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Principal Examiner Feedback

Summer 2016

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Higher (Non-Calculator) Unit 2

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GCSE Mathematics 2MB01
Principal Examiner Feedback – Higher Paper Unit 2

Introduction

There were some excellent scripts in response to this higher tier examination paper and there were few very weak performances.

Students appear to have been able to complete the paper in the time allowed.
All questions attracted some good answers with Q3b, Q14 and Q16 being the least well answered.

Students generally showed their working in a clear manner so examiners could often give credit for a correct method where the final answer was not correct.

Report on individual questions

Question 1

This question proved to be a good opening to the paper. Over three quarters of students scored full marks. Where there was a loss of marks, it was often because an arithmetic error had been made. Students using a method to obtain 15% by splitting it into 10% and 5% sometimes made an error in the calculation of 5% of 520 or 360 or 880. Less common errors included finding 85% or 1.5% instead of 15% and subtracting 54 from 78 instead of adding.

Question 2

The great majority of students worked out the correct value of p. However a significant number of students worked out the value of $n \times 3 - 5$ and some students calculated $2^4 - 5$

Question 3

The first part of this question was answered very well. It was rare to see an incorrect answer. A variety of approaches were used. The most common error made was in calculating the value of 10 ÷ 8. Students often evaluated this as 1.2 and gave their final answer as 14.4. These students often gained partial credit for their working. Those students who used the fact that 12 portions required one and a half times the recipe quantities were generally more successful in scoring both marks in this part of the question.

Part (b) of the question was not answered well. Most students worked out that 3.75 pounds of apples were required to make 12 pasties but relatively few of these students could convert 2 kg to pounds with sufficient accuracy and reach a valid conclusion.

Question 4

The most successful approach was where students calculated the number of boxes which would fit along the edges of a container. Students who worked out the volume of the box and the volume of the container and then divided one by the other often made errors in their arithmetic or in their conversion of the units used. Completely correct solutions using this method were relatively rare.

Question 5

Most students indicated that they were going to find the area of this compound shape by splitting it up. However, a large proportion of students could not handle the algebra accurately enough to find a correct formula for A in terms of x. Some students missed out necessary brackets whilst other students expanded brackets incorrectly, for example $3(x + 1) = 3x + 1$ or $5(2x + 1) = 10x + 1$ were often seen. A majority of students were able to score at least 1 mark for a correct expression for a part of the area. Fewer students got as far as the expression for the total area, $13x + 8$ and only about one quarter of students gave the complete formula $A = 13x + 8$

Question 6

The large majority of students scored full marks for their answers to this question. Where full marks were not scored, errors included the incorrect evaluation of y values for negative values of x, incorrect plotting of points and not joining the points plotted. A small minority of students used the scales on the grid incorrectly and so drew a line with the wrong gradient.

Question 7

This question was a good discriminator. Students often did not take into account all the necessary conditions in order to answer this question.

Most students realized that multiples of 24 and 36 were key to answering the question and they usually scored the 2 marks for listing multiples of each number. However, some students lost accuracy in their lists or stopped once their lists had reached 250 instead of finding the lowest common multiple higher than 250.

Some students ignored the requirement to have enough book marks and dust covers for 250 books and found the first common multiple of 24 and 36, i.e. 72. Attempts by a trial and improvement method rarely ended in success. Under a half of all students scored full marks for their answers.

Question 8

Many of the more able students found this question straightforward. However, for a significant number of students, progress beyond finding the size of the angle *APT* or the size of angle *QRD* was limited. Those students who found the size of angle *APT* (58°) did not always recognize that angle *PTR* was the same size (alternate angles) though this route was the one which featured most commonly among fully correct solutions.

Students who found the size of angle *QRD* could not usually work out that to use it a line parallel to *APB* and *CTRD* through *Q* was needed. More often, students assumed that angle *PTR* and angle *QRD* were equal in size despite their being no indication that line *PT* was parallel to line *QR*.

A small number of students drew a vertical line through *Q* and went on to complete the question successfully.

Question 9

This question was not always attempted. Many students did obtain a correct answer and most students achieved partial credit for finding the area of at least one face. A common error was for students to identify 4 of the faces as having the same area. A significant number of students calculated the volume of the cuboid instead of the surface area. Errors in calculations were also quite common.

Question 10

All parts of this question were answered well. Not surprisingly part (d) provided the most challenge with a smaller percentage of students gaining the mark available.

Question 11

This question was also answered quite well. The involvement of a negative power in the first part of the question led to it having fewer correct responses attributed to it than part (b).

Question 12

Most students were able to make a start with the factorization in part (a) of this question and so they scored at least 1 mark. Progress as far as $x(2a + b) - y(2a + b)$ or $2a(x - y) + b(x - y)$ was quite common. Only a small proportion of students could carry on to factorize the expression.

The expansion of $(n + 2)^2$ in part (b) of this question was usually correct and it was encouraging to see only a small number of expansions resulting in $n^2 + 4$.

There were more errors in the expansion of $(n - 3)^2$ with students making mistakes with signs or giving 6 as the constant term in the expansion. Success in adding the two expressions was varied and $n^2 + n^2 = n^4$ was seen far too often. However, a good proportion of attempts at this part of the question ended successfully.

Question 13

About two thirds of students scored some credit for their response to this question. There were two main errors in students' approaches. Some students multiplied the integer parts of the fractions separately and so gained no credit. A significant proportion of students converted the mixed numbers to improper fractions to score the first mark but then wrote the fraction with a common denominator, making later multiplication more awkward. Some of these students completed the question successfully but most did not. Many students did not give their final answer in the form required. Examples of final answers scoring 2 marks are $11\frac{10}{15}, \frac{35}{3}, \frac{175}{15}$

Question 14

It appears that this geometry question involving a circle and angles in an algebraic context may not have been familiar to some students who made no attempt at the question or who could not make any real progress towards a complete solution.

A significant number of students tried to apply one or more circle theorems, for example “angle at the centre is twice the angle at the circumference” or angle between tangent and radius is 90°” but without any real idea of how this would help them.

More able and confident students could see a route to finding the size of angle *POQ* and scored some credit for their solutions but many of them made sign errors or subtracted angles in the wrong order. Only the most able students scored 4 or 5 marks. This question was one of the least well done on the paper.

Question 15

This question was quite well answered and examiners saw many correct equations for the line L.

In cases where the final answer was not correct, it was often possible for examiners to award partial credit to students who found the coordinates of the midpoint of *AB* and/ or who made progress in finding the gradient of the line perpendicular to *AB*.

Many errors were seen when students attempted to find the value of *c* in $y = mx + c$ by substituting the point (3, 7).

Question 16

About 1 in 6 students gave fully correct responses to this question. A good number of students were able to combine the two fractions by using a common denominator but far fewer realised the need to rationalise a fraction at any stage.

Question 17

This was a straight forward question for those students who were well practised in factorising quadratic expressions and there were many students who scored full marks. Students gaining partial credit usually gained the mark for factorizing $x^2 - 9$. A significant proportion of students attempted to simplify the fraction without expressing the numerator and denominator as a product of factors.

Summary

Based on their performance in this paper, students should:

- practise answering questions involving algebraic manipulation in the context of geometry, for example, Q5 and Q14
- learn the conversions between common units of measure, for example between pounds and kilograms
- read the specific demands of a question to ensure you take account of all the information given
- practise answering angle questions which require several stages of working

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