# Principal Examiner Feedback

# Summer 2012

GCSE Mathematics (2MB01)
Paper 5MB1H_01 (Calculator)

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## GCSE Mathematics 2MB01
## Principal Examiner Feedback – Higher Paper Unit 1

### Introduction

This paper was comparable to recent papers. However there were some questions which were poorly answered because of the need to fully understand the concepts within the question. Question numbers 8, 9b, 11 and 13 were particular examples of this.

Although this was a calculator paper, many candidates made many arithmetic errors which could have been avoided had a calculator actually been used.

### Reports on Individual Questions

### Question 1

There were very few errors in part (a). The most common either to simply sum the three given probabilities (= 0.74) and then fail to subtract from 1 or perform an arithmetic error, usually in addition, even though a calculator was available.

In part (b), although well answered, a significant number of candidates failed to use the given probability of 0.15, choosing rather to use their answer to part (a). Common errors seen were, 300/4 × 0.15, 300/4, 300/15, 0.15 × 200 and 300/0.15

### Question 2

The exchange rate was used correctly in the majority of cases although 96 × 1.20 was not uncommon. In addition many candidates tried to convert €96 by splitting the exchange rate of 1.20, often finding 0.2 of 96 then subtracting from 1 (or adding to 1).

Most candidates were able to gain some credit in part (b), many with full marks. Some executed correct calculations but failed to actually answer the question with an explanation of the city where the handbag could be bought more cheaply. On some occasions, units were omitted; 54 or 63 alone without units were unacceptable forms of the costs. For multiple attempts, the values being used needed to be clearly identified to gain credit.

**Question 3**

Many candidates failed to correctly read the scale on the Value axis, resulting in the incorrect plotting of the point (5, 300).

Part (b) was usually correctly answered either by stating the correct correlation or a correct relationship between Age and Value of Varley scooters. Value for money was referred to on some occasions.

In part (c), it was more usual to see an answer, within the given range, found by inspection rather than with the aid of a line of best fit. The lines of best fit drawn were usually fit for purpose.


**Question 4**

Very few candidates failed to select the appropriate values from the given spreadsheet and it was rare for any candidate not to gain some credit on this question. The most common errors made were in the calculations of 1/3 and 25% of a costing. Many gave answers, often incorrect, without fully showing their method to either find 1/3 or 25% of a number. Many candidates opted for 33% or 0.3 instead of 33.3…and this method mark was more often given for correctly finding 25% and subtracting. However, the accuracy mark was then lost.  Even when these calculations were carried out accurately, many failed to deduct their answers from their values of costs, showing little understanding of the term 'discount' or the word 'off'. Premature rounding of monetary values prevented many candidates from gaining full marks. For example $\frac{1}{3}$ of £150.25 was often rounded to £50. Some candidates failed to read the question properly and chose the wrong amount of adults or children. Calculators were often not used for finding a third or 25% and accuracy marks were lost as a result of this. It is pleasing to report that the great majority of candidates conclude their solution with an acceptable statement regarding the favoured ferry company.


**Question 5**

The majority of candidates were able to draw accurate ordered stem and leaf diagrams in part (a), however the omission of a key was widespread.

In part (b), very few actually showed any method for working out Jamal's mean score; it therefore had to be correct to be of use in any comparisons made. Further credit was given for either quoting Jamal's highest and lowest scores or for calculating ranges of scores. Many candidates tried to use median, quartiles and IQR but could gain no credit for this since Gill's actual scores were not given. It must be noted that, to gain full marks, candidates must describe their comparisons in the context of the question. For example, just to say that Gill's mean was greater than Jamal's mean was not enough; mean **scores** were required. Some pupils made comparisons with no data behind them. Sometimes, statements such as 'Gill's highest was … whereas Jamal's highest was …' without actually making a comparison were seen. These gained no credit.

## Question 6

Many candidates, even at this level, still find difficulty in working out an estimate for the mean from a grouped frequency table. Most of the candidates who knew to multiply frequency by speed, did so using the midpoint of the intervals, although the use of the end points was not uncommon. After correctly finding the total of *fs,* many divided by 4 instead of 75. Weaker candidates often found the mean of any group of 4 numbers from the table, usually the frequency values. A number of candidates found cumulative frequency instead of using midpoints to find an estimated mean. Some attempted to calculate frequency density. Some candidates added up the midpoints and divided by 200 instead of 75.

## Question 7

A correct cumulative frequency table was seen in most cases in part (a).

Points were usually correctly plotted in part (b), although sometimes these were at the midpoints of the groups from either the frequency or cumulative frequency tables.

This was usually followed by a correct reading of the median from their cf graph in part (c), although many candidates used 22 or 23 as the value on the cf axis. A significant number of candidates drew a 'line of best fit' through there correctly plotted points. This was not followed through in part (c) for their estimated median.

## Question 8

This question was very poorly answered, the modal incorrect answers being 318 (153 + 165) or 159 (318 ÷ 2). Most candidates who understood the concept performed accurate calculations resulting in full marks being awarded. However many of these gained just the first method mark for the totals 3519 or 2805. Although many rounded their answer to 158 on the answer line, 158.1 was usually shown in their working to gain full marks.

## Question 9

Very few candidates failed to construct an accurate box plot showing the given information in part (a). Some failed to draw a box whilst a minority showed all 5 pieces of information in a box.

Part (b) was very much less well done. Many candidates clearly appear not to understand the meaning of quartiles in the context of a problem and failed to grasp that they had to find ¾ of the data. The most common incorrect approach was to try to use the Weight values as frequency values.
For example 6.5 − 2.8 = 3.7

**Question 10**

Answers to part (a) were generally good gaining full credit. Very few candidates failed, in some way, to introduce a time period factor into their question. Some sets of responses omitted actual boxes; no credit was given. Many response boxes were either overlapping or non-exhaustive. This gained credit provided they did not fail on both counts. Some responses were written as inequalities. It should be noted that this is NOT acceptable since the use of inequalities is inappropriate in a questionnaire.

In part (b), it was clear that many candidates had not read the question carefully enough. Saying that the sample was biased because all 10 friends do visit the sports club missed the fact that the questionnaire was designed for "people who visit the sports club". Many comments related to the responses of the 10 friends being biased rather than the sample.

Part (c) was less well done than other parts of the question; many candidates clearly not understanding the concept of stratified sampling. Of those who did, many considered either just male runners or just runners in the 30-39 age range. A few left their answer as a decimal rather than round to a whole number of runners.

**Question 11**

This question was very poorly answered by other than the higher achieving candidates. 45, 85 (40+45) were common answers. Some candidates, trying to use ratio methods, used a ratio of 5:45 rather than 5:50 resulting in an answer of 360 (40×9).

**Question 12**

Many candidates failed to accurately complete the probability tree diagram in part (a). Sight of $1 - p$ anywhere was not the norm; $-p$, not $p, q$ were the most common labels on the 'lose' branches. Some candidates tried to replace the letters with fractions or decimals, 0.5 being the most common.

However, $p$ was usually the answer shown on the 'win' branch and this usually led to the correct answer in part (b), although $2p$ was often seen. A significant number of candidates actually wrote $p \times p = 2p$.

It was rare to see a fully correct expression in terms of $p$ for answers to part (c). Many, who did have algebraic expressions in terms of $p$ for their probabilities in part (a), gained one mark for correct application of probability theory. Many candidates recorded $p \times p - 1$, instead of $p \times (p - 1)$ omitting the brackets and therefore failed to simplify correctly.

**Question 13**

Full understanding of frequency density was rare. Many candidates labelled the frequency density haphazardly and were then unable to relate this to the 285 farms in the problem. Some did equate 1 square centimetre to 5 farms but were then unable to go further. $\frac{285}{38}$ was a common response.

**Question 14**

Many candidates assumed that once one card was taken it was then replaced before selection of the second card was made. This method, if successful, could only gain a maximum of 2 of the 4 marks. In general, probability tree diagrams or sample space diagrams were drawn. Mistakes usually revolved around incorrect arithmetic of fractions or incomplete diagrams. Some candidates worked in decimals and often accuracy was lost with inaccurate fraction to decimal conversions. Many candidates added instead of multiplying the probabilities. Most candidates attempted to add up the number of outcomes getting different cards rather than taking away the number of outcomes of the same lettered cards from 1. Of the candidates who listed all the possible outcomes, many omitted one or more of the possibilities or failed to successfully identify the relevant ones.

**Grade Boundaries**

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