Principal Examiner Feedback

Summer 2012

GCSE Mathematics (2MB01)
Paper 5MB3F_01 (Calculator)

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GCSE Mathematics 2MB01
Principal Examiner Feedback – Foundation Paper Unit 3

Introduction

Most candidates made a good attempt at the paper and the overall performance was most encouraging.

The great majority of candidates used the spaces provided on the question paper effectively to show their working. However there are still some students who do not write down sufficient working.

Some candidates appeared to be at a disadvantage through not having access to a calculator or protractor. Candidates who did have a protractor often did not use it correctly.

Questions involving fractions were not answered well. Candidates did not seem to appreciate how to take advantage of a calculator in these questions.

Candidates are becoming more aware of what is required to gain communication marks. However there is still a substantial proportion of candidates who do not give a clear statement which directly addresses the demand of the question.

Report on individual questions

Question 1

Sixty three per cent of candidates were able to write down the mathematical name of the polygon in response to part (a) of this question. Incorrect spelling was allowed as long as the intent of the candidate was clear.
The great majority of candidates were able to identify the two congruent polygons in part (b).

About two thirds of candidates gave a correct response to part (c) though it appears that a significant number of candidates either did not read the information given or did not understand the term "interior angle". Some candidates seemed confused between interior and exterior angles while other candidates did not count correctly the number of angles in the shape given. A small number of candidates attempted to find the size of an exterior angle and then subtracted it from either 180 or sometimes, 360. A commonly seen incorrect answer was 30.

Question 2

The first three parts of this question were answered quite well with a correct response from 72%, 63% and 88% of candidates, respectively.
Part (d) was also well done though some lack of care was evident with a significant number of candidates either misreading the temperature scale or making an error in their arithmetic. The incorrect answer 10 was commonly seen. Candidates who wrote down the subtraction of their two temperatures were more likely to gain potential credit in such circumstances. Few did.

Question 3

Nearly all candidates made a sketch of a polygon and over half of the sketches were of a pentagon. Freehand sketches were accepted. Many hexagons and octagons were drawn. Where candidates made more than one attempt at sketching a shape, they did not always make clear which one they wished to be marked and consequently sometimes lost a mark.

Question 4

Eighty five per cent and sixty seven per cent of candidates were awarded a mark in parts (a) and (b) respectively of this question. The use of a calculator had clearly helped candidates to avoid errors such as using "two minuses make a plus" incorrectly in part (b) though 18 was the most often seen incorrect answer.

Question 5

Nearly all candidates attempted this question well. A small proportion of candidates gave 16 (presumably from 20 − 4) as their answer to part (a).

Question 6

Most candidates appeared to know what was required in this question and nearly two thirds of them were able to give the real distance within the tolerance accepted by examiners. In cases where a candidate did not score full marks but had attempted the question, it was often not possible for examiners to give them any credit because no working was shown. Part marks were available for either a correct measurement from the map or for the method of multiplying their measurement by 2. Regrettably, many candidates did not show either of these. A common incorrect answer seen was 14.5 which seemed to indicate that some candidates may have measured the 7.5 accurately but then were unable to double it without error.

Question 7

This question was answered very well with the vast majority of candidates reflecting the shape accurately and clearly. Only occasionally in part (b) did candidates either translate the shape given rather than reflect it or plot one vertex of the image incorrectly. Over 95% of candidates scored both marks in this question and less than 1% of candidates failed to gain any credit.

Question 8

Majority of candidates gained at least 3 marks for their answers to this question. Responses were well organised and much of the working was accurate. Most candidates calculated sales for each day before adding to give the total sales. A smaller proportion of candidates calculated the sales for each item then added to give them their total. Candidates generally handled the mixture of pounds and pence with confidence. Where marks were lost it was usually due to either an occasional mistake in the arithmetic or a failure to give a clear conclusion in response to the question "Has Mark sold at least £28 of equipment this week?" Candidates who had made an arithmetical error which gave them a total less than £28 often qualified for the award of the communication mark where their final statement was supported by their working.

Question 9

Over four fifths of candidates gave a correct answer (either 66 or 88) to part (a) of this question though answers of 88 were rarely seen. The most common incorrect answer seen was 44 and it seems that candidates giving this answer may have not considered the drive back from Devizes to Apley as part of the journey

Almost as many candidates were successful in part (b). Where candidates were not successful there was often no working shown so examiners could not give any credit for method even though candidates might have got one of the distances correct and have performed the relevant subtraction.

Part (c) was not done as well. The answer seen most was 17 followed by 19 and then the correct answer 18 which was given by only 6% of candidates. These answers imply that most candidates did not consider anything beyond dividing 17 by 1 and of those who did, most considered there to be seventeen water points plus one at each end of the route. These candidates were awarded 1 mark. A small number of candidates considered the longer route from Beswick to Charnwood via Apley and Devizes. They were, of course, rewarded for answers of 49, 50 or 51.

Question 10

The correct scale factor was given by over a half of all candidates. The two most common incorrect answers seen were 2 and 9. Sometimes answers in an incorrect form were given. For example 1 × 3 and 3 × 3 were seen quite often.

Well over 80% of candidates were able to move the square 4 squares to the left. Small number of candidates either moved A one too many squares to the left or drew a 3 by 3 square. In order to avoid the former error candidates could be advised to concentrate on one corner at a time rather than the whole shape.

In part (c) squares were usually drawn accurately and within the tolerances allowed by examiners. Almost 90% of candidates scored full marks for their drawing with a further 7% of candidates scoring 1 mark for either a side of correct length or a 90° angle. A few candidates drew rectangles rather than squares.

Question 11

The vast majority of candidates were able to draw the conversion graph in part (a) of this question and most used a ruler to draw the straight line. Some candidates failed to join (0, 0) to (15, 10) and were penalised for this. Of those candidates who failed to gain any marks in this part of the question, many drew vertical and horizontal lines but did not specify the points being plotted clearly, for example, by using a cross. A few candidates drew line graphs or bar charts.

It was encouraging to see so many correct answers to part (b) of the question despite the fact that the first part of the question asked the candidate to change £ to $ rather than $ to £. Candidates who drew lines across to or up to their conversion graph were less likely to make errors in reading from their graph. Over 80% of candidates scored at least 2 marks for their answers to this question.

Question 12

This question was a good discriminator with part (a) being well done by most candidates and part (b) providing more of a challenge. Over 80% of candidates were successful in gaining both marks in part (a) and 50% of candidates gained all 3 marks in part (b). In the second part some candidates failed to realise that the question was testing inverse operations and substituted 13 for the number of children. Other candidates were able to identify the inverse operations needed but applied them in the wrong order. Many candidates used a trial and improvement method. Sometimes candidates could have avoided a loss of marks by checking that they had put the correct number on the answer line. For example "13 = 32 ÷ 4 + 5" was often seen in the working space but sometimes the answer "13" was then written on the answer line.

Question 13

A good proportion of candidates used their calculator effectively to produce a clear, concise and accurate answer to this question. However, there were many others who were clearly unable to work out a fraction of a quantity. Centres are advised that this technique appears frequently in questions and candidates should be advised to practice it. Over 40% of candidates scored full marks but over 40% of candidates scored no marks. A small minority of candidates converted the fractions to decimals or percentages but this did not seem to give them a better chance of scoring highly on the question.

Question 14

Most candidates made a good start on this question and gained some credit for their answers. However many triangles drawn in part (a) did not have accurately drawn angles either because candidates did not have access to a protractor or because they had misused it and drawn an angle of 40° rather than 50°. Some candidates drew the two given sides and the given angle accurately but then failed to complete the triangle by joining the end of each line. Few candidates used a scale other than the obvious 1cm represents 1m. A good answer in part (a) was often followed by a fully correct answer in part (b).

Thirty five per cent of candidates scored both marks in part (b) with a further 13% gaining some credit for their attempt. A significant number of candidates misguidedly thought it was appropriate to use Pythagoras to calculate the length of the third side of the triangle, whilst others added together only the lengths of the two sides. Other incorrect methods included adding the lengths of the two given sides without considering the need to include the length of the third side (to give an answer of 13) and using a method which included multiplying the 7 and the 6.

Question 15

This question proved to be a good discriminator. Eighty three per cent of candidates gained some credit for their answers with 52% of candidates scoring full marks. There was significant evidence on some scripts to suggest more candidates than expected had difficulty with working out $18 \times 6\frac{1}{2}$ – surprising in a calculator paper and suggesting that many candidates did not have access to a calculator. Some candidates used 6.3 or 6.30 instead of $6\frac{1}{2}$ and, of course, lost marks as a result.

A significant proportion of candidates completed only part of the calculation needed whilst other candidates failed to appreciate that the final answer should be rounded to a whole number of boxes.

Question 16

Many candidates found this question straightforward with over 70% of them obtaining at least 2 out of the 3 marks available. Where candidates did lose one mark it was often because they omitted units (cm) in their answers. Conversely there were candidates who scored 1 mark for correct units but did not have a correct method to find the length of the enlarged photograph. A small number of candidates successfully found the length then went on to calculate the perimeter or area of the photograph.

Question 17

This question was well answered by about half of the candidates. There were instances where random calculations such as $60 \div 3$, $500 \div 3$ appeared in the working space or where attempts using a compound interest method were adopted. However, many candidates appeared to know exactly what was expected and completed the question concisely and accurately. Of the candidates who were not successful, it appeared that many of them could not work out a percentage of a quantity.

Question 18

The first part of the question was badly done with many candidates merely solving the equation given. Few candidates realised that the formulation of algebraic expressions for the number of cards each person has was the key to this part of the question.

Fortunately, many candidates then realised that it was the solution of the equation in part (a) that was needed in order to obtain the answer to part (b).

Other candidates successfully adopted a purely numerical approach to the problem. Very few candidates scored full marks in this question but over 60% of candidates gained at least 1 mark for their solutions.

Question 19

This question was not well done with less than one in five candidates scoring any marks. The question was often either not attempted or an incorrect answer appeared on the answer line without any working shown in the space provided. Many candidates could not deal with or ignored the whole number parts in their calculations. Candidates working with decimals were given credit provided they carried out their working with sufficient accuracy. Many candidates lost marks here because they rounded prematurely. It is perhaps surprising to report that few candidates seemed to use a calculator to help them to complete the question or to check their answers.

Question 20

This question proved to be a good discriminator.

Parts (a) and (c) of this question were generally well answered though some candidates worked out the VAT on the cooker in part (a) without adding it to the £650 to find the total cost of the cooker. Some candidates calculated the VAT then subtracted it from £650. Very few candidates used a method involving one of the multipliers 0.2 or 1.2 but many calculated 10% and 5% of £650 before adding them. In part (c), a significant number of candidates could only partially complete the question by either dividing by 3 or multiplying by 8 but not both.

Part (b) was not well answered. A few candidates expressed the sale price as a percentage of the original price but most candidates seemed to complete working without any clear intent. Many of them subtracted £39 from £260 but got no further.

Almost 30% of candidates scored the full 7 marks in this question. Eighty seven per cent of candidates scored at least 1 mark.

Question 21

Many answers seen were concise, accurate and clearly communicated. One third of all candidates scored full marks. A further 7% of candidates scored 3 marks out of the 4 available either because they did not give a clear statement indicating which box gave best value or because they made an arithmetic slip. Approaches to answering this question varied. A large number of candidates worked out the cost per kg of soap powder for the three boxes and compared these. However, a significant number of candidates worked out the cost of the same amount of powder, e.g. 90kg, using each box size. Other candidates worked out the number of kilograms of powder per £ for each box.

A large proportion of candidates only compared the cost of two of the boxes, often by comparing the cost for example of 10kg of powder using 2kg or 5kg sizes. These candidates were usually unable to provide a convincing comparison with the 9kg box. Limited credit could be given to these candidates.
Many candidates did not have a clearly thought out approach to the question and 45% of candidates gained no marks for their responses.

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