GCSE

Mathematics B (MEI) (Two Tier)

General Certificate of Secondary Education **GCSE J519**

Report on the Units

January 2009

J519/MS/R/09J

Oxford Cambridge and RSA Examinations

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

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

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General Certificate of Secondary Education

Mathematics B (MEI) (Two Tier) (J519)

REPORTS ON THE UNITS

B291 Foundation Paper 1

General Comments

This is the modular paper for the Foundation tier of the MEI specification. Section A is non-calculator. Candidates appeared to have plenty of time on both sections. Questions 7, 8b and 16b were common, all or in part, with questions 4, 2 and 10 of Paper 3.

Comments on Individual Questions

1 This question was generally well done. There were some problems in finding the magazine value in part (c). Many sensible comments about accuracy and ease of reading values were made in part (d)

2 Perimeter and area were frequently interchanged in (a). Rather than counting squares, or using formulae, many candidates attempted to multiply dimensions in part (b). Similarly in part (c) there was a tendency to multiply, thus finding the volume of the cuboid which would contain the given shape.

3 This question was done well, with clear labelling of the bars on the chart, and many thoughtful comments.

4 Parts (a) – (c) were well done. The answers to (d) were often reversed, and there was mixed success in placing the brackets in (e).

5 The coordinates were usually correct, but many drew a point on $y = 3$, or a vertical or sloping line.

6 Most candidates earned at least one mark, either for measuring accurately or for multiplying by 2, and many found the correct answer.

7 Many candidates got part of the way to the final answer, but were let down by their lack of arithmetical skills. A common error was to attempt to add the fractions.

8 (a) This was fairly well done, the final mark often lost through failure to divide correctly by 2.
(b) Those who multiplied correctly (and those who didn't) often attempted to combine the two terms.
(c) Part (i) was very well done, but m^4 was very common in (ii).

9 Most candidates' measuring was good and many candidates managed to name the cuboid, though with interesting spellings. Rectangle was a common wrong answer. Ability to identify the correct vertices and side was patchy.

10 Generally well done, though some errors of the "$\frac{1}{4}$ = 0.4" and "0.03 = $\frac{3}{10}$ or $\frac{1}{3}$" type occurred.

11 Many candidates explained quite well, though few mentioned factors or multiples of two. Some thought the n was the second digit in the number, and some really just repeated the question, especially in part (b).

12 Most candidates had some idea how to tackle this, though some confused feet and metres, and some had rather tall men, such as ten metres. A few just did some sort of conversion, along the lines of " 8cm = 80 (or 800) metres".

13 The usual errors were seen, with 5a (with a = 3) being evaluated as 8 or 53.

14 Many correct answers were seen, but the common errors in calculator use resulted in 1.25 in (a) and 0.69 in (b), the latter from only applying the square root to the 1.5^2.

15 Most candidates answered (a) correctly, but there was a very disappointing response to part (b).

16 There were a reasonable number of correct answers in (a), though many found the perimeter, or the mean of the two dimensions. Few used π in (b), and some who did found the circumference. Part (c) was a complete mystery to the candidates, with only one or two correct answers seen.

17 Some achieved full marks here, and others earned one mark by starting the process correctly, with at least one factor pair.

18 There were many correct answers to part (a). In (b) a pleasing number managed at least the first step, although t = 9s + 8 was seen fairly frequently, as was the adding of 9 and 8 to give 17 or 17t.

B293 Higher Paper 3

General Comments

This paper was sat for the first time in the Summer of 2008, meaning that this was the first winter series paper. It was an adaptation of the B263 paper sat at the same time with changes in line with the changed requirements for GCSE given that there is no coursework. Comments on the common questions are therefore identical.

One of the changes required is to include an increased number of marks that can be allocated to AO1. This will be seen, typically in reasoning questions and also investigative questions. It seemed to the examiners that candidates were not well prepared for such questions, and especially what was required in Q17 was poorly understood.

Comments on Individual Questions

1 This question was usually well answered, often with little or no working. This highlights a difficulty that examiners have with the marking of such questions. If the answer was incorrect, but there was evidence that a candidate had attempted to turn all the fractions into decimals or had attempted to put them all as fractions with the same denominator then method the mark was awarded. Failure to show any working at all with in incorrect answer can only get 0.

2
a) This question was generally well answered by all candidates.
b) Many could not multiply out the brackets correctly giving eg. $2x^2$ for x^3 or $5x$ for $5x^2$. Some found the correct answer then tried to simplify.

3
a) Usually correctly answered, though a few candidates doubled up giving the reverse outcomes presumably for the second spinner spun first. A few misread the question and listed the remaining possible outcomes.
b) The estimate for a probability is required either as a decimal or a fraction, preferably expressed in its lowest terms. The answers “2 out of 9”, or “2:9” were penalised once only in the two parts.

4 For many the number of steps proved to be too many and numeric errors resulted. Without a calculator, many were unable to work $\frac{7}{12}\times 300$ in fractions, preferring instead to find $\frac{300}{12}$ and then multiply the result by 7. Several found 175 or 360 but not both. Some candidates could not add 175 and 360 correctly.

5
a) This part was almost always answered correctly.
b) Some scripts showed evidence of misreading of the scales and bad plotting was not uncommon.
c) It was pleasing that most candidates did this correctly. There were only a few curves or “zigzags”.
d) Some misread the scale, finding their answer at 11.
e) Some candidates failed to understand that a mathematical reason was required, so suggested tiredness etc but many realised there was a lack of appropriate data and gave an answer which could be related to this.

6 a) The most common incorrect answer was "the probabilities do not add up to 1." There is, of course, no reason why they should, while it is not possible for the probabilities to exceed 1.

b) This part was usually answered correctly.

Common errors in this type of question will revolve, not around the figures given as such, but the validity of the predictions. "Because the probabilities should all be the same" and "Because it has snowed 2 times on Christmas day in the last 10 years" are typical, incorrect, answers. "Independent" and "mutually exclusive" were words that would be appropriate here!

7 a) Some candidates created their own scales (in spite of the warning!) and then measured the midpoint. This was rarely correct. Very few showed clearly that they should be finding the mean value of the coordinates of the end points. The negative value of the x coordinate of the point A caused extra problems.

b) Several candidates thought the gradient came from $\frac{x \text{ step}}{y \text{ step}} = \frac{20}{10} = 2$, which was often given as the answer.

8 a) Most knew to equate the coefficients of one of the unknowns in two equations and most knew they needed to subtract if the xs were equal or add if the ys were. However, the arithmetic was often wrong either numerically or in the signs. Some found x in terms of y or vice-versa and substituted but the algebra then became too difficult and few managed to obtain correct answers from this method. Some candidates had little idea how to set about solving these equations and attempted to combine the two given equations or ignore one unknown and solve for the other; a few even tried to turn them into a quadratic and solve using the formula!

The ability of most candidates to set their work out clearly and methodically was sadly lacking in this question. While this caused extra problems for the markers it was clear that in many cases the candidates confused themselves and a correct start often did not result in a correct answer because they got lost in their own working.

b) Parts (i) and (ii) were usually correctly answered with a few candidates giving eg. a^{12} or m^4. Part (iii) was poorly done with answers such as $4xy^6$, $64xy^6$, $12xy^5$ often seen

9 Most had great difficulty finding $(4\sqrt{3})^2$ and $(5\sqrt{2})^2$.
Some expanded eg. 16 + 4√3 + 4√3 + 3. Some gave 16√3 and /or 25√2. A few tried to combine 4√3 and 5√2 in some way eg. 9√6 sometimes before squaring.
Having obtained 98 some could not reduce √98 to 7√2.

10 a) This question was answered correctly by most. A few candidates think $2\pi r$ or πd gives the area of a circle.

b) Most candidates correctly multiplied 10(a) by 3.7, though some restarted. Some divided 10(b) by 0.54. Some multiplied 10(a) by 0.54.

11 Most candidates managed to transpose and collect at least one term correctly, eg. $5x = 29$ or $11x = 15$. This question was generally answered correctly.

12 The usual problems occurred with those who did not understand this topic, with midpoints added and divided by 7 or 90, or the sum of *fx* found and divided by 7.

13
a) This was often correct. Some multiplied by 1.25 instead of 1.025 and a few found 2.5% and subtracted.
b) We saw many correct answers, but several candidates found 98% of 26450 correctly but could not calculate 1.4% of this and added or used an incorrect multiplier eg. 1.14. Some found 1.4% and subtracted.

It was noticeable that most candidates were actually unable to find the percentage increase by multiplying by 1.025. Even with a calculator they were writing down 10% then 1% then 0.5% and 2% and adding them up. Needless to say there were many numeric errors introduced here, especially when 0.4% was being calculated by this process!

14
a) The majority of candidates found 5 and 17, common errors being –1 and –13.
b) Most could plot their points correctly, but there were a few who misread the scale or plotted at reflections eg. (–2, –2) for (–2, 2).
c) Some gave the value 2. (intercept with *y*-axis.) Some gave 1 or 2 roots out of 3. Some gave their answer as coordinates eg (–2.2, 0) even (0, –2.2).

Some drew a straight line and gave the *x*-coordinates of the intersection with the curve. A few unfortunately decided that this could be solved using the quadratic formula (since there were three terms!).

15 A few tried to factorise. Many used the formula correctly, though some candidates only divided the root by 2. Some tried to complete the square, (often correctly), but made arithmetical errors in finding their answers. A few did not give their answers to 2 decimal places.

16 There were very few correct answers here, and many started off on the wrong route and were therefore unable to be awarded any marks. Several thought the volume was simply $\frac{1}{3}\pi 10^3$

Those that realised that the circumference of the base of the cone was the arc of the sector given were then able to work their way through it (albeit with working out the actual length using π rather than taking a simple ratio $10 \times \frac{288}{360} = 8$). Further errors resulted in the assumption that this value was the height of the cone (with base radius 5).

17 Few candidates realised that this was an investigation. Many focussed only on the information given and tried to draw a conclusion. Few even attempted to derive the interior angles of the given polygons and made no effort to investigate other polygons. Consequently their conclusion tended to be incorrect.

Grade Thresholds

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January 2009 Examination Series

Component Threshold Marks

Component		**Max Mark**	**a***	**a**	**b**	**c**	**d**	**e**	**f**	**g**
B291	Raw	72	N/A	N/A	N/A	49	41	34	27	20
	UMS	83	N/A	N/A	N/A	72	60	48	36	24
B293	Raw	72	63	52	41	30	18	12	N/A	N/A
	UMS	120	108	96	84	72	60	54	N/A	N/A

The total entry for the examination was 1120

Statistics are correct at the time of publication.

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