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Examiners' Report
March 2013

GCSE Mathematics 5MB3H
Higher (Calculator)
Paper 1

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Introduction

This is a calculator paper. It was evident from some work that candidates were attempting the paper without the aid of a calculator. This is not advisable, since calculation errors will cost marks.

Many candidates were able to make inroads into some of the unstructured questions, while still gaining marks on questions of a more traditional style.

Many able candidates lost marks in the easier questions in the first half of the paper, due to careless errors being made. To gain the highest marks, candidates had to demonstrate high order thinking skills in a range of questions, not just in questions towards the second half of the paper.

The inclusion of working out to support answers remains an issue for many candidates.

Report on individual questions

Question 1

This question was extremely well done; the most common method was price divided by kg, though many candidates used the fact that the large box was twice the weight of the small box and compared £8.40 with £8.68. Each season sees an improvement in the statements being given, but some candidates still miss these out or interpret their own figures incorrectly.

Question 2

This question was done well by the majority. A minority did not gain the mark for a correct monetary answer, leaving their value without any indication of £s or pence. The most common incorrect solution came from $(7 \times 8)^2$.

Question 3

This was another question that usually gained full marks with arcs accurately drawn and shading correct. Only those who did not understand that an arc was required failed to score any marks. A few candidates shaded inside the arc and it was evident that a few did not use a compass.

Question 4

This question also offered full marks to most. In part (a), some candidates failed to include the 0, or added −4 or 2 to their list of numbers. In part (b), weaker candidates often interchanged the signs. Some candidates offered a list of integers perhaps not recognising the change in requirement from part (a) to part (b). Not all candidates included a variable with their inequalities.

Question 5

It is disappointing to see that a large number of candidates chose to use the wrong formula, in this case the area of a circle formula, attracting no marks. There were some who lost marks by using the diameter and others who gave a rounded (inaccurate) answer without showing any supportive evidence of working.

Question 6

This whole question was very well answered by the vast majority of candidates. In part (a), most candidates calculated the correct missing values; only a few weaker candidates got −5 instead of 5 for y when $x = -3$.

In part (b), the vast majority of candidates gained full marks for a good curve. Only a few used straight line segments, which prevented them from gaining full marks. Overall the quality of graph drawing was an improvement on previous years.

Question 7

Many candidates failed to give one of the necessary requirements for an enlargement, most commonly omitting the centre of enlargement. Centres should make candidates aware that any use of combined transformations will not entitle them to any marks. It should also be stressed that coordinates should be written correctly and not as a column vector.

Question 8

It was important in this question to set out all working clearly to attract the maximum possible marks. The majority calculated 7.5% correctly but often converted $\frac{7}{9}$ to an inaccurate decimal, which spoilt the rest of the working.

There were a significant amount of candidates who gained three marks but then clearly did not understand what they had found, and concluded incorrectly.

Question 9

Part (a) was answered accurately even though rounding was poor. As long as the correct decimal was shown, full marks were gained. A significant minority showed no interim calculation and only wrote 0.88 on the answer line, so they failed to score any marks.

Part (b) rarely attracted any marks, since candidates multiplied by 100^2 or just 1000, or performed a division.

Question 10

This was a successful question for many. There have been great improvements in the quality of answers offered for this type of question over the years. The vast majority of candidates are now gaining at least three marks. It is pleasing to see that candidates show the results of each trial to some degree of accuracy and that in the main a trial to two decimal places assists them in gaining full marks. Weaker candidates continue to omit this 'extra' trial and write the result of a trial on the answer line rather than the value of x.

Question 11

This question was not well understood and proved to be a good discriminator. Most gained the method mark for showing the calculation 60 000 × 0.75 or for the digits 45 but did not know the conversion rate of mg to g. Generally anything but 1000 was seen. Weaker candidates made the mistake of dividing by 0.75. This is clearly a topic that needs more understanding and practice.

Question 12

In part (a), many candidates used incorrect signs when attempting to collect the x's on one side and the numbers on the other, $3x$ and -1 were common. This was a standard question and candidates at this level should be performing much better; this is a topic in algebra that needs more practice.

Part (b) was very well done by the majority. The most common route was to expand the brackets. Some of those that divided by 4 first made errors.

Question 13

Too many responses used a compound interest method on scheme A to work with 4%, and answers for comparison of £2704 and £2698.80 were very common. Too many tried 'step' methods to work out the percentages – 10%, 1%, 3%, etc. – which led to inaccuracies. Some used the 4% in part (b) instead of 3.9%. Many of these problems could have been avoided with careful reading of the question.

Question 14

Although many candidates spotted that by adding the equations the y's would be eliminated, they then went on to make careless arithmetic errors. Many multiplied the equations by 7 and 3 respectively, so that they could eliminate the x's by subtraction but often made errors with negative signs.

Question 15

All parts were well attempted. In part (c), the only common error was to fail to show the power 3 as negative.

Question 16

Many candidates established the correct area of a circle with 78.5… seen. Some responses did not go on to use 1000 correctly to calculate the height.

Question 17

Candidates who did not initially multiply out the brackets correctly ran into problems soon after. Many errors resulted from poor rearrangement and $2y - 3$ was frequently seen.

Question 18

Many candidates worked out the x distance and the y distance from A to C, giving the answer (9, 18), failing to recognise that they needed to add these values to A (2, 3) to get the coordinates of C. Many were not able to work on their own initiative to solve this question.

Question 19

This question was poorly done except by the most able candidates. The vast majority only managed to gain the first method mark for Pythagoras and generally $AC = 5$. Very few recognised the need to use trigonometry and many attempted to use the cosine formula badly. Of those who did use trigonometry, the sine rule was seen most commonly.

Question 20

Many candidates used the formula, usually gaining the first mark for substitution, but many of these were unable to handle the negative signs. Stronger candidates who did factorise generally got full marks. Too many used trial and improvement, usually getting no marks since they were unable to establish the solutions.

Question 21

This topic was clearly not well understood or prepared for. The vast majority of candidates gained one mark for 1180.5, but many showed no knowledge of bounds. Very few understood that they needed to substitute 6.15 in the volume formula before dividing. Some realised that they needed the upper bound for mass divided by the lower bound for volume and this was rewarded if 1180.5 or 6.15 was seen. Only the most able candidates gained full marks.

Question 22

Very few attempts were made at this question. Sometimes one mark was awarded for identifying two pairs of equal sides. There were attempts to calculate angles *DAG* and *EAB* but these often incurred incorrect calculations and failed to reach the conclusion that they were equal. There was much evidence of misconceptions and misjudgement such as stating that two of the triangles were isosceles or incorrectly pairing sides.

Question 23

Part (a) was answered correctly by many candidates. In contrast part (b) was rarely attempted. Working was often unlabelled and difficult to follow so it was virtually impossible to follow the candidates' routes to solving the problem. Many established a first step of correctly identifying *QB* as $2a + 2b - c$ but then did not know what step to take next.

Summary

Based on their performance on the paper, candidates should note the following points:

- ensure a calculator is brought to this calculator paper
- ensure easier questions are practised as well as harder ones
- practise quality of written communication (QWC) questions, remembering to give a statement with the answer
- show all working out whenever possible
- remember that rearranging algebra is an essential skill, especially when solving equations.

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