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Principal Examiner Feedback

June 2011

GCSE Mathematics (2MB01)

Unit 1: 5MB1H_01
Higher (Calculator)

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1. PRINCIPAL EXAMINER'S REPORT – HIGHER PAPER 1

1.1. GENERAL COMMENTS

1.1.1. Although it was clear that the majority of candidates had been well prepared in knowledge and in use of techniques for this paper, they did have difficulty in applying these techniques to questions which were either multistep or which required the candidate to chose their own method to solve the problem. Consequently, the structured probability question, Q10 was answered well compared to the unstructured Q3b.

1.1.2. The questions in which candidates had to show QWC (Quality of Written Communication) had a mixed response. Candidates need to be coached in the importance of clear layouts, of consistent use of units and of selecting and interpreting statistical measures in context.

1.1.3. The small amount of algebra on this paper was not done well. Candidates need to be aware of what is meant by an (algebraic) expression as opposed to an equation.

1.2. REPORT ON INDIVIDUAL QUESTIONS

1.2.1. Question 1

There was a lot of information to be processed in this question. Those candidates who used a suitable two- way table were much more successful than those who tried to reason it out. The most common successful approach was to set up a two way table with rows labelled 'Swim' and 'Not Swim' and with columns labelled 'Year 4' Year 5' and 'Year 6'. Candidates could then work through the given information and put it in the correct cells in the table to produce a table like one in the diagram.

	Y4	Y5	Y6	Tot
S		21	18	
NS	11			37
Tot			30	96

The table was a huge aid in organising the data, so that the remaining cells could be filled in easily and the correct values picked out. Even so, some candidates managed to put at least one given value (usually the 18) in the wrong cell. A few candidates who did adopt this approach then put the wrong number down on the answer line so losing a mark.

1.2.2. Question 2

Generally the points were plotted correctly in part (i) and then the vast majority of candidates knew that the relationship was one of positive correlation. Part (c) was also well done with nearly all candidates being able to give a value within the required range, with or without the use of a line of best fit.

1.2.3. Question 3

Part (a) was a multistep question which caught many candidates out. Although the information given was not difficult to organise, many candidates overlooked the fact that 2400 had to be reduced by 15%. Of those that did spot this a great majority could get the correct 360 and most of these went on to derive the 2040 as the dry weight of constituents. The ratio part of the problem was dealt with very well, whether it was 2400 or 2040, although a few candidates shared out the 360.

Part (b) required some insight and thought on how to go about answering the question. As this was a starred (QWC, Quality of Written Communication) question candidates were expected to make their calculations and resulting conclusion really clear. The most common successful method was to multiply the weight of cement found in part (a) by 30 and compare the answer with 6.5 tonnes. This comparison could only be legitimately made if the two weights were in the same units. Many candidates could not convert tonnes to kilograms correctly, often using a conversion factor of 10000. The other efficient method seen was to convert the 6.5 tonnes of cement to kilograms, to then divide by 30 and compare with the answer (255) in part (a). To get full marks candidates had to have a correct method, be able to convert between kg and tonnes and come to a conclusion based on their calculations.

1.2.4. Question 4

Part (a) was a routine stem and leaf diagram completion. Candidates did well on this although many forgot to give a key. A substantial number of candidates had a diagram in which the number of entries was less than the number given in the list at the start of the question. Candidates should be trained to check that the number of numbers in tables should be the same as the original data.

Part (b) was more open ended. This was a starred (QWC) question in which candidates had to select relevant statistics to compare the two distributions and then make a general statement. Many candidates drew a second stem and leaf diagram but were unable to use it convincingly for comparison purposes. Many candidates sensibly found the median and range (which can be obtained quickly from ordered lists) and then used them as a basis for comparison. The two most successful approaches were to state values of the median and of the range and then to conclude that the boys were on average taller, or that the heights of the girls vary less than that of the boys. Comments such as ‘the median of the boys’ heights is greater than the median of the girls’ heights’ was not given a mark as it is not sufficiently general. Other acceptable statistics were the means and the interquartile ranges. A few candidates

attempted to draw box plots in the working space. If they were accurate they were accepted.

1.2.5. Question 5

In part (a) most candidates knew that the probabilities added to unity but many were unable to write a suitable expression. Answers which put a letter *y* (say) in the empty box and then went on to
$x + y + 0.1 + 0.3 = 1$ were awarded one mark and if they rewrote this correctly in the form y = they were given the second mark. Answers such as $p(2) = 0.6 – x$ or $p(2) = 1 – (0.4 + x)$ were given full marks but not $2 = 0.6 – x$ or $x = 0.6 – x$

Part (b) was very well done but many candidates had problems with part (c) where the expression *np* was often not known.

1.2.6. Question 6

Part (a) was answered well, with many candidates pointing out the overlapping intervals under the response boxes. One or two pointed out that asking a person's age could be argued to be intrusive. This was given a mark. The other mark was harder to earn and many candidates did not see the issue of question 2 being a leading question.

Part (b) asked candidates to produce a question about fruit consumption of their own to ask . Many did a good job on this with a time frame in the question and no overlapping intervals with the response boxes. Some candidates asked how often fruit was consumed and this was felt not to be worth a mark.

Part (c) was a standard stratified sample question and many candidates did the correct calculation and rounded of their answer to get 7.

1.2.7. Question 7

The most efficient method of working out the final amount is to apply the compound interest formula. Candidates who did this were generally awarded full marks. There was an unfortunate error of thinking that the multiplier was 1.35 rather than1.035 that was not infrequent.

Some candidates who calculated interest year by year and added it on did get full marks but they were likely to pick up rounding errors on the way.

Many candidates do not understand the concept of compound interest and simply did 3 times £42.

1.2.8. Question 8

Part (a) asked candidates to pick out the modal class. Many were able to do this but many wrote down the frequency rather than the interval.

For part (b), there were many good responses to this standard task but also many candidates who found the sum of the frequencies and divided by 6 or the correct 2370 and then divided by 6. Less frequent was the error of using the upper end or the lower end of each interval.

Part (c) required candidates to draw a cumulative frequency diagram on a given grid. Many candidates went back to the original table and filled in cumulative frequencies down the side. Many were then able to plot a correct diagram but many lost a mark by plotting their points at the mid-point of the interval or did histograms.

Part (d) required candidates to read off a value of the median and to work out the interquartile range. Many candidates were able to do this but there was evidence of careless working or misunderstanding) in which the quartiles were located at n = 25, 50 and 75 or at 21.5, 43 and 64.5 from 92 – 6.

1.2.9. Question 9

Candidates are required in this module to understand, use and calculate gradients. This was a challenge for most of the entry where 18, –18 and 32 were very often seen for the gradient. Some candidates did draw triangles and work out height ÷ base and so were able to earn a method mark. Others used one point on the graph to select values of m and k which worked for that point, without realising that they were not likely to work for any other point.

1.2.10. Question 10

Most candidates were able to get at least 1 mark in part (a) and many scored both. The principal error was that the sum of the probabilities on branches was not the unity it ought to have been.

Part (b) was well answered – many candidates knew that it was a multiply and had their calculators to get the correct answer. Some candidates added to get a probability greater than 1.

Part (c) was less successfully answered as often candidates only considered 2 of the 3 cases. The omitted case tended to be the one already found in (b), so candidates were generally interpreting the demand of ‘at least one’ as ‘exactly one’. It was pleasing to see some candidates using the economical $1 – 0.4 \times 0.5$.

1.2.11. Question 11

Part (a) required candidates to draw a histogram from a table. Thus they had first to calculate appropriate frequency densities followed by accurate plotting. Most competent candidates were able to do the calculations, adopt a sensible scale and draw a correct histogram. A few candidates lost marks by drawing at least 1 column with the wrong width – usually the 5 – 10 one which got extended to 0 – 10, or the 10 – 12 one which was drawn wrongly as 10 – 11 or by poor labelling of the frequency density scale. A few candidates attempted to answer by means of an area key.

Part (b) could be done independently of the histogram and some candidates did score full marks by realising that they had to use one quarter of the interval 12 – 16 as well as all of 16 – 20 and 20 – 25.

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