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Principal Examiner Feedback

Summer 2014

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Unit 3: 5MB3F_01 (Foundation)

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Summer 2014
Publications Code UG039454

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

Introduction

This paper included a number of questions where students were required to draw or measure accurately. Unfortunately a lack of accuracy with these activities caused a number of students to lose marks on a variety of questions where their understanding of underlying concepts may well have been secure. Students need to be aware that tolerances of only ± 2mm and ± 2° are generally allowed.

More proficiency with a calculator would have helped some students along with willingness to use it rather than revert to perhaps more familiar non-calculator methods for calculations such as finding percentages. It was disappointing to see misunderstandings about units meaning that values were squared on sight of cm^2.

Centres should make sure that students are prepared with strategies to check their work. These could include careful re-reading of a question before moving on to ensure that the actual question set has been answered and a common sense consideration of whether an answer is of the correct magnitude.

Report on individual questions

Question 1

The majority of students answered this problem successfully and their accuracy was supported by clear step by step working. Occasionally an answer of 13 and 7 was seen indicating that the student had misunderstood the first line of the question and thought that Ann and Ben had 20 cards between them, which is 10 rather than 20 each. Students need to be encouraged to take care with reading details given especially at the beginning of questions and at the beginning of a paper when their eagerness to make a swift start can lead to unfortunate errors.

Question 2

About three quarters of students successfully identified a pair of congruent shapes in (a) and about two thirds found a similar shape to that given in (b). The different orientations of the congruent shapes may have caused difficulty as many incorrect answers identified shapes A and C which had the same orientation with just one vertex moved 1 cm. Several gave the pair of similar shapes instead but did not revisit this answer after completing part (b). Shape I, the other isosceles triangle, was the most common incorrect answer in (b) with those students presumably not realising the mathematical meaning of the term “similarity”.

Question 3

Two thirds of students correctly identified the pentagon in part (a) with hexagon given often as an incorrect answer despite its appearance in part (b). The majority were able to sketch a hexagon in part (b) and when multiple attempts had been made students were well disciplined in clearly indicating their final answer. In part (c), virtually all students attempted to draw a rectangle and appeared to understand the properties of the shape. Where mistakes occurred it was generally due to a lack of perpendicular sides rather than inaccurate side length. Students need to be made aware of the need for care and accuracy with their drawing with tolerances of only ± 2mm and ± 2° allowed here. A few students drew triangles and thus gained no marks.

Question 4

Students were very successful finding the total scores of 27 and 27.1 and identifying Sarah as having the higher total score. Where a mark was lost, it was more often for the incorrect identification of Greta rather than following arithmetic errors as calculators were allowed.

Question 5

The context of painting a wall seemed accessible and so students made the correct decision to round up their accurate answer to 5 whole cans. There were, however, a significant number who misinterpreted the m^2 units and squared the values 58 and 12 before dividing.

Question 6

Comparative heights of bars in the chart were interpreted correctly by virtually all students to give correct answer for the month with the highest rainfall in part (a) and the pair of months with the same rainfall in part (b). In part (c) students needed to make 2 correct readings from the rainfall axis and this caused many problems. Typically, they did not realise that two small squares represented 1mm and instead assumed that one small square was either 1 mm or 0.1 mm giving readings of 13 and 7 or 10.8 and 5.2

Question 7

As in question 5, the context of the question appeared accessible and so meant that most students made a correct decision about the need to round their final answer up to give enough minibuses. A few did not use all the information and disregarded the 3 coaches, expecting to transport all the people by minibus.

Question 8

Reflecting the shape in part (a) caused very few difficulties with just a few drawing a translation instead. Only two thirds had a correct scale factor in (b) with several responses left blank or involving addition instead.

Question 9

Students showed a good understanding of using a formula given in words with the majority picking up the first mark for calculating 75 minutes. Problems then occurred with the need to convert this answer to hours and minutes to find the start time. Some omitted this stage completely or incorrectly used the decimal 1.25 and subtracted 1 hour and 25 minutes from 1pm, thus gaining no further marks. Unfortunately, a few students spoiled otherwise correct work by giving 11.45 pm rather than 11.45 am or even just 11.45 which was accepted.

Question 10

Part (a) was on the whole answered very well. Where students lost marks it was generally not due to inaccuracy when plotting, but just a lack of understanding of what they were being asked to plot with lines that did not extend to 0 or 8 gallons and responses showing bar charts or stick graphs seen.

Part (b) caused few difficulties but misreading of the horizontal scale in part (c) led to many answers of around 6.7 where one small square was interpreted as representing 0.1 rather than 0.2 gallons.

Question 11

Addition of directed numbers caused relatively few problems in part (a) but when subtracting in part (b) some did give 9 as an answer to – 5 – 4 presumably from a misconception along the lines of “2 negatives make a positive”.

In part (c) an answer of 3 was the most common error with the negative sign being completely ignored. In other cases, the division symbol was read as subtraction leading to an answer of – 8

Question 12

Just over three quarters of students were able to substitute two positive values into this formula but evaluation caused a minority some difficulty when the rules for order of operations were not adhered to and $4 + 2 \times 5$ was given as 30 of those who did not substitute correctly, the most common error was to simply write 25 for $2t$ rather carry out the substitution 2×5

Question 13

Part (a) was answered well and students were able to use a value or values in the table to build up to a correct answer. Very few part marks awarded for this question. In part (b), most students had the correct idea but many lost final mark as whilst they were able to carry out a currency conversion, they did not correctly interpret that values showed the cost of the coat was cheaper in France. Use of correct units was essential and students need to make sure that they are used to writing the symbols for Pounds and Euros distinctly.

Question 14

Solution of simple equations caused no problems for most students. Both parts of the question attracted just a single mark and little working was evident but students dealt with the arithmetic with few difficulties. Occasionally a subtraction took place to reach 6 as a solution to $2x = 8$ and 14 was the most common incorrect solution to $y + 4 = 10$

Question 15

About three quarters of students had some success with this tessellation question with the vast majority picking up both marks available. This shape was relatively straightforward to tessellate, so students were able to draw their solutions in a systematic way quite easily. It was very clear where students did not have any understanding of the word “tessellate” but instead gave a variety of shapes drawn scattered over the grid.

Question 16

Throughout this question, students appeared more confident with scale drawing than with bearings. In part (a) where a bearing was measured only about 40% gave the correct 120° with some answers of 60° blank responses indicated that some may not have been equipped with a protractor.

The vast majority of students picked up some marks on parts (b) and (c) but the main issue was one of accuracy. In part (b) the distance on the map had to be measured to within 2mm but many students were 3 mm away from the correct value.

Similarly, students who appeared to know what to do in part (c) lost one or even both marks due to a lack of care with their actual drawing. Again, students need to be aware that the tolerances allowed here were ± 2mm and ± 2°

Question 17

This question was answered well with a variety of methods to make the comparison used. The majority of students appeared confident with converting between cm and m and they were able to use their results to come to the correct conclusion from calculation of the length of thread needed or the number of dresses that could be made. When errors did occur it was usually with the conversion but unfortunately very unlikely answers did not prompt these students to reconsider.

Question 18

A pleasing 40% of students gained the full 5 marks on this starred question where Quality of Written Communication was being assessed with the very best students clearly well used to presenting their work in a clear structured manner with an explicit concluding statement. Most of the other students were able to carry out the basic operations needed for Investment A to work out the total interest earned after 3 years.

With Investment B, however, there were various problems with percentage calculations, with many using a “build up” method for calculating 3.5% rather than having a solid calculator method for calculating percentages. Unless evidence of a fully correct method was seen, part marks were not awarded for such work unless the correct answer was reached.

A common error, perhaps amongst more able students, was to treat Investment B as if compound rather than simple interest was being applied. Students need to be encouraged to check details carefully in such questions and not make assumptions based on similar questions they may have tackled during preparation for a paper.

Question 19

Performance on this question was very disappointing with less than 20% drawing a fully correct plan and very few picking up a single mark for a rectangle with one correct dimension. There were a great many nets or 3-D representations of the cuboid offered instead and a high proportion of blank responses seen.

Question 20

This question again highlighted many students reluctance to use a calculator for percentage work. Those who lost marks generally did so where they used a “build up” method rather a direct calculation of 5%. Some lost marks because they did not understand the concept of a “booking fee” and instead applied this as a reduction. Others calculated 5% of just one ticket rather than using the total cost of four.

Question 21

Students appeared well-prepared to answer this best value question with over a quarter able to employ a proportional method to reach a fully correct conclusion with supporting evidence. The majority of those who gained full marks calculated the cost per tea bag and where students lost marks for this method it was generally down to premature rounding. Students who calculated quantity per unit price were generally less successful and were on the whole unable to correctly interprect their results, in many cases mistakenly thinking they had calculated price per tea bag. Several students successfully gained one mark through scaling to 125 bags for the small box, but this method did not generally produce a correct overall conclusion.

Question 22

Part (a) was answered very badly and on the whole the majority of students scored nothing as they offered just numerical work that was in fact more appropriate for part (b). Where marks were gained students were able to correctly identify expressions to represent ages, but the addition of these was not clear.

Part (b) was answered well with about half of students correctly reaching the correct solution. A mixture of methods were given with trial and improvement as well as more formal solutions seen. As the numbers involved were relatively straightforward, those using trial and improvement scored full marks where part marks would not have been awarded if they had not reached the correct answer.

Question 23

Over one third of students recognised the transformation as an enlargment and gave the correct scale factor but correct identification of the centre of enlargement was very rare indeed. Many students lost marks through giving multiple transformations as answers, mostly in an attempt to give information about the position of the image in the absence of a centre of enlargment. Typically, a translation was described or vector given.

Question 24

Very few students gained marks on this question with less than 5% gaining full marks. A few showed beginning steps to find the cross-section area or cylinder volume but the relatively large numbers involved and conversion aspect presented too much of a challenge for most. The most successful students did set out their working well and often gave a descriptive commentary which may well have helped them to structure their solution.

Question 25

Students had little success with changing the subject of this formula with a few managing the first step, invariably to subtract 8 from both sides. Errors with algebraic manipulation were common with addition of 8 or even subtraction of 5 from both sides seen.

Grade Boundaries

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