Principal Examiner Feedback

November 2010

GCSE Mathematics (2MB01/01)

Foundation Calculator Paper (1H)

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1 PRINCIPAL EXAMINER'S REPORT – HIGHER PAPER 1

1.1 GENERAL POINTS

1.1.1 This paper seemed to give the opportunity for candidates of all abilities to demonstrate positive achievement.

1.1.2 Candidates showed a good general understanding of probability and were usually able to work out averages and measures of dispersion accurately.

1.1.3 Many candidates were less successful in questions on number involving several steps. They often did not record their working in a logical sequence which examiners could follow.

1.1.4 This was the first examination for a new specification. In general, candidates seemed well prepared for the examination. However, some candidates did not realise the need to make clear statements in response to questions asking them to "compare" and limited their responses to calculations. Full credit could only be given to candidates who used their calculations to reach a conclusion and clearly communicated the link between the two.

1.2 REPORT ON INDIVIDUAL QUESTIONS

1.2.1 Question 1

Seventy one per cent of candidates scored full marks for their responses to this question. A further 23% of candidates gained at least one mark. The vast majority of candidates gave a correct answer to part (a) of the question. In part (b) many candidates recorded the correct answer in the appropriate cell in the table but then wrote an incorrect value on the answer line. Sometimes this was apparently due to incorrect conversion from decimal to fraction form. All candidates need to be aware that the expression of a probability as a decimal is quite legitimate and is usually preferable in cases where decimals are used in the question itself. It was not unusual to see 0.75 and/or 0.2 expressed as $\frac{0.75}{1}$ and/or $\frac{0.2}{1}$. Some lower attaining candidates gave the answer $\frac{1}{4}$. Other candidates left out a step in answering this part of the question – they added 0.25 and 0.35 and then divided by 2.

1.2.2 Question 2

This question discriminated well between candidates. Most candidates earned some credit for their response to the question and just under a quarter of candidates scored full marks. Candidates usually selected the correct prices from the table. It is surprising that, at the higher tier, in a paper where the use of a calculator is expected, the majority

of candidates used a "build up" method to work out percentages rather than using a "multiplier method". Many of these candidates failed to obtain the mark for working out an appropriate percentage because they were unable to evaluate the percentage correctly and did not explain their method in sufficient detail to convince examiners. Other candidates read "of" as "off" and subtracted 95% and 85% from the adult prices to obtain the price per child. Candidates did not always work out the costs of the holiday for all four members of the family, some being content just to compare the costs for adults only or for 2 adults and 1 child. A significant number of candidates who successfully found the correct total cost of each holiday did not compare their answers and so could not be awarded the mark available for quality of written communication. Calculating the difference in prices without saying which is cheaper was not accepted as a comparison. Some candidates gave a valid comparison based on a "best buy" basis of the cost per day for each holiday. Rounding errors led to some candidates losing marks.

1.2.3 Question 3

Only about one in seven of candidates scored full marks for their responses to this question. This was the least well answered question on the paper. A large proportion of candidates wrote a question for a questionnaire rather than design a data collection sheet.

1.2.4 Question 4

This question was worth 6 marks so it was somewhat surprising to see that some candidates limited themselves to a brief comment stating that heart rates were higher after people had walked up the stairs. Examiners were able to give this little credit without any supportive evidence. At the other extreme a significant number of candidates worked out the mode, median, mean, range and interquartile range for "before" and "after". Some then made an attempt to interpret their findings whilst others judged that they had completed the question once the calculations were done. What was required, of course, was the calculation and comparison of an appropriate average (i.e. the median or mean) for "before" and "after", the calculation and comparison of an appropriate measure of spread (i.e. the range or interquartile range) and then some interpretation in the context of the question. Most candidates were able to score marks for the calculations, but far fewer were able to deduce that the hearts rates had risen (due to the rise in the average considered) and that they were more varied after the 15 people had walked up the stairs (due to the rise in the measure of spread considered). Common errors included giving "60" as the median and "81" as the highest heart rate for the people before they walked up the stairs. This seems to have arisen because candidates took the leaf furthest to the right as having the highest value.

1.2.5 Question 5

This question differentiated well. The more able candidates were able to deal with the different currencies and weights without hesitation and produce succinct and logical arguments together with a clear statement in conclusion. These candidates had often found the cost in either Pounds or Swiss francs of 1 kg of cheese in Switzerland. Many other candidates were able to obtain a full solution after trying various strategies or some credit for either converting between pounds and Swiss francs or for finding the cost of comparable weights in England and Switzerland. A minority of candidates tried to find the cost per gram of cheese or the number of grams per penny/Swiss franc. These candidates were less successful.

1.2.6 Question 6

Only a small proportion of candidates constructed and used a two-way table to solve the problem posed by this question. These candidates were nearly always successful. Again, some candidates could solve the problem quickly and easily. However, most candidates' solutions seemed to consist of calculations scattered around the working space. A generous mark scheme allowed examiners to award credit to candidates who made limited progress towards a correct solution. A small proportion of candidates simply added up 28, 36, 20 and 15 and subtracted their answer from 120. Over a half of all candidates scored full marks whilst most other candidates scored at least one mark for their responses.

1.2.7 Question 7

Thirty per cent of candidates were awarded full marks for their response to this question. Unfortunately, a surprising number of candidates did not take into account the ratio of the number of letters to the number of packets thereby simplifying the question. These candidates could be given little credit for their attempts as they restricted their working to finding a simple fraction of a quantity followed by the calculation of a simple bill. Candidates who did realise the significance of the ratio often failed to show their working in a coherent way. This may have inhibited their ability to think through the processes involved and execute them accurately in the correct logical sequence.

1.2.8 Question 8

Many candidates drew a triangle on the line but very few were able to use it to obtain a fully correct answer to part (a) of this question. Common errors included counting squares without reference to the scales on the axes of the graph, working out "difference in y" × "difference in x", working out " difference in x" ÷ "difference in y" and omitting the negative sign. Very few candidates were able to provide an answer worthy of credit in part (b) of the question, often because they did not use "the value" they gave in response to part (a).

A significant proportion of candidates did not attempt this part of the question. Those that did usually tried to describe the process they used to calculate the gradient rather than use the context of the question.

1.2.9 Question 9

It is encouraging to report that well over 80% of candidates were able to find an estimate for the median speed. Part (b) was more challenging and a substantial proportion of candidates did not appreciate the need to use the graph to estimate how many cars broke the speed limit. These candidates often restricted themselves to working out 20% of 60 or even 20% of 130 km/h. Other candidates provided a correct, concise and clear argument to support their conclusion that the police were wrong. Good attempts were made to draw an accurate box and whisker diagram, with few candidates not knowing what was expected. Many weaker candidates were able to gain some marks here. The drawing of the whiskers and the median was generally well done. However candidates' attempts at finding and drawing the lower and upper quartiles were less successful.

1.2.10 Question 10

Part (a) of this question was poorly attempted. About one third of candidates gained all four marks. Many candidates attempts were blighted by the inability to find the midpoint of each of the intervals in the table. It was common to see these recorded as 5, 13, 18 and 28. Some candidates used the lengths of the intervals, 10, 5, 5 and 15 to represent the weights of the suitcases. Other lower attaining candidates merely carried out the calculation "$50 \div 4$" or summed their midpoints and divided by 4. About one in every ten candidates gave a correct answer in part (b). Few candidates identified the need to use multiplication and there were many instances of fractions appearing on the answer line, most commonly $\frac{6}{50}$ or equivalent, without any working shown. For part (c) a fair proportion of candidates worked out the frequency densities but only about one third were able to go on to use them in order to complete a histogram. Even the better candidates often failed to label/scale the vertical axes or provide a key for their graph. A large proportion of lower attaining candidates drew bars with heights representing the frequencies.

1.2.11 Question 11

In their attempt to answer part (a) of this question many candidates depended on the word "random" thereby just rephrasing the wording of the question. Other candidates defined the term "random" rather than describe a method to explain how 80 laptops could be sampled from a population of 600. One quarter of candidates were awarded the mark available. These candidates usually referred to numbering the computers and picking 80 numbers from a hat containing the numbers 1

to 600 or to using a random number generator on a calculator to generate 80 numbers between 1 and 600. Some candidates suggested taking a stratified or systematic sample. Part (b) was well answered with over 60% of candidates gaining both marks for their response. A small but significant proportion of candidates worked out $600 \div 80 \; (= 7.5)$ then rounded their answer to 8 before multiplying by 3.

1.2.12 Question 12

This question proved to be a good discriminator. Nearly all candidates gained at least one mark for putting $\frac{3}{10}$ on the first stage of the tree diagram in part (a). They then attempted to complete the diagram but a much smaller proportion of candidates realised the non replacement nature of this question and it was common to see the $\frac{7}{10}$ and $\frac{3}{10}$ repeated for the 2nd sock. There were many credit worthy attempts to part (b) of the question with a large proportion of candidates correctly discriminating when to use the multiplication and/or addition of probabilities. However, the multiplication and/or addition of fractions was often not carried out accurately, even though the use of a calculator was permissible. This is reflected in the award of marks. The majority of candidates gained at least one mark for their attempt at part (b).

1.2.13 Question 13

Candidates who had a good understanding of stratified sampling found this question straightforward. However, it was not a straight forward application of the process and many different incorrect methods and answers were seen. A significant proportion of candidates worked out the number of people from Irton that would be in a sample of total size 50 if the sample was stratified by village population. Some candidates did not give an integer answer. Thirty seven per cent of candidates gained full marks.

2. STATISTICS

1.1 MARK RANGES AND AWARD OF GRADE

Unit/Component	Maximum Mark	Mean Mark	Standard Deviation	% Contribution to Award
5MB1F/01	60	30.6	9.2	30%
5MB1H/01	60	28.4	12.5	30%
5MB2F/01	60	28	9.5	30%
5MB2H/01	60	25.9	12	30%

GCSE Mathematics Grade Boundaries 2MB01 – November 2010

	A*	A	B	C	D	E	F	G
UMS (max: 83)				72	60	48	36	24
Paper 5MB1F				39	32	25	19	13
UMS (max: 120)	108	96	84	72	60	54		
Paper 5MB1H	50	39	28	17	12	9		

	A*	A	B	C	D	E	F	G
UMS (max: 83)				72	60	48	36	24
Paper 5MB2F				39	32	26	20	14
UMS (max: 120)	108	96	84	72	60	54		
Paper 5MB2H	47	37	27	17	12	9		