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Principal Examiner Feedback

March 2012

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

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GCSE Mathematics 2MB01
Principal Examiner Feedback – Higher Paper 1

Introduction

There was no evidence to suggest that candidates had difficulty completing the paper in the given time.

The vast majority of candidates completed their answers in the spaces provided but some candidates need to be reminded about what working they need to show when doing particular calculations.

Candidates should be advised to show the multiplication stage in their working. For example, in Q1 they need to show all the products 6×0, 9×1, … in the calculation and not just the results 0, 9, …; and in Q4 they need to show each calculation of percentage, eg $\frac{10}{100} \times 2329 = 232.90$', and not just simply state the result '10% of 2329 = 232.90'.

When making deductions, candidates should be advised to give the reasons for their deductions, and these should be both summative and conclusive, eg Royal European is the cheapest because it has the lowest discounted price.

Candidates should be advised to draw large triangles on graphs to maximise the accuracy of their calculations of gradients.

When working with cumulative frequency diagrams, candidates should be encouraged to show their work by drawing clear horizontal lines from the cumulative frequency axis to the graph, rather than simply marking the graph with dashes or dots.

Candidates should be advised to use a ruler when drawing box plots.

When counting squares in histograms, candidates should be advised to state the units of area of their squares, eg cm^2 or '2mm squares'.

Report on individual questions

Question 1

This question was done quite well. Most candidates were able to multiply the number of can by the frequency to find the total number of cans. A common error here was to calculate 6×0 as 6. Common incorrect methods included calculating the sum of the frequencies (28) and the sum of the number of cans (15). Candidates should be advised to show the multiplication stage in their working, ie 6×0, 9×1, … and not just the results 0, 9, …

Question 2

This question was done quite well. Most candidates were able to find the total number of seats needed (128), calculate the number of seats available (126) and deduce that more seats were needed. Some candidates calculated the number of coaches that would be needed (3.04...) or the number of seats required in each coach (42.6...). A common incorrect approach here was to try and find the required number of teachers by dividing 120 by 16 (rather than 15), and consequently these candidates were unable to make much progress in their solution. A significant number of candidates, having obtained the correct figures, simply stated 'no' as a direct response to the demand of the question. Candidates should be advised to give the reasons for their deductions.

Question 3

This question was answered well. In part (a), most candidates were able to calculate the probability that the spinner will land on a number greater than 2, but some candidates thought that this included the 2.

Part (b) was done quite well. Most candidates knew that they had to multiply 200 by 0.3 and the vast majority were able to do this correctly. Some candidates thought they need to use the 5 in some way. Common errors here were 40 (200÷5) and 12 (0.3÷200÷5). A small number of candidates incorrectly gave their final answer as $\frac{60}{200}$.

Question 4

This question was done quite well. Most candidates were able to select the cost per person for each suite and calculate the discounts and/or discounted prices for each cruise company for one or two people. Many of those candidates adopting a two stage approach, ie a calculation of the discounts followed by a calculation of the discounted prices, but some made an error somewhere in their calculation. Candidates should be advised to write down the full process need to calculated any percentage, eg '$\frac{10}{100} \times 2329 = 232.90$' rather than '10% of 2329 = 232.90', as an error in the calculation of the later cannot be awarded any credit for method.

A significant number of candidates incorrectly thought that to find 5% of 2147 they had to divide 2147 by 5. Some candidates simply stated 'Royal European' as a direct response to the demand of the question. A few candidates found the total cost of all the cabins or the discounted price for each of the four types of cabin.

As with question 2, candidates should be advised to give simple reasons for their deductions. A small number of candidates incorrectly used the cost per person for an inside cabin. Many of these were able to score some marks for a correct method to find either the discounts and/or the discounted prices and a correct conclusion based on their figure.

Question 5

This question was done quite well. Most candidates were able to draw an ordered stem and leaf diagram and use it to find the median.

Common errors in part (a) include missing out a number from the leaves (usually the 6 from 96), using 1 in the stem (instead of 10), and defining an incorrect key. Although not penalised, candidates should be encouraged to give the units with the key, eg 7|1 represents 71cm.

In part (b), many candidates were able to identify the position of the median, but many of these thought that they had to give their final answer as a whole number. A significant number of candidates thought incorrectly that the location of the median was given by the formula $\frac{n}{2}$. Common incorrect answers here were 92 and 2.5

Question 6

This question was not done well. In part (a) few candidates were able to work out the gradient of the line. Of those that realised that they need to calculate the increase in the amount of water divided by the time, many drew very small triangles on their graphs and consequently were unable to do the calculation with sufficient accuracy. Some ignored the scales, some used $\frac{x}{y}$, some started their triangles on line *P* and finished them on line *Q*, and some, having obtained an accurate gradient of 0.35, did not realise that a negative sign was needed for the decrease. Candidates should be advised to draw large triangles on graphs to maximise the accuracy of their calculations of gradients.

A very common misconception in part (b)(i) was to compare the gradients of the graphs rather than the time it took each container to empty. Candidates need to be able to distinguish between a statement and a comparison.

Question 7

This question was not done well with most candidates gaining either 3 marks or 0 marks. Few candidates realised that they needed to use the 100^{O} given in the pie chart to calculate the amount raised in Year 7. Most candidates only used the numbers in the table. A common incorrect answer here was (£)193.75. Although not penalised, candidates should be advised to take greater care with the use of money notation. Answers such as £137.5, 137.50 and 137.5, were very common.

Question 8

Part (a) was generally done well. Most candidates were able to find an estimate for the median height.

In Part (b) many candidates were unable to use the information given in the cumulative frequency graph to calculate the interquartile range. A significant number of candidates did not appreciate that there were a total of 88 hollyhock plants (ie not 80) and many used 20 and 60 to determine the lower quartile and upper quartile heights.

The inability of many candidates to interpret the scale on the cumulative frequency axis was evident in part (c). Calculations such as 84 – 74 and 88 – 74, and answers such as 5 (ie the number of 2mm squares), were very common. Candidates should be encouraged to show their work by drawing clear horizontal lines from the cumulative frequency axis to the graph, rather than simply marking the graph with dashes or dots.

Question 9

In part (a), most candidates were able to score at least 1 mark for 2 or more correct entries in the tree diagram. Few were able to score both marks. Many candidates did not appreciate that the probabilities in each pair of branches must add to 1. A common incorrect answer was 0.6 and 0.3 written in all three pairs of branches.

In part (b), many candidates were able to identify the correct outcomes from the tree diagram, but a significant number thought that they needed to add the probabilities rather than multiply them. Some candidates calculated the outcome for only one branch, eg 0.6×0.7. Most candidates were able to give their answer in a suitable form (usually as a decimal).

Question 10

In part (a), few candidates realised that they needed to find the total number of seconds for both the morning customers and the afternoon customers. Most thought that all they had to do was simply calculate the average of 48.7 and 50.2. Other popular incorrect methods were 50.2 – 48.7 and $\frac{6275}{75}$.

Part (b) was generally done well. Most candidates were able to draw an accurate box plot for the given information. Common incorrect answers were generally based on misinterpretations of the scale on the seconds axis. Freehand diagrams were often messy and difficult for examiners to mark. Candidates should be advised to use a ruler when drawing box plots.

Question 11

In part (a), many candidates were able to write down a suitable question for the questionnaire, sometimes with the time frame given with the response section. In the response section many candidates gave at least three response boxes, but these were not always exhaustive (often the 0 response was omitted) or non-overlapping. It should be noted that the use of inequalities to define intervals is inappropriate in the response section of a questionnaire, and that eg '□ 5 – 6' followed by '□ 6+', where '□' is a check box, are considered to be overlapping intervals.

In part (b), many candidates were able to find the number of males needed for the stratified sample, most giving their answer as an integer (generally 4). Some candidates got confused with the order of the calculation and worked out $127 \div 50 \times 10$ not realising that their final answer (25.4) constituted more than half of the total number of people to be surveyed. Another common error was $\frac{19}{127} \times 50$.

In part (c), most candidates were able to give at least one correct reason for why Raul's survey is biased. A common incorrect reason here was that the sample was too small. Some candidates thought that only males aged between 17 and 30 were being sampled.

Question 12

In part (a), this question was done quite well. Many candidates were able to draw a histogram with at least 3 correct blocks or to calculate at least 3 correct frequency densities (usually by frequency ÷ class width shown in the table). A common error here was to simply draw a bar chart, or a frequency polygon, for the information given A few candidates extended the last block in the histogram to 55.

Part (b) was not done well. Few candidates were able to relate the area of the given block (x) to any of the areas of the other blocks. Many thought that they needed to work only with the heights of the blocks. It was often unclear as to which methods the candidates were attempting. Candidates should be advised to state their units when using a counting squares approach (eg cm^2)

Question 13

Part (a) was done well. Many candidates were able to divide 0.9 in the ratio 1:2 (usually by inspection), but some incorrectly gave 0.6 on the answer line. A very common error here was $\frac{1-0.1}{2}$ (=0.45).

Part (b) was not done well. Few candidates could work out the required probability by calculating $(0.1)^3$. A very common incorrect answer here was 3×0.1. Some candidates, having reached the correct calculation $(0.1 \times 0.1 \times 0.1)$ were unable to evaluate this correctly. A common incorrect answer here was 0.01.

Part (c) was not done well. Only the best candidates opted for the direct approach and were able to deal with the probabilities 0.3 and 0.7 correctly to arrive at the correct calculation (usually by drawing a tree diagram). Many candidates attempted this question by dealing with all three probabilities 0.1, 0.3 and 0.6 and drawing a tree diagram with 27 outcomes. Few of those candidates attempting this approach were able to select all the correct outcomes for the required probability.

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