GCSE

Mathematics C

General Certificate of Secondary Education **J517**

Report on the Units

January 2008

J517/MS/R/08J

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GCSE Mathematics C (J517)

REPORT ON THE UNITS

Chief Examiner's Report

General Comments

Centres, in particular examinations officers and heads of department, are to be congratulated on managing this January examination session, with three different sets of modules for the old and new specifications. OCR staff managed to assist in a preventative way by querying entries for a module such as 2335 which was not accompanied by an entry for a terminal paper and suggesting that B245 for J516 or B275 for J517 was the intended entry instead.

Centres should note that we will continue to have units for both J516 and J517 specifications for the next three 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 January was the first session for which J517 modules were available. There is more AO1 and more AO4 assessed on these units compared with J516 corresponding units. For the modules, the effect is that most pairs of modules have 47-48 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 first year of their GCSE course, entering for J517 modules. Some centres also take the opportunity in January to enter those in their second year for further modules – such candidates took the J516 modules. 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 January. It was also noticeable that there was a slight trend in centres entering their candidates for higher modules than in past years – for instance, entries for M1 and M2 were lower than past years, but entries for M7 and M8 were higher than past years (not that candidates previously entered for M1 would have been entered for M7, but this illustrates the knock-on effect up the series of modules).

B271: Module M1

General Comments

Most candidates were well prepared for the paper and attempted all questions. There was a wide spread of marks on the paper, with most marks in the range 10 to 45.
Most work was presented legibly although some candidates changed answers by overwriting rather than crossing out and replacing, causing difficulty in marking. Written work was of a reasonable standard but presentation of graphical work was weaker, with many candidates appearing to have no access to a ruler.
Many candidates failed to show working and so could not be awarded any available method marks. In questions requiring reasons, candidates need to try to give a complete mathematical reason.

Comments on Individual Questions

Section A

1 Candidates performed well on parts (a) and (c) but many omitted part (b) suggesting an inability to divide. Most candidates attempted to subtract in part (d) but frequently just subtracted the smaller digit from the larger in each column, leading to an answer of 43.

2 **(a)** Most candidates answered this correctly.

(b) The better candidates had no problem with this question; however a large number failed to read the question and used the incorrect number of adults and children. 36 was commonly seen as an answer probably from 2 adults and 2 children, but with no working seen, this failed to score. The weakest candidates just added the 12 and 6 together.

(c) Most candidates interpreted the scale correctly in (i). Fewer were correct in (i), with more omitting this part. Candidates found it harder to interpret the half symbol in (iii), with answers of 1½ common.

(d) Almost all could read the scale correctly in (i) although in (ii) most reasons were incomplete with candidates identifying that the bar for yes was the highest, but not mentioning that it was higher than the other two together.

3 **(a)** Most candidates could label the gates correctly. More had problems with (ii), with any of barracks, stables and store room appearing, as well as answers not relating to the diagram.

(b) This was a poorly answered question, with many attempts to subtract seen. Those who did add often misaligned the digits or misused carry figures.

4 This was generally well answered. Many candidates have been well trained to give both a quantity and direction in their reason.

5 **(a)** The better candidates understood how to round, but weaker candidates gave answers such as 500, 550 or 653.

(b) This was generally well done.

6 **(a)** Time was generally given in an acceptable format, although it was fairly common to see an answer of 9:30.

(b) There were a pleasing number of correct answers, with many candidates showing some working with 55 seen frequently. Some who had failed to get the time correct in (a) managed to follow through correctly.

Section B

7 **(a)** Candidates were more successful at identifying the octagon than the pentagon. The hexagon was often mistaken for the pentagon.

(b) Most candidates measured in centimetres, and there were many correct answers, although marks were sometimes awarded for showing the length of one side. Very few candidates attempted to find the area.

8 **(a)** This was rarely correct, with most candidates attempting to add the numbers. Very few method marks were awarded: those candidates who understood the question managed to get the right answer.

(b) Candidates struggled more with this question than they often do with questions of this type, with perhaps the context causing confusion. Some candidates gave only two more ways, and others attempted to introduce different strokes.

(c) Most candidates identified even numbers, although some omitted one or added extras. Multiples of 5 were usually seen in (ii), but 55 and 45 were common.

9 The first answer was usually correct, but few identified that vanilla was evens.

10 **(a)** Most attempted to divide the shape in columns rather than rows and 4 or 8 shaded squares were common.

(b) This was very poorly answered, with many candidates omitting it. Few candidates linked this with the diagram in (a).

11 Generally (a) and (b) were correct, with frequently several attempts at (b) seen. The most common answer for (c) was 5, from 10 ÷ 2.

12 Very few marks were awarded here, with many candidates omitting the question. Some attempts at using a conversion factor of 1cm = 100 mm were seen but there were also answers that appeared to be complete guesswork.

13 Most candidates got at least one line correct, usually the top one with the base line often one square too short. Many poor freehand drawings were seen.

14 Very few candidates reversed the coordinates, and those that had often plotted D correctly, indicating that they knew what a rectangle was. The area was found reasonably well, although a significant number omitted this part. Few candidates measured line AC in millimetres, with 6 or 7 as a common answer. Some candidates struggled to convert between centimetres and millimetres with answers such as 60.8 mm seen. There was some inaccuracy in measurement, with 70 mm seen as the answer, when the exact length of the line was 67 mm.

B272: Module M2

General Comments

The quality of candidates' performance appeared slightly worse than the previous January session. A wide spread of marks were seen in both sections of the paper, with candidates tending to do as well on Section A as on Section B, but with more variation in performance in Section B.

By and large the standard of presentation was acceptable. Number work was usually legible and handwriting readable. Nevertheless some handwriting was not easy to read as were the occasional sections of number work. Candidates should be advised not to overwrite incorrect answers as it is sometimes difficult to ascertain which is the correct answer, although whenever possible candidates are given the benefit of any reasonable doubt.

Candidates completed the paper within the time allowed and made a serious effort to show what they could achieve. There were comparatively few instances of questions not attempted: Q8 and Q12 were omitted most often, each with omission rates of about 10% overall. There were no consistently obvious instances of candidates misinterpreting the rubric; however the number of "acute right angles" given as answers to Q.1 (a) suggested a possible problem with candidates' perception of the diagram/question.

Overall, the best and worst answered questions were Q9 and Q11 respectively. Lower capability candidates as a group tended to do best on Q6 and worst on Q12. The group comprising the highest capability candidates found Q8 and Q9 the most accessible and Q.11 the least accessible.

Some candidates showed a weaker than expected command of some basic numeracy – including the more competent; for example fraction and decimal work (Q2(a)(ii) and (iii)), integer division (Q2(e)(i)) and conversion between metric measures (Q3(e)). The latter has been particularly evident in previous sessions.

Areas of content in which most candidates overall demonstrated good levels of success included: some instances of basic number work (Q1(d), Q2(a), Q4(b), Q9) , using maps (Q2(b)), and reading and interpreting tables, including pie charts (Q9, Q3(f)) .

In common with previous years there was some evidence that method marks were needlessly lost by lack of written evidence. Again as in previous years some candidates did not make use of calculators in Section B as evidenced by some rather involved pencil and paper methods, particularly noticeable in Q12.

Comments on Individual Questions

Section A

1 **(a)** A moderately well answered question, but a slightly higher facility might have been expected. Significant numbers of candidates were appeared confused by the right angle shown and gave that as an answer, or in many cases compound answers such as "right-angled acute" or "obtuse right angle".

(b) Reasonably well answered. A small but noticeable minority interpreted the question as one involving length estimation. There were a noticeable but small number of responses around the 80º to 100º region – perhaps indicative of some confusion as to which angle was required.

(c) Almost two thirds of candidates were successful. There was a fair smattering of comparatively recent dates between 1999 and 2007. Candidates showing working usually ended up with the correct answer, suggesting that a proportion of the wrong answers may well have been guesses. In a small but noticeable number of cases candidates mixed up the digits to answers of "3173".

(d) A part question accessible to most candidates. Most errors involved beginning with "one million" a result perhaps of assuming that the number must be very large.

2 **(a)(i)** A well answered question, with a variety of written methods in evidence including "doubling twice"

(ii) A relatively poorly answered question with over half the candidates failing to gain any credit. Partial credit was available to those who progressed no further than "220 ÷ 4" (as evidenced by "55" given as the answer).

(iii) Despite its very straight forward nature this question was very poorly answered, and about nine in ten candidates failed to gain any credit. Common errors, in order of frequency, were "3·4", "0·34" or "0·25"

(b)(i) A very accessible question.

(ii) A well answered question, with a facility similar to the previous part question.

(iii) Moderately well answered, but only about half as successfully as the two previous part questions. A noticeable number of candidates gave "Ormond Quay" as their answer suggesting that they had omitted to read the rest of the question. Other wrong answers included "Mary's Abbey" and "Strand St Great".

(c)(i) With only about one third of candidates gaining credit, this question was not quite as well answered as similar questions asked in previous series. A common wrong response was 1305, a result perhaps of misreading the question. Another common wrong answer was 1026.

(ii) A follow through was available from the previous part question. This resulted in a similar number of candidates gaining credit for this part.

3 **(a)** Almost a third of candidates gained partial credit for this question and a third full credit In some instances they experienced problems performing the operation "106 × 5" accurately; however partial credit was available in cases where there was a clear intention to do this. In other words clear intention to use the formula was rewarded.

(b) About two thirds of candidates gained at least some credit for this question. Most marks were lost by omitting the correct units to match the given number. However it was pleasing to note that the number of candidates attempting to use Imperial units was considerably smaller than in the past.

(c)(i) Only about one third experienced success and a large proportion (about 15%) failed to attempt this part question. Many candidates gave answers of “7” showing a tenuous grasp of place value.

(ii) The extent to which candidates experienced success or failure to in this part question closely mirrored the situation witnessed with the above part question.

(d)(i) As might have been predicted with part (d), taken as a whole, a significant proportion confused mean, mode, median and range. However partial credit was available in cases where there was evidence of an ordered list. There was no evidence that data presented in decimal rather than the more customary integer form made the question less accessible. Almost two thirds of candidates were successful in part (i)

(ii) The proportion of credit achieved by candidates was half that of the previous part question. A not uncommon response was “0·2 and 0·4” showing at least a partial understanding.

(e) This was the worst answered part question on the whole paper. Less than one tenth of candidates were successful and the question was not even attempted by about one fifth. Common answers, all indicative of poor understanding of conversion between metric units were “1·2”, “12” and “1200”. This straight forward type of question has attracted very low facilities on previous papers.

(f)(i) The most prevalent wrong answers were “others” and “Botswana”; the former attributable to merely naively reading the scale and the latter perhaps to simple carelessness resulting from a brief look at the pie chart. Nevertheless this part question had one of the highest facilities across all levels of capability.

(ii) About half of candidates were successful; “60” was a common wrong response, presumably because the ‘Russia’ sector coincided with this part of the pie chart scale.

Section B

4 (a)(i) Less than a half of candidates were successful. Most errors involved the incorrect use of decimals, although $\frac{2}{5}$ was not uncommon.

(ii) Similar levels of success, or slightly more, to the previous part question were observed in this part question. Some candidates may have been confused between pie charts C and D, as both might be said to show 25%.

(b) Almost a half of less capable and about three quarters of all candidates gained full credit.

5 Many candidates lost credit by assuming the shape to have lines of symmetry which were diagonal to it. In many cases correct answers were negated by the drawn diagonals. The facility for the question was less than a half.

6 About one third of all candidates experienced some success with this question.

7 (a) Most candidates gained some credit for giving the correct value for “Y”. A very common wrong answer for “Z” was “33”.

(b) In common with previous years a common attempt, which gained no credit, was "following the pattern" or similar. Other common wrong answers were "increases by 4" or "increases by 2". The least capable gained very little credit, whilst less than half of the most capable were successful.

8 Candidates tended to gain either full credit or none for this question, with almost two thirds gaining full credit. A popular wrong answer was "61".

9 Candidates showed a high level of success with the whole question, including some of the least capable. In their case success ranged from well over fifty percent, to forty percent in part (b) down to about 20% in the final part. A significant number gave "220" for (a) – walking but not uphill. In part (c) a common error was to calculate "90 + 65" without taking into account the number of hours.

10 **(a)** Found difficult by the least capable and with an omission rate of almost one in five candidates, performance on this question was a strong function of capability.

(b) This part question was less well answered than part (a). This was particularly the case with the more capable candidates.

11 Found difficult by all candidates, almost independent of capability. There was no obvious pattern or logic to the wrong responses. This suggested an element of guessing in the responses. Some, but by no means all, of the reason for the low facility may have been candidates' failure to realise that for symmetry purposed the cubes may be "cut in half". The bottom left-hand diagram caused the most problems.

12 Success on this question was a strong function of candidates' capability. Many candidates managed to show the "4096" somewhere in their working and gained credit for this. Nevertheless, about half of all candidates failed to gain any credit and only about one fifth full credit. There was some evidence that a number of candidates correctly chose "64" by either multiplying 32 by 2 (the other two numbers in the column) or by multiplying 16 by 4 (the numbers in the middle row). They would then, using similar reasoning, calculate 8 × 4 or 32 × 1 in order to give the other cell, incorrectly, as "32".

B273: Module M3

General Comments

The marks covered the full range with some extremely low marks and others with near maximum. This was seen in both parts A and B. Fewer candidates omitted questions. It did not appear that any candidate was short of time.

Candidates seemed to do better on the equation questions than in previous papers, but it was obvious that many were unaware of plans and how to draw a view of a shape; many just redrew what was given or attempted to draw a 3D version from another angle. Again, it was apparent that candidates were not fully aware of how to use a calculator when addition and then division was required, as in many cases it was evident that a set of values were added to the last number divided by the required value. Some candidates lost marks due to no working seen, especially on section B. Calculators did appear to be used in Section B.

Questions requiring a written explanation continue to cause candidates problems as the answers lack mathematical content or, in the case of nonsensical 'sunflower' heights in Q12, demonstrate an inability to estimate the height of a person and then use that to calculate an additional height.

The layout, literacy level and diagrams were appropriate and did not seem to cause any problems.

Comments on Individual Questions

Section A

1 **(a)** Usually correct but a common error was 19 (09:56 to 10:15).

(b) Rarely correct. Common wrong answers were 10:33 and 10:42, from adding 9 on each time. Occasionally an extra hour was added. Some follow through marks were picked up. Only a few failed to return to the diagram to complete the question.

2 **(a)** Very few candidates got this correct, only the stronger ones. The most common answer was 4 rather than 11

(b) Mainly correct, with partial credit often gained.

3 **(a)** 24/40 was seen often but only a few cancelled fractions were seen. 24/16 and 23/40 were common errors, or 24 on its own, not as a fraction.

(b) Poorly done, considering the numbers were straightforward. One mark was picked up for 5 occasionally, but some unrelated answers and non-attempts were seen. 24 was seen regularly. The better candidates managed this question.

(c) Candidates usually scored 2 or 0. One half or 20 as the answer were the most common errors.

4 **(a)** Quite a few correct answers were seen without any working.

(b) Again many correct answers, but not done as well as (a).

5 **(a)** Generally correct, but 8, 800, 0·8 and 0·008 seen often.

(b) 0·56 was a common error. The inability to do 7 × 8 correctly caused some problems.

(c) Usually well done but common errors were 100 and 0·42.

(d) Poorly done. 5 and 7 were sometimes seen, or × 0·6.

6 **(a)** Full marks were rare. Most candidates used a ruler. A common error was drawing one side a square short.

(b) Inaccurate measuring led to 70 or 60 as the most common answer from a correct diagram. The inability to do a correct conversion was seen, with answers of 60·7 and 60·8

7 **(a)** This was correct on less than half of occasions. 16 or 35 were seen often

(b) Very badly done, with many vague explanations. The word “frequency” was rarely used. “Add bars” or “add numbers” was often given as explanation

Section B

8 Good attempts. 1mark picked up if not 2 (usually for B with D or C).
Some gave answers on the diagrams not the answer line.

9 **(a)** Usually correct; the most common error was 12.

(b) Mainly correct. The wrong answers occurring most were 12 and 13 or 14 and 15.

(c) Correct by about half; 46 was the most common error.

10 **(a)** Mixed response. Sometimes the range was given for the mean and vice versa. Some candidates lost marks for failing to show method when they had answers only, eg 22·8. Several candidates multiplied by 10 instead of dividing. Some gave an answer of 23 from an ordered list. 229 was seen regularly with no attempt to divide by anything.

(b) Correct answer rarely seen; some candidates put down answers of 18 – 32 or 32 – 18, or 21.

(c)(i) Correct by about half. Some candidates drew 2 unlabelled arrows.

(ii) 8/12 was the most common error. 8/20 was the most common answer but was sometimes given as a percentage.

11 **(a)** Well answered.

(b) C was the most popular answer, but this question was poorly done.

(c) 2 marks were scored only occasionally. Many 3D diagrams and assorted versions of the diagram given in (b) were seen.

12 **(a)** Almost always correct.

(b) Good, but most common wrong answer was 10.

(c) Mixed. 15, 54, and 21 often seen. It was interesting that some of the weaker candidates managed to get this correct.

13 2 marks were not awarded often. Many scored 1 mark for the person's height but were then not able to use this to estimate the sunflower: 'Just a bit added on' was a common response. Many stated imperial units as though they were metric e.g. Ken is 5·8m. When both parts were correct then the explanations were good. The better candidates did well on this.

14 **(a)(i)** Well answered by the stronger candidates and many correct answers were seen, but 343 or 539 were common errors.

(ii) Weaker candidates did better on (b) than (a). 2/7 (0·285714) as a decimal was seen often.

(b) Usually well done, but a lack of calculator skills resulted in 73·75 seen regularly. Working was often not seen and candidates lost marks.

B274: Module M4

General Comments

Most candidates were well prepared and they found Section A easier. However many candidates did not have the use of a calculator in Section B and this reduced the marks that they could achieve. It was clear that many candidates did not read the questions carefully and many did not show all their working.
Almost all candidates attempted the majority of questions so time did not appear to be a problem.

Comments on Individual Questions

Section A

1 A common error was to write 3/10 as 3, 3·0 or 0·03. The second part engendered all permutations of 3 and 9 like 39%, 3·9 or 3/9, and both as fractions and decimals. The nearest answer of 39/10 was all too common.

2 **(a)(i)** It was quite common for answers to be ‘add 3’ or ‘subtract 4’ which included the counting of the numbers not the gaps.

(ii) The answers often showed the previous two numbers, 17 and 20.

(b) Many subtracted two in getting 4 and 2. Those who divided had problems with 3 divided by 2, often writing 1 r1.

3 **(a)** Many confused multiple and factor so 5 and 36 were often seen. It was also common to see partly correct answers like 5 and 9 or 40 and 36.

(b) The answers seen were usually satisfying one of the conditions but not both, so 10, 18 or 27 were typical answers given.

4 **(a)** This was usually answered very well, the main error was to multiply by 2 rather than divide by 2 so giving an answer of 150.

(b) The usual method was to multiply by 20 which many found difficult. Those who did multiply by 5 had problems with 450; the other two numbers were usually multiplied correctly.

(c) As in (b) many tried to multiply 450 by 12. Some achieved the figure 1350 but interpreted it incorrectly and stated that there was 150g left over.

5 **(a)** This was answered very well; the only alternatives were 37 and 32·5.

(b) Candidates found a variety of ways to answer this correctly, including ‘stopped’, ‘stayed’, ‘rested’ and ‘had a break’. Many correctly responded ‘stayed at the same depth’. A small number of responses stated ‘went straight’ indicating that they had not interpreted the graph correctly.

(c) The main error was to give an answer of 6 or 6·8 by misreading the vertical axis.

6 **(a)** This was answered well except by those who reflected it in the *y*-axis.

(b)(i) There were occasions when the coordinates were reversed.

(ii) B was usually plotted correctly even when part (i) was incorrect. If it was plotted incorrectly it was plotted at ($^-1$, $^-4$).

(iii) Most triangles plotted were not right-angled. Some candidates did not mark their intended point C on the graph so it was difficult to award the second mark in these cases.

7 The main error was not to add together the three numbers to get the total number of chocolates. A common answer was 6/8, which cancels down to 3/4. There were far too many candidates who failed to understand the need to give information to justify their statements. This means that some answers were correct but insufficient for full marks, for example ‘a quarter of all the chocolates are white’ or ‘there are 24 chocolates and 6 are white’.

Section B

8 (a) Some candidates confused rotational and reflective symmetry, so A and D were often answered ‘No’ and C ‘Yes’.

(b) The two shapes with order 2 proved difficult to find but many answered the second part better, giving D as the answer. Some thought they had to name shapes which had these properties and they did not refer to part (a).

9 (a) Most candidates could not get this part correct. Common answers were 6000, 6·000, 0·06 or 0·0006.

(b) The common misunderstanding was that the longer a number is, the larger it is, and thus 0·024 was often written as the largest number. Many put 0·42 as the middle value.

10 (a) Most candidates attempted to subtract 84 and 153 from 360 and, despite the availability of calculators, many did not get the correct answer. It seems that many candidates did not have the use of a calculator.

(b) The usual attempt was to subtract 37 from either 180 or 360 and to ignore the right-angle.

(c) As in part (b), many subtracted 55 from 180 or 360, ignoring the third angle. Many did not appreciate the properties of an isosceles triangle.

11 Many candidates simply added the three prices together without multiplying by the quantities, 4 or 2·5. It was obvious from the attempts at the addition that many candidates did not have the use of a calculator. In calculating the instalments some halved and halved again. The working was not always clearly structured and a sequence of numbers was all that could be seen.

12 (a)(i) Errors in this question predictably arose because candidates did not remember the meaning of the mathematical language employed. Some candidates gave the highest and lowest numbers without subtracting them, whilst others worked out the mean, or gave the total 153.

(ii) Those that worked out the mean in (i) found the median in part (ii). It was also common to see the correct working but the wrong answer, even though candidates could have used a calculator.

(b) Most read the height of the bar for 17, ignoring 18, 19 and 20.

(c) The best answers compared the means and the ranges. Some compared the mean only. The weakest answers described the distribution through the week, misinterpreting the seven bars of the bar chart as representing the days of the week.

13 **(a)** Most correct answers included the multiplication sign. Some could not write an expression so they gave a numeric answer.

(b) As in part (a), many had to write a subject for their expression thus making this more difficult. They would often choose *n* as the subject. There was some confusion between the use of the letters *n* and *m*, for muffins. Other candidates wrote 10 – 5 = 5 and gave a numeric answer, usually 5.

B275: Module M5

General Comments

A balanced range of scores was seen from candidates for this paper, and they were able to complete each section in the available time.

Working out was often lacking, especially with the volume and mean questions and the equations. When questions were missed out, it was often all the algebra questions.

Comments on Individual Questions

Section A

1 **(a)** Many candidates correctly found the square root of 36, with 18 being a common error, as expected.

(b) Many candidates correctly found the cube of 4, with 12 being a common error, as expected.

2 **(a)** Most candidates gained something here but many did not have any particular pattern to their generation of results, making it harder to avoid repetition or omission. Those who followed a logical system usually gained full marks. Some seemed to think that order did not matter and a few omitted DD, CC and RR.

(b) Many candidates knew how to write probability and gave the correct or follow-through correct answer here. A few incorrectly used repeats. A number took each individual choice to be two choices, for example DD taken as 2 choices.

3 **(a)** Drawing the net of the cuboid was poor in many cases. Commonly the 4 by 3 rectangle was missing or two rectangles of each sized face were not used. Sometimes the correct rectangles were shown in the wrong positions. Nets for a 4 by 3 by 3 cuboid were fairly common and a number drew 3D views. Many nets were drawn freehand. However, good candidates often answered correctly.

(b) There were many correct answers, but when the answer was wrong candidates usually lost the method mark as the working was missing. Common errors were to add lengths or to attempt finding the surface area.

4 **(a)** Many candidates simplified the fraction correctly but a very common error was 5/8, perhaps from subtracting 10 from both numerator and denominator rather than from thinking that $3 \times 8 = 18$.

(b) Those who knew how to multiply fractions often reached 2/12 but it was frequently not reduced to the simplest form. Those who attempted a common denominator method usually made calculation errors and failed to gain any marks. 3/7 and 3/12, and to a lesser extent 11/12, were common errors. Many of the weaker candidates had no idea how to proceed.

5 **(a)** A large number of candidates had this correct with some adding several extra lines to form quite novel order 2 diagrams. Some candidates, as expected, confused line & rotation symmetry.

(b) Some candidates confused octagon or hexagon with pentagon. Some clearly did not know what 'order of rotational symmetry' meant.

(c) Many candidates answered correctly but some confused anticlockwise with clockwise. There were many permutations of direction and angle, with 180° and 45° appearing frequently.

6 **(a)** The better candidates correctly rounded to one significant figure, but many of the weaker candidates did not know what to do, with 21 000 and 22 000 being common errors.

(b) Candidates were more confident in rounding to one decimal place, and many correct answers were seen. Common errors included 27·40 or giving the answer 273·6 (i.e. moving the decimal point in 27·36 so that there was one decimal place).

(c) Acceptable roundings of the given numbers were seen very often. Usually the multiplication was attempted but this often failed due to the wrong number of zeroes or dots/commas in the wrong places. A small number of candidates attempted the exact calculation, with some rounding their answer afterwards.

7 **(a)** Most candidates scored at least one mark on this question for obtaining 4·2, 8·6 or 6·4. Some candidates multiplied the whole numbers by two but not the decimals, leading to an answer of 12·4; others added 2 to the length and width instead of multiplying them by 2.

(b) Many of the stronger candidates completed the table with the correct values in part (i), and the majority of them followed this by a correct line in part (ii), although some plotted points but made no attempt to join them. A few joined points with a freehand line. 1, 3, 5 was a very common error followed by a straight line. Less common was 1, 3, 7 with no attempt at correction when the line obtained was not straight. Weaker candidates often did not know what to do in this question.

Sometimes only the point (2, $^{-}1$) was plotted, using data from the equation of the line, $y = 2x - 1$.

Section B

8 **(a)** Many candidates failed to show enough/any working, so that method marks were awarded less often than examiners would like. Many were very confused as to what was required, often giving the median instead of the mean. Some calculated the range using the first and last values in the list.

(b) Many thought they had to justify their answer using both the mean and the range. A few added the mean and range together before attempting to compare.

(c) This probability was usually correct.

9 **(a)** Many gave a correct answer, whilst some gained partial credit for showing their measurement, usually 5·5 cm. A few measured the total distance on the diagram from N to A to B.

(b) There were many correct answers, but a considerable number of candidates did not use their protractor accurately enough, with 120° being a common answer. Others did not know which way bearings are measured.

(c) Those who knew about bearings often gained the mark, but many did not appreciate that bearings measure clockwise, so that

10 This whole question was a good source of easy marks for strong candidates but some weaker candidates struggled with it and frequently omitted it.

(a)(i) This was generally correct.

(ii) A large number of candidates gained only one mark with 5*a* +/- 5*b*, and 5*a* 3*b*, as common errors, with 8*ab* also seen reasonably frequently.

(b)(i) There were many correct answers to this simple equation, some answers being embedded.

(ii) There was often no formal working shown so few gained a method mark when the answer was wrong. Giving an answer of 16 was the most common error.

11 **(a)** Candidates were obviously not familiar with the properties of a rhombus. Full marks were seldom achieved. Some candidates had the completely opposite answers – perhaps they were thinking about a different quadrilateral such as an isosceles trapezium, but they may simply have been guessing.

(b) Most candidates earned the mark here. A few candidates produced very accurate ruled kites. The majority drew freehand kites for their sketch. The line symmetry was a problem for many and led to borderline diagrams looking more like a trapezium or rhombus. A number added the kite tails.

12 **(a)** A number of candidates showed no working and simply wrote ‘Sheila 6’, which gained one mark. Frequently there were a ‘48’, a ‘54’ and the correct answer with nothing else. Those who showed working often coped well with the method and scored highly. Some attempted to simply compare the 60 and 120 minutes or the 2/5 and 90%. A significant number calculated both from the same time total. Those who could not do this question sometimes had a lot of figures and spurious percentages scattered over their papers.

(b) Those who did well in part (a) tended to gain the mark in this question, which tested a different aspect of percentages.

B276: Module M6

General Comments

Responses to this module covered the entire mark range. There were some very pleasing scripts with many candidates showing all working out. There were still a significant number of candidates who lost marks as they failed to show any working, on either Section.

Several candidates appeared not to have been entered for the correct module, as they failed to attempt several of the questions.

Many lost marks on the non-calculator paper because they were unable to handle simple calculations. Candidates generally answered graph questions well, but did less well on questions which related to the 'real world' involving, for example money and area.

Some candidates did not have access to a calculator in Section B.

Comments on Individual Questions

Section A

1 **(a)** Most candidates scored at least 1 mark. A common error was to misread the scale. Others started the line at the correct point, but stopped when it touched the curve.

(b) This was generally correct. A small number of candidates read off the time rather than the distance.

2 Most candidates were able to calculate the cost of 2kg of beans, although £2·40 was a common error. Many were unable to calculate the cost of 2·4kg. A common error to find 0·4kg was to divide £1·70 by 4. Those who tried to use traditional or grid multiplication often made errors. A large number of candidates found the cost of 0·5kg and either used this or subtracted a random amount in an effort to find 0·4kg. A few lost marks as they did not subtract their total from £5.

3 **(a)** Well answered by the majority of candidates. The most common error was to reflect in the *y*-axis.

(b) Not answered as well as part (a). Some candidates translated the wrong rectangle.

(c)(i) Weaker candidates found this difficult. Common incorrect answers were 6 and 9.

(ii) Very poorly answered, with few correct answers seen. A common incorrect answer was (4,5).

4 **(a)** Most candidates scored at least 1 mark. Several did not label the scale on the *y*-axis. The vertical heights were generally correctly plotted, although a small number of candidates made it difficult by using a scale of 5 squares to represent 4 cars. Several candidates who chose to draw a frequency polygon did not plot the heights at the midpoints and a smaller number did not join the points with a straight line.

(b) Generally well answered. A common error was to write 39 or 42·5.

(c)(i) The majority of candidates who realised they needed to use 12 and 80 did use them as a fraction; only a small number used the wrong form. A common incorrect answer was 12.

(c)(ii) Those candidates who had correctly answered part (c)(i) usually also got this correct. Of those who did not, many scored 1 mark for the use of 11.

5 Many candidates scored at least 1 mark. Common errors were to add, or to invert the second fraction, 8/20 being a common error.

6 **(a)** Many candidates scored 1 mark for $2x = 19$. Common incorrect answers were 8·5 and 9·1 as candidates were unable to divide correctly. A common error in the working was $2x = 5$.

(b) Candidates found this equation more difficult, although many scored 1 mark for a correct first step. It was quite common to see $5x + 10$ without an equal sign. Several failed to deal correctly with the negative signs; $9x = 16$ or a final answer of 2 were often seen. Where candidates showed clear steps for a method they were more likely to achieve full marks on this question. Those who tried to use trial and improvement were rarely successful.

Section B

7 Generally well answered. Common errors included not entering the numbers into their calculators with brackets, and also failing to round the answer to 1 decimal place.

8 **(a)** Many acceptable lines were seen. It was pleasing to see very few zigzags joining all the points.

(b) The majority of candidates were able to use their lines to give an acceptable estimate.

(c) Many candidates scored this mark. Of those who did, there was an equal balance of real life reasons eg "it may be in poor condition", with statistical reasons "it's only an estimate". Of those who did not score the mark, many failed to realise the question related to a car which had done 8000 miles.

9 **(a)** Common incorrect answers were 2,4,6,8 or 6,4,2,0.

(b) Most candidates plotted the points from their table. Weaker candidates had failed to realise the points should be on a straight line. Others changed the point (2, 4) which was given. A small number tried to plot values for y above 10. Some of the candidates who had the correct points in the table lost the second mark for failing to join the points.

10 Many candidates scored full marks. Of those who were not successful many managed to score at least 1 mark. Several candidates used non calculator methods often being unable to get further than 400 m^2.

11 **(a)** Many correct answers were seen. The majority scored 1 mark for a ratio not in the simplest form. A common error by weaker candidates was to fail to show any working.

(b) Better candidates scored full marks. 84 was a common answer as many candidates had divided by 5 rather than 6.

12 **(a)** Although the formula for a trapezium is given many did not use it. Adding or multiplying all the values was commonly seen. Candidates who split the shape into a rectangle and a triangle often omitted to halve the base of the triangle. Although several candidates scored the mark for cm^2, it was common to see cm, no units and in a small number of cases cm^3.

(b) This was well answered by a large number of candidates. Common errors were to use 60 or 240 or find the area.

13 Better candidates often scored all 5 marks. A significant number gave the answer as 104° as they thought 76° and angle *x*, or (B) 52°+(C) 52° + angle *x* made a straight line. Others stated that AB and AC were parallel. It was pleasing to see that many candidates had shown working; of these several got at least as far as angle B and C being 52°.A small number of candidates stated the need to subtract from 180°, but failed to give the reason why.

B277: Module M7

General Comments

The paper proved to be accessible and candidates did particularly well in the questions on prime factorisation, correlation, percentage reduction, ratio and the construction.
There was a wide range of ability demonstrated, with some candidates gaining full marks, or nearly so, but some weaker candidates being clearly unfamiliar with much of the content for this module, and attempting very few of the questions.
Topics where candidates showed weak understanding included writing an equation, writing a time in decimal form for a speed calculation and solving inequalities.
Candidates' explanations were weak, tending in the angle question to show calculations without giving a justification, and in the probability question omitting evidence for their choice.
All candidates had time to complete the two sections of the paper

Comments on Individual Questions

Section A

1 Most candidates recognised that they needed to round the numbers in order to estimate the answer, but many ignored the requirement to round to one significant figure. As a result few gained full marks but almost all gained 1 mark.

2 **(a)** Expanding the brackets was relatively successful but many then simplified incorrectly, reaching either $7x – 2$ or $7x + 10$. Weaker candidates tended to record $3x – 2 + 4x - 1$.

(b) About half the candidates were able to expand the brackets but sometimes, having correctly reached $x^2 + 4x +5x$, gave +9 rather than the correct +20. Weaker candidates gave answers of $x^2 + 9$, $x^2 + 20$, $x + 4 + x + 5$, or $2x + 4x + 5x + 9/20$.

3 **(a)** Many candidates gave the correct answer of 70º but only the most able gave the correct reason, alternate angles. Some stated the angles were corresponding or opposite.
A few assumed the triangle was isosceles and gave an answer of 65º.

(b) Similarly, many candidates gave an answer of 60º but were unable to give an acceptable explanation. Many just showed calculations and some used incorrect terms. Better candidates who appeared to understand what was required, failed to score the explanation marks because they did not identify the angle to which they were referring. Three-letter notation for identification of angles was, disappointingly, rarely seen.

4 **(a)(i)** Candidates were generally successful on this part. Some candidates found the wrong total but then subtracted from 1 correctly.

(ii) This part was generally correct.

(b) Although most candidates recognised that Mary's dice was more likely to show a 5, many failed to score because they did not support their decision with numerical probabilities. Some simply said that every number on a fair dice has an equal chance of coming up. Some who tried to give probabilities neglected to write both as fractions or both as decimals and so failed to make a comparison. Of those who tried to write 1/6 as a decimal it was common to see 0·15.

5 **(a)** Most candidates were successful in this part. The most common error was to evaluate 3^3 as 9 not 27.

(b) Candidates were generally successful in this part. The most common error was to fail to write the answer as a product. Often the factors were listed or added.

(c) Those candidates who were successful in part (b) compared the products for 540 and 240 and then generally reached 60 or $2^2 \times 3 \times 5$. Those candidates who attempted to list the factors were generally less successful. Some candidates listed multiples rather than fact

6 Many candidates gained 1 mark for $^{-}6$ but many evaluated $4x^2$ as 144 or $^{-}36$ rather than the correct 36.

7 This question was well answered with almost all candidates identifying the correct statement for 2 diagrams and most for all three diagrams.

Section B

8 This question was well answered although some candidates found the reduction rather than the reduced price. Some candidates chose to use a non-calculator method but generally errors arose after 10% and 1% were found.

9 **(a)** Generally only the more able candidates scored in this part. Many candidates listed the terms as an addition but failed to equate to 360. Some thought that they had to start with $x = ...$ and so struggled to complete the equation.

(b) Many candidates restarted in this part and generally scored full marks. Some had simplified in (a) to $7x - 10 = 360$, $7x + 30 = 360$ or $6x + 10 = 360$ and then found part (b) more difficult.
Generally candidates followed through from x to evaluate $3x$ but some identified $2x + 20$ as the largest angle.

10 The majority of candidates answered this correctly. The most common error was to calculate $200 \div 14$ and then multiply by 3.

11 Most candidates found the correct distance and time, although a few calculated $4 - 2{\cdot}15 = 1{\cdot}85$ then changed this to 2 hours 25 minutes. Most recognised the need to find speed by distance ÷ time but only the ablest recognised that they needed to write the time as a decimal. Division by 1·45 and 105 was common.

12 Most candidates recognised the term perpendicular bisector. Some drew freehand lines but many accurate constructions were seen.

13 **(a)** Candidates had difficulty with the denominator in the inequality and a significant number wrote $3x/5 < 2$ or $15x + 10 < 20$. A common incorrect answer, with little method evident, was $x < 4$. Some solved the inequality as an equation and then gave an answer of $x = 6$.

(b) Only the ablest candidates scored in this part. A significant number of those who had recorded an inequality in a) then marked a point in b) or drew a line that stopped at zero.

14 This was often well answered, even by some weaker candidates. Errors tended to arise from incorrectly adding their *fx*, sometimes through misreading their values. A common error demonstrated was to add the midpoints and then divide by 6.

15 Many candidates failed to recognise the need to use Pythagoras' theorem and simply wrote 15cm. Those candidates who used Pythagoras' theorem were generally able to apply it correctly although a few multiplied, rather than added, 15^2 and 15^2.

B278: Module M8

General Comments

There were many high-scoring candidates on this module and although a few found the content challenging in parts, they were generally correctly entered at this level. The questions on probability, adding mixed numbers and similarity were particularly well answered. More challenging topics appeared to be standard form, regions and inequalities and trigonometry.

All candidates had time to complete the two sections of the paper and where questions were left unanswered it was owing to difficulty with the content.

Comments on Individual Questions

Section A

1 **(a)** The tree diagram was correctly completed by virtually all candidates.

(b) For many this part also proved straightforward with the correct method showing the product of 7/10 and 3/10 being written in working. Some were then unable to evaluate this product accurately and answers such as 2·1 were seen. A common error was to add the two fractions. Virtually all candidates used the correct notation for probability

2 **(a)** There were many excellent answers showing both steps of the rearrangement clearly in working. A few went on to incorrectly cancel the correct answer and there were occasional sign errors when moving terms.

(b) Generally well answered with the most common approach to subtract 5 from both sides before multiplying by 3. Those that made errors often multiplied by 3 as their first step but left out the 5 value in doing this and then went on to give an answer of 1. A number of candidates gave answers of $^{-}1$ despite having started correctly with $x/3 = {}^{-}3$.

(c) This was also well answered. Some lost the inequality sign, replacing with an equals sign. Others, having shown a fully correct method, made a numeric error in dividing 9 by 6. Answers including 1·3 were surprisingly common. Trial and improvement was unsuccessfully used by the weaker students.

3 Many selected the correct expression, although fewer were able to justify fully their decision. Candidates often mentioned that the expression contained a squared term but this was insufficient. The better answers referred to both terms in the expression as having two dimensions.

4 This was well answered and many candidates were well prepared for fractions. Some showed clear working and dealt with the whole numbers separately to the fractions, a few gave answers such as $6\ ^{23}/_{20}$ and did not fully simplify. Some worked with improper fractions and left answers such as 143/20, while a number made errors when trying to convert this improper fraction to a mixed number. Some made arithmetic errors within an otherwise correct method.

5 There was a full range of answers to this question. The more successful candidates showed clear working on the grid by first rotating and then translating the original triangle before giving a **full** description of the single transformation. Others gave a partial description and omitted key information such as the centre of rotation or gave more than one transformation such as rotation followed by translation. Describing the transformation as a reflection was also a common error.
For those that struggled with this question, it appeared that interpreting the distance and direction of the translation was the issue and a few showed no working at all on the grid thus not allowing part marks to be awarded where their description was incorrect.

6 **(a)** Many candidates appeared to be unfamiliar with the conventions of standard form and answers such as 365×10^3, $3{\cdot}65 \times 10^3$ and 365×10^{-3} were common. Others did not use the correct notation for standard form.

(b) Many were unable to tackle this calculation and a common approach was to convert the standard form values to decimal numbers before multiplying. This proved very unsuccessful and the alternate approach - combining the powers of 10 separately to the numbers - proved more successful. Fully correct answers were not common, however, and 1200, 12×10^2 were often seen. Some candidates appeared to add the two values.

7 **(a)** There were a full range of answers to this part. Many were well prepared and had little difficulty in identifying the correct factors with the correct signs. Others made sign errors or picked incorrect factors of 15. A number did not link the quadratic expression given to a double bracket factorisation, however.

(b) Those that answered part (a) well were successful in this part. A few thought that only one solution was required and eliminated the negative root. Some ignored the word 'Hence' and restarted the problem.

Section B

8 **(a)** There were many excellent answers showing clear method of using the two multipliers 0·75 and 0·8 for this two stage reduction, some gave answers of 60% however and did not consider the reduction. Most worked with the value £360 and calculated intermediate values before the attempting the final percentage and a number of these candidates did not complete the calculation but earned some credit for showing partial percentage reductions.
Weaker candidates gave answers such as 45% by adding 20% and 25% and some used multipliers of 1·25 and 1·2.

(b) Many were successful with the reverse percentage, but a number did not recognise this from the wording of the question and calculated a 10% reduction (or increase) of £36·30.

9 **(a)** Mixed responses with errors including (0, 4), (0, 2), ($^-2$, 0) and (4, $^-2$) as answers.

(b) Many were more successful in this part and understood that the gradient was the coefficient of the *x* term. Answers of 4*x* were sometimes given however as well as those that gave the gradient as the constant term $^-2$.

(c) Those answering part (b) well almost always gave a correct equation here. Those that did not find the gradient of 4, however, were unable to make the correct link to the parallel property required.

10 **(a)** There were many very good, clearly drawn, accurate box plots scoring both marks. The example ensured that almost all tried to draw a box plot of the correct form. Some struggled in interpreting the horizontal scale, where one squares was worth two marks. Others found the positioning of the median and quartiles difficult and there was some confusion over these terms where, for example, the median was drawn in the upper quartile position.

(b) There were some excellent comparisons involving the interpretation of the median and the interquartile range. Some however made no interpretation of these terms and simply compared actual values.

11 **(a)** This was generally well answered with both moving averages calculated correctly. For those that made errors it was often unclear as to which values had been used. Some, having calculated 16000 for the first average, gave 16500 as the second average, presumably from a perceived 'pattern'.

(b) Many thought that the explanation was trivial, when in fact reference had to be made to the constantly increasing nature of the moving averages. It was important for candidates to use the correct terminology and not just refer to values or the first and last moving average. Many were successful but there were a large number of vague and incomplete statements.

12 In this question, the equations of two boundary lines were given and many were able to give one of the two inequalities as $y \leq 3 - x$. The non-inclusive inequality, $<$, was also accepted. The other inequality was less frequently correct and $y \geq 0$ was the most common error. For a number of candidates, this topic appeared unfamiliar and omissions were common.

13 This question certainly differentiated achievement and the more able had few difficulties in applying trigonometry to the problem, although some overlooked the degree of accuracy required in the answer where two or three significant figures was acceptable. A number recognised that trigonometry should be used but were less well practiced in applying it, and there were many errors in selecting the most appropriate trigonometric ratio to find the height. Others recognised that tangent should be used but were unable to set up a correct statement and errors such as tan 48 = h/25 or tan 25 = 48/h were common.
A few used their own non-trigonometric methodology and attempted to combine 25 and 48 in a variety of incorrect ways.

14 This was generally very well answered and most linked the term similarity with enlargement and gave a scale factor of 1·75 or equivalent, followed by the correct product. Some found their own incorrect connection between the corresponding lengths, such as 8 multiplied by two and then take two would give 14, and so applying this to DE gave a length of 10 for AB.
A few mistakenly attempted Pythagoras' theorem or even trigonometric calculations.

Grade Thresholds

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

Unit Threshold Marks

Unit		Maximum Mark	a*	a	b	c	d	e	f	g	p	u
B271	Raw	50								30	15	0
	UMS	59								40	20	0
B272	Raw	50							35	20	12	0
	UMS	70							60	40	30	0
B273	Raw	50							25	13		0
	UMS	79							60	40		0
B274	Raw	50						39	23	14		0
	UMS	90						80	60	50		0
B275	Raw	50						30	14			0
	UMS	99						80	60			0
B276	Raw	50					28	13				0
	UMS	119					100	80				0
B277	Raw	50				26	13					0
	UMS	139				120	100					0
B278	Raw	50			31	15						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 January 2008 session.

Raw marks in between grade boundaries are converted to uniform marks by a linear map. For example, 23 raw marks on unit B278 would score 130 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.

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