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Principal Examiner Feedback

Summer 2014

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Unit 1: 5MB1H_01 (Higher)

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

Introduction

Students appear to have been able to complete the paper in the time allowed.

Most students seemed to have access to the equipment needed for the exam.

The paper gave the opportunity for students of all abilities to demonstrate positive achievement. The performances seen on this paper were generally good.

Many students set out their working in a clear, logical manner.

Questions which focussed on the quality of written communication were generally answered well with students writing down enough detail and making clear conclusions.

There were many instances of inaccuracy in calculations despite this being a calculator paper.

Report on individual questions

Question 1

This question was well answered with about three quarters of all students being awarded both marks for two correct comments. Nearly all students gained some credit for their responses. In a few cases students rephrased one of their answers to give as a second answer. Students usually expressed their answers clearly and concisely. In some cases it would have been helpful if students had made clear whether their comments referred to the stem of the question or to the response boxes.

Question 2

Most students found this question straightforward and scored full marks.

Occasionally students did not plot the extra point in response to part (a) but it was plotted accurately by the vast majority of students.

The relationship was clearly described in part (b) though a small minority of students stated that “as the weather gets hotter more hot drinks are sold”. Lines of best fit were generally well drawn. Only a small number of students attempted to draw a curve of best fit where a straight line was required.

The estimates given in part (d) were well judged and most students who drew poor lines of best fit were able to show their method and scored the mark available here.

Question 3

This question was quite well answered but there were many students who changed $\frac{1}{3}$ to 30% and worked out 30% of 120 instead of $\frac{1}{3}$ of 120. These students were only able to gain at most one mark for their answers. A significant number of students successfully worked out 20% of 120, subtracted their answer from 120 but then worked out $\frac{1}{3}$ of 96 instead of $\frac{1}{3}$ of 120. This usually led to an incorrect final answer of 64 and the award of one mark. Relatively few students used the method of working in fractions, converting 20% to $\frac{1}{5}$ then adding this to $\frac{1}{3}$ before calculating $\frac{8}{15}$ or $\frac{7}{15}$ of 120. Similarly, only a small number of students worked entirely in percentages or in decimals.

Question 4

Many students found this question to be straightforward and presented their calculations and conclusion in a clear concise manner. Almost all students realised the need to round their answers to the nearest integer. However, there were also many responses consisting of false starts and incorrect assumptions and examiners often had to work hard to identify a correct method from a jumble of calculations. The most successful approach was to work out the amount of squash needed to provide drinks for the 140 children then divide by 750. A large proportion of the incorrect answers given were “38” gained by dividing the amount of orange drink needed (28000 ml) by the amount of squash (750 ml) in each bottle. A common sense check might have alerted students to a possible error if they had reflected on the need for 38 bottles of squash to provide enough orange drink for 140 people.

Question 5

A disappointingly small proportion of higher tier students could give a correct expression in response to this question. When correct answers were seen $\frac{20-x}{20}$ was seen much more often than $1 - \frac{x}{20}$, many students were awarded 1 mark for “$20 - x$” but they often failed to realise that this expression could not represent a probability.

Question 6

Many students did not appreciate that this was a question about bounds. They simply multiplied 42 by 60 and could not be awarded any credit. Some students then rounded the result of this calculation (2.52kg). They were not being awarded any marks either. Most students successfully converted from grams to kilograms, usually towards the end of their calculations but some students used the incorrect conversion 100g = 1 kg.

Question 7

This question was a good discriminator. The great majority of students drew an accurate stem and leaf diagram in part (a) together with a key. Only a small proportion of students made errors here by either omitting a value in the diagram or by not giving a correct key.

In part (b) most students found and used a measure of average and a measure of spread to compare the age distributions. There were some students who found both the means and the medians but did not use a measure of spread. These students could not access all three marks. Many students worked out many more measures than necessary. In some cases they gave many numerical values without making clear what the values referred to. It would be good to see these students concentrate on working out what is sufficient to answer the question and check their answers for accuracy rather than spend time on too many calculations. Ranges were usually worked out accurately but many errors were seen in the calculation of the means and medians. Few students calculated the interquartile ranges and where they did, they often made errors.

Some students restricted their answer in part (b) to completing a second stem and leaf diagram. Where this was done without comment, only one mark could be awarded. A small number of students did not work out any statistics and restricted their answers to, for example, comparing the number of people in the swimming pool aged in their thirties with the number of people in the gym in their thirties. Such answers gained no credit. Some other students could not be awarded the final mark because they failed to make a comparison but merely stated the statistics instead of comparing their sizes or interpreting a comparison in the context of the problem.

Question 8

This question was generally well answered though a significant number of students worked out either 550 ÷ 4 or 56 ÷ 4. Some students multiplied 56 by 550. Obviously neither of these approaches yielded any marks. Some students were awarded one mark for a partially correct or a partially completed method. A common approach was for students to work out how many would be expected in 100 trials, using this to then find the expectation for 500 trials and then 50 trials, eventually leading to an expectation for 550 trials. Some students were successful in this approach, but others made errors on the way.

Question 9

The first two parts of this question were answered correctly by about two thirds of all students. The most common incorrect responses seen to parts (a) and (b) were 46 and 14 respectively. Part (c) of the question was much less well done and it was clear that many students do not have the depth of understanding to realise that the box plot divided the 80 children into four equal groups of 20 children. A large proportion of students calculated the difference in weights (58 – 52 = 6). Other students' misunderstandings led to incorrect calculations, most commonly 80 ÷ 6 or $\frac{6}{25}$ of 80.

Question 10

It was encouraging to see that a good proportion of all students were able to work out an estimate for the mean in part (a) of this question. Errors arose because the class intervals did not all have the same width and 60 was often used as the midpoint of the interval $50 < x \leqslant 80$. Some students rounded their answer to 46. Examiners accepted this provided 45.5 had been seen in the working space. A small minority of students worked out class width multiplied by frequency rather than midpoint by frequency and there were some students who divided by 5 rather than 60.

Nearly all students completed the table in part (b) correctly.

In part (c) students usually plotted their points using the upper boundary of the class intervals though some used the midpoints instead.

Cumulative frequency curves were generally well drawn and used correctly to find the estimate required in part (d), though some students failed to subtract the value obtained from their graph from 60.

Question 11

Students who obtained the correct answer to this question usually did so by calculating $\frac{30\times60-20\times56}{10}$ rather than by using a ratio approach. Of those students who could not be awarded full marks, some were awarded at least one method mark for finding the total of the marks for the whole class (1800) or for finding the total of the marks for the girls (1120). A significant proportion of students then failed to find the difference between these two values or did not divide the difference (680) by 10. The question seemed well answered by students from some centres but not from students at others. A commonly seen error was to write the answer “64” on the pretext that $\frac{56+64}{2} = 60$.

Question 12

This question was well answered. Students usually used one of two approaches, either using 0.8 as a multiplier to find the value of the van in successive years or by using the rather more long winded approach of finding the 20% depreciation and subtracting it from the value for each year. The most commonly seen incorrect method was for students to subtract a constant £5500 depreciation each year.

Question 13

Perhaps surprisingly, it is disappointing to report that many students were unable to identify what they needed to do in this question, particularly in part (b). Those students who did realise that they needed to divide cost by number of cubic metres of water often took the readings from one point and divided the y coordinate by the x coordinate rather than the increase in cost divided by the increase in volume, that is they failed to find the gradient of the line. Methods were often not made clear and relatively few students showed a triangle drawn on the line to help them work out the gradient. Where students did draw triangles and use an appropriate method for finding the gradient, they often did not interpret the scales on the axes correctly and so obtained an incorrect answer. Thus relatively few students were awarded 1 mark for a correct method (but an incorrect answer). Some students answered part (b) in the working space for part (a).

Question 14

This question was quite well done with over a half of all students scoring both marks for a fully correct response. Nearly all students realised that they had to round the answer, 16.97…and most students correctly rounded up to 17. Where students did go wrong, $\frac{117}{520} \times 150$ was often seen.

Question 15

Most students who attempted it realised that this question centred on probabilities involving non replacement and so gained the first mark. They often then went on to score at least one more mark for writing down the correct calculation for at least one favourable outcome. It is good to report that there were a significant proportion of students who completed the question successfully. Of those students who made errors, many could have avoided them by making better use of their calculator to complete and check their calculations.

The question was completed successfully by about one third of students with many students giving a clear and concise solution. Some students did not recognise the need to change the denominator of the probability fractions relating to the second cake taken. Such students could still score up to 2 marks for their responses but most scored only one mark.

A few students multiplied three fractions together to find the probabilities of favourable outcomes or added probabilities instead of multiplying when finding possible combinations. Some other students found the probabilities of choosing two cakes the same but failed to subtract them from 1.

Question 16.

This question on histograms attracted a good proportion of correct answers. Many students understood the need to calculate/use frequency densities rather than just draw a diagram where the heights of the bars were proportional to the frequencies. Their calculations were usually accurate as was the translation of frequency densities found onto a diagram. A small but significant minority of students represented the interval $0 \leqslant x \leqslant 20$ with a bar the same width as the bar representing the interval $20 \leqslant x \leqslant 30$. The scaling and labelling of axes was generally well executed but some students did lose a mark for failing to provide labels.

For part (b) of the question there were also a good number of fully correct responses. Indeed, some students who were unsuccessful in part (a) went on to answer part (b) successfully by using an approach based on linear interpolation. A surprisingly large proportion of students worked out a correct estimate for the number of weather stations where the rainfall was recorded as over 40 mm (18) but failed to convert this to a probability ($\frac{18}{85}$). A check of their work might have alerted some students to their error.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
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