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Principal Examiner Feedback

November 2011

GCSE Mathematics (5MB1H)
Paper 01 (Calculator)

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1. PRINCIPAL EXAMINER'S REPORT – HIGHER PAPER 01

1.1. GENERAL COMMENTS

1.1.1. Almost all candidates attempted all questions.

1.1.2. Accuracy of arithmetic continues to be an issue for some candidates. This is a calculator paper and candidates should be actively encouraged by centres to use them appropriately.

1.1.3. Candidates should read questions carefully and answer the questions asked. Misinterpretation of words such as estimate and approximate can lead to candidates losing marks Q8 –10, Q13(b), Q14 – 20 were less successfully completed.

1.1.4. The use of keywords and mathematical vocabulary is important for both understanding and answering questions. This was highlighted on this paper when pupils needed to describe the type of correlation seen in Q5.

1.1.5. Premature rounding in working does lead to inaccurate answers and centres should encourage pupils not to round to one decimal place at the first stage of calculations unless the answer is exact to this accuracy.

1.1.6. As previously reported the probability tree is usually well done but marks are lost by the candidates lack of manipulative skills with fractions. For this paper a calculator could have been used to avoid unnecessary mistakes.

1.1.7. The standard of pupils communication is sometimes poor. We see examples where we feel a student may have the correct idea but they are unable to articulate their mathematical thoughts fully. With the introduction of QWC questions centres should support students to develop the skills necessary to provide succinct and appropriate explanations or reasons.

1.2. REPORT ON INDIVIDUAL QUESTIONS

1.2.1. Question 1

Part (a) was well answered. With 96% of candidates scoring full marks with the most common error occurring in the subtraction.

Part (b),majority of candidates got this part correct, although there were some, who knowing it was a probability question, thought the answer should be less than one and so wrote down 0.24 as the answer. Some wrote down the answer as a fraction $\frac{24}{60}$ and these candidates scored B1 only. For those candidates who showed working and arrived at $\frac{24}{60}$ and then proceeded to cancel it to $\frac{6}{15}$ there was a method mark but no accuracy mark. Those who wrote down $\frac{6}{15}$ without any working scored no marks at all. A common error in solving this question was working out 60 ÷ 4 to get 15. Others didn't know what to do and did (60 × 0.40) ÷ 100. Candidates should be made fully aware that it is foolhardy to just write down an answer without working as showing method can gain method marks even though their answer may be incorrect.

1.2.2. Question 2

This question was often fully correct. Candidates showed very little working of meaning and so part marks were hard to award. Where working was seen it was often incorrect, such as an attempt to use a build up method of the ratios to obtain an answer but not finishing the method, simply dividing 60 by 2, 3 and 7 or changing the 60kg incorrectly to 6000g and attempting a wrong method to work out the answer.

1.2.3. Question 3

This question elicited a wide variety of responses. Many were unable to correctly identify all three terms that needed adding or else they tried to substitute numbers. Of those that managed to add x, $x + 3$ and $2x$ and gain one mark the second mark was lost by incorrect simplification, forgetting to divide by 3 or most commonly failing to realise the importance of brackets, with $4x + 3/3$ and similar expressions being disappointingly common. Even though the question asked for an expression many candidates felt the need to express their answer in the form of a formula, providing the letter they chose was not x they were not penalised.

1.2.4. Question 4

98% of candidates were able to identify at least one of the aspects that were wrong in part (a), although the literacy of the answers was quite poor. Some lost marks due to the difficulty in expressing themselves clearly, and generalised statements such as 'biased' and 'leading question' were too vague to be awarded a mark. Those that spotted 'there was no other box' or 'what if someone doesn't use the internet' were allowed the mark for realising that the responses were not exhaustive. There were a pleasing number of candidates that managed to mention all three of the aspects.

In part (b), many candidates managed to correct the original question by providing a time frame to gain the mark for the 1st aspect. As commercial questionnaires do not contain inequalities, those that chose to use inequalities in the response boxes lost the mark for the 2nd aspect. Tally charts also did not gain a mark for the 2nd aspect, although few of these were seen. There were still a number of overlapping response boxes but as long as these were exhaustive they gained a mark.

1.2.5. Question 5

In part (a), almost all candidates were able to plot the points correctly.

In part (b), most candidates stated it was positive correlation, a few commented on the strength as well and this did not affect the mark awarded. Some however did try to describe the relationship and these kinds of answers gained no marks.

Part (c) was the worst answered part of the question. Although most knew that a line of best fit had to be one straight line there was the occasional candidate who joined the points with a multitude of straight lines. The biggest error here was that a significant number drew their lines short or not within the guidelines. It was mainly the boundary at 185 that caused the problems. These candidates lost the mark for this part. Some candidates drew their lines of best fit going through the origin. Most candidates scored the mark for part (d) by reading off their graph correctly.

1.2.6. Question 6

In part (a), there were many alternative methods employed in this question to good effect, with most candidates appearing to understand the concept of 'best buy'. Those that chose methods that displayed the price for an equivalent amount, e.g. how much 22 tablets from the small box would cost, often lost the accuracy mark by rounding prematurely. Those who found "price per tablet" or "price for an equivalent amount" generally came to the correct conclusion, and could usually articulate "for one tablet". However, those who calculated "tablets per £" generally drew the wrong conclusion, with many believing they had found the price per tablet. The most common responses that gained no marks were those that subtracted the number of tablets and prices, and tried to justify the cost of the 7 tablets difference in a variety of rather vague ways.

Part (6bi), a surprisingly large number of candidates, 40%, failed to answer correctly this relatively easy question. Some rounded to the nearest unit or 10 or even 100 and of course 356.9 or 356.499.

In part (6bii), again a surprisingly large number of candidates, 68%, gave incorrect answers to this question. Not only was 357.49 seen as an incorrect answer, more accuracy was required, but pupils again gave answers to the nearest 10.

1.2.7. Question 7

In part (a), many pupils were able to give the correct gradient for this question. However there are still some candidates who do not know which way round to divide and obtained an answer of $\frac{1}{2}$ instead of 2. Many responses contained a right angled triangle drawn on the line. However some who had drawn a right angled triangle on the line scored a method mark but lost the accuracy mark because they made the assumption that for both axes a scale of 1cm = 1 unit was used.

In part (b), nearly all candidates gave the correct answer of 'Train A' but there were a variety of reasons of which some were right and some were wrong. The right answers mainly came from those who compared the distances travelled in the same time. Some said that the gradient was steeper and a few attempted to calculate the speeds and compare those. Among the wrong answers were Train A went further but omitted to mention that it was in the same space of time or wrong speeds being compared. Literacy skills were an issue for some candidates in this part of the question.

1.2.8. Question 8

There were too many that lost the mark for the basic addition required in part (a). Even with the error in the table most then went on to score either part or full marks in part (b). The most common mistake in part (b) was not realising that 'greater than 12' does not include 12, but $\frac{7}{20}$ still gained one mark. The vast majority of responses were presented using correct probability notation, with very few 'out of' or ratios seen.

In part (c), the layout of many of the candidates working for this question was haphazard, with a minimal use of words to explain steps. In spite of

this many scored full marks. The weaker candidates could not link the $\frac{2}{20}$ to a situation of 60 people, but most were able to get 1 mark for working out the income of £30. Although there were a number that worked backwards, making the mathematics fit, these rarely justified why 6 had won and so lost part of the marks for the question. There were a number that showed the profit from the non-winners only and loss of £1 to each of the winners, this was an alternative valid method and could if done correctly gain full marks.

1.2.9. Question 9

Part (a) was well answered with 84% of candidates gaining full marks.

In part (b), for those that had an answer to part (a) the majority plotted the points correctly and joined them with a curve or straight line segments. Only a few did not plot the points at the end of the intervals but provided they were consistent within the intervals they scored one mark instead of two.

In part (c), a significant number managed to get answers within the range 48 - 52 and gained the 2 marks. The range of 48 to 52 was too tight for some students but follow through marks were available in this part of the question. Where answers were incorrect some forgot to subtract their reading at 36 from 120, these candidates scored 1 mark only, others read off the value at 33 not realising that the 2 scales were different and so failed to score.

1.2.10. Question 10

Part (a) required the candidates to draw an accurate box plot from the given data. There were very few non attempts and nearly all candidates, managed to score at least a mark for two correct values drawn with a box or whiskers. The majority managed to have the maximum and minimum values in the correct places, although the UQ and LQ values proved challenging to many.

In part (b), many candidates stated values without comparative statements thus losing marks. Those that used the word mean instead of median also lost that mark although ‘average’ was acceptable. Quite a few commented on the oldest and youngest members of women/men without any mention of range. Others stated that there were ‘more older men than women’ attending the tennis club, losing the mark as there is nothing to suggest the quantities of men at the club

1.2.11. Question 11

On the whole a well answered question. However common errors were to round too early or leave the answer as a fractional amount of girls. Answers should always be checked to see if they are sensible

1.2.12. Question 12

In part (a), there were a number of ways to gain the first mark in this part and many were able to gain at least one mark. Most were for at least one correct value in the table. Although a few managed to demonstrate that frequency = frequency density x column width, or a correct frequency density scale was seen. It was rare to see a correct area identified. The most commonly seen errors were 90 for the first frequency.

Part (b) was answered consistently well but common errors were drawing the first bar at 3cm and the second bar at either 4.8cm or 1.2cm for those that did not find the correct scale, or forgot to change the class width accordingly.

Part (c) proved to be beyond the capabilities of all but the very able. Although many candidates were able to find the interval in which the median lay, very few were able to progress beyond this point and either left their answer as a range or else gave the middle value of the group. A number of candidates attempted to calculate an estimate for the mean.

1.2.13. Question 13

In part (a), the tree diagram was generally very well done with the majority of candidates gaining full marks. For those that did not, marks were lost by some candidates who did not read the question and answered it as if there was no replacement.

In part (b), many candidates went on to calculate correct probabilities from their tree diagrams even those with mistakes. Some added rather than multiplied the probabilities and arithmetic skills were mixed in this part.

1.2.14. Question 14

This question proved difficult for many candidates. It was clear that many candidates had never met this 'capture/recapture' concept and many used a method of addition/subtraction assuming that all the rabbits had been collected over the two days so there were 175 in total (ie 120 – 15 + 70) – scoring no marks. The explanation part was also often misunderstood with many candidates thinking that they had to explain in detail what their calculation was for, rather than assumptions about rabbit population or still attached tags. However a few did score a mark for a correct assumption with no correct working.

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