3 or 4 temperatures rather than the 7 required.

Grade Thresholds

General Certificate of Secondary Education
Mathematics C – Graduated Assessment (Specification Code J517)
March 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	a*	a	b	c	d	e	f	g	p	u
B272	Raw	50							37	20	12	0
	UMS	70							60	40	30	0
B273	Raw	50							30	15		0
	UMS	79							60	40		0
B274	Raw	50						37	22	13		0
	UMS	90						80	60	50		0
B275	Raw	50						27	12			0
	UMS	99						80	60			0
B276	Raw	50					28	13				0
	UMS	119					100	80				0
B277	Raw	50				25	12					0
	UMS	139				120	100					0
B278	Raw	50			29	14						0
	UMS	159			140	120						0

Notes
The above table shows the raw mark thresholds and the corresponding key uniform scores for each unit (module test) entered in the March 2008 session.

Raw marks in between grade boundaries are converted to uniform marks by a linear map. For example, 24 raw marks on unit B278 would score 133 UMS in this series.

The grade shown in the above table as ‘p’ indicates that the candidate has achieved at least the minimum raw mark necessary to access the uniform score scale for that unit but gained insufficient uniform marks to merit a grade ‘g’. This avoids having to award such candidates a ‘u’ grade. Grade ‘p’ can only be awarded to candidates on B271 (M1) and B272 (M2). It is not a valid grade within GCSE Mathematics and will not be awarded to candidates when they aggregate for the full GCSE (J517).

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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

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14 – 19 Qualifications (General)
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