

# Principal Examiner Feedback

March 2012

GCSE Mathematics (2MB01)  
Paper 5MB2F\_01 (Non-Calculator)

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# **GCSE Mathematics 2MB01**

## **Principal Examiner Feedback – Foundation Paper 2**

### **Introduction**

Candidates appeared to be able to complete the paper in the allotted time.

Candidates were showing their working out well. In starred questions most candidates realised that they needed to show numerical or algebraic working and rarely offered unsupported worded responses.

Candidates need to practice writing concise sentences where questions required a sentence to confirm their result.

Candidates need to learn the metric and imperial conversion facts to be fully prepared for these papers. On this paper, many candidates did not know  $1\text{m} = 100\text{cm}$  and even less knew  $5\text{miles} = 8\text{km}$ .

### **Report on individual questions**

#### **Question 1**

In part (a) most candidates knew that a million had six zeros, however many incorrectly wrote more or less than six zeros with 80000 and 800000 being common incorrect answers. Candidates should be discouraged from writing commas in large numbers.

In part (b) most candidates correctly wrote seven thousand, one hundred and two. A few candidates incorrectly wrote seventy one thousand and two or wrote seven million one hundred and two.

Part (c) was well attempted but few candidates correctly wrote 15.5. The most common incorrect responses were 15.50 and 15.4

Part (d) was also well attempted and more candidates gained a mark in this part of the question than in part (c), but often few candidates correctly wrote 420. Common incorrect responses included 42 and 400.

## Question 2

Many candidates successfully worked out  $4 \times 3 + 2 \times 5$  and arrived at 22, with very few writing  $4 \times 3 + 2 \times 5$  and not arriving at 22.

Many candidates correctly wrote or did  $4 \times 3$  or  $2 \times 5$  for M1 but then presented their answer as an incorrect algebraic expression, the most common of which were  $22ab$  and  $12a + 10b$ .

Another frequent incorrect response was  $43 + 25 = 68$  where candidates not only omitted the times signs but clearly did not understand how to evaluate  $4a$  or  $2b$  correctly. Two other common incorrect responses were  $6ab$  and 14 from  $4 + 3 + 2 + 5$  showing a lack of understanding of substitution.

## Question 3

This question was well attempted by candidates.

Many candidates were able to gain two marks for part (a) of this question.

Very few candidates incorrectly simplified  $\frac{12}{20}$  though many still only gained

M1 as they either wrote  $\frac{12}{20}$  or  $\frac{6}{10}$  as their final answer. A common incorrect response was  $\frac{3}{4}$ .

In part (b) most candidates gained B1. The most common incorrect response was candidates only shading 3 squares.

## Question 4

Although part (a) of this question was well attempted by candidates many incorrect attempts were seen. Common incorrect responses were 4, 2 and 16.

Candidates were more successful in part (b) and wrote 1000, however, a common incorrect response was  $10 \times 10 \times 10$  with no final evaluation.

Part (c) was the least successful part of the question with only a few candidates offering correct responses, the most common of which was 4.5. Common incorrect responses included 4 and 5, along with multiples and factors of 20 written with and without a square root sign.

### Question 5

All parts of this question was well attempted by candidates.

In part (a) many candidates gained B1 for  $5g$ . A common incorrect response was  $g^5$ .

Many candidates also gained B1 for part (b) of this question. Candidates were more successful in part (b) than in part (a) though  $m^4$  was also a common incorrect response for part (b).

In part (c) most candidates did not fully simplify the expression hence wrote  $20 \times ef$  or similar and scored B0. A common incorrect response was  $9ef$ .

### Question 6

Most candidates correctly measured the line to be 9cm in part (i), however a few candidates incorrectly confused parts (i) and (ii) and wrote 4.5cm for the length of the line.

In part (ii) most candidates correctly marked the centre on the line within tolerance. Very few incorrect responses were seen.

Many candidates confused parallel and perpendicular in part (iii) of this question and drawing a line parallel to  $PQ$  was by far the most common incorrect response. Others included a line drawn at an acute angle to the line  $PQ$  or missing out the question. Some, though very few accurately constructed a perpendicular bisector for B1 even though an accurate construction was not required.

### Question 7

In part (i) most candidates wrote 64. Common incorrect responses followed from candidates who subtracted 64 from 180 and usually wrote 116 or who attempted to measure the angle.

In part (ii) many candidates gained a mark for 'opposite angles' but very few correctly stated the full theorem or used the word vertically. Some went on to write too much and lost the B1 due to including incorrect vocabulary along with correctly stating opposite angles, often writing that the angles were parallel, corresponding or alternate. Many candidates responses were vague and confused. Other common incorrect responses were to state they used a protractor or to describe methods.

### Question 8

Most candidates correctly identified at least four if not all of the factors of 18 in part (a). Common incorrect responses included 4 and/or 8 in the list of factors but still often gained B1 or omitted 1 and/or 18 from the list. Some candidates confused factors with multiples and only a very few demonstrated no understanding of either factor or multiple. Some candidates wrote their answers as (1,18) or  $3 \times 6$  but still gained full marks.

In part (b) most candidates gained B1. Common errors included only writing 21 or writing 21 with an incorrect response, often 27

### Question 9

Part (a) was attempted by candidates but in failing to write down the reading of 38.5 from the thermometer or counting on the scale and then writing 17 they did not score any marks. Some correctly wrote 38.5 in their calculation but were unable to subtract 36.8 and arrive at 1.7. The most common incorrect response was 2.3 or 23 resulting from not borrowing for the unit calculation.

Most candidates were able to calculate and then record  $37.3 \pm 0.1$  on the scale in part (b). Incorrect responses varied and included numerous values between 35 and 39

### Question 10

Part (a)(i) of this question was well attempted by candidates and many gained B2 but there were also often cases where candidates forgot about the given black tiles and drew in four which although symmetrical to each other did not complete the given pattern and hence gained B1. A common incorrect response was to translate the two tiles given in row two and three.

Part (a)(ii) was also well attempted and many gained B1 for 34 tiles but many candidates forgot to include the tiles already placed, these candidates arrived at the answer 22 and scored B0.

Part (b) of this question was also well attempted by most candidates who wrote  $5 \times 6.20$  and often went on to calculate this correctly for M1A1, however, many candidates did not read the question carefully and only calculated  $4 \times 6.20$  and hence gained M0A0. Candidates who knew to calculate  $5 \times 6.20$  frequently failed to achieve the A1 mark due in the main to careless errors, incorrectly carrying, doubling values incorrectly or just transferring a value to a second calculation incorrectly.

## Question 11

Part (a) of this question was well attempted with most candidates writing in 4 values, however, their values were often incorrect. The zero value caused the most problems with a common incorrect response being €0.20. €35 was another common incorrect response for £30.

Part (b) was the least successful part of this question. Although many candidates did score B2 for a fully correct line, the scale of two 2mm squares to 1 unit caused problems for many others. Having incorrect values in part (a) also prevented students achieving B2 but they did, in some cases, achieve B1 for plotting their points. A few candidates, whether they had responses in part (a) or not left part (b) blank.

Despite problems in part (b) some candidates still went on to gain M1A1 in part (c) realising that they could use £25 = €30, or any other given value, from the table though often correct answers of 300 were not supported by any working out. Several candidates gained M1 for  $1.20 \times 250$  but did not arrive at 300 for the correct answer.

## Question 12

This question was well attempted and candidates were frequently achieving at least 1 or 2 marks. Very few candidates were unaware of the need to show working out to support their conclusion and only gave a worded answer. There was also evidence to show that candidates were getting better at presenting their results in an easy to follow way with, giving, many cases, titles to identify which working out was for which store. Candidates were in the main scoring M1 for  $30 \times 12 + 100$  but frequently forgot to subtract 210 from 630 or incorrectly calculated one third hence MOA0 but then correctly compared their answers to gain C1. Candidates who attempted to calculate  $\frac{1}{3}$  using 33% could have gained M1 but often did not due to their lack of accuracy in calculating 33%.

### Question 13

Part (a) of this question was well attempted but there were as many incorrect 8's seen as correct 48's. Candidates did not seem to understand what the sign post was showing them hence were subtracting the distances.

Although candidates attempted part (b) of this question, again some candidates were confused and did not realise that Caroline had passed the road sign, however even though adding rather than subtracting did not affect their chances of obtaining full marks, full marks were rarely achieved.

Most candidates did not realise that they needed to convert the distances to miles or kilometres and the most common incorrect responses were 50 and 70. Candidates frequently offered incorrect conversion facts such  $1\text{ mile} = 1000\text{ km}$  though at least some candidates were still able to gain a mark for using their conversion fact correctly. Only a few candidates who arrived at the correct numerical answer forgot to add the units and lost the A1.

### Question 14

Part (a)(i) of this question was well answered with very few incorrect responses seen. Some candidates wrote additional terms in the sequence 27, 32, etc but provided they were correct this did not stop them achieving B1, of course a few did offer additional incorrect answers and achieved B0.

Part (a)(ii) was well attempted by candidates with candidates correctly offering +5, add 5, increases by 5, however, many candidates offered ambiguous answers such as stating the difference without indicating whether it should be added or subtracted, hence B0. Likewise others referred to a gap of 5. Some of the more able candidates quoted  $5n-3$  which was awarded B1. A common incorrect response was to comment on the units digit alternating between 2 and 7

Part (b) of this question was also well attempted by candidates but frequently the weaker candidates worked out further terms or wrote  $n + 5$  and gained no marks. Some correctly wrote  $5n$  realising a link to the five times table but only achieved B1. Common incorrect responses included  $2n$  and  $3n$ .



### Question 15

Very few candidates were able to show a clear set of steps starting with the information in the diagram and leading to the conclusion of 5000 being the maximum number of boxes that could fit into the container. Most candidates were only achieving 1 or 2 marks. Where candidates achieved M2 this was usually for correctly calculating a volume and showing that they could convert 5m, 10m or 4m to centimetres. Where candidates only achieved M1 this was usually for correctly calculating a volume.

Common errors included the use of incorrect conversion facts  $1\text{m}=10\text{cm}$  or  $1\text{m}=1000\text{cm}$ , finding the surface areas or just adding the side lengths.

Candidates often tried to fix their calculations to get 5000 or did not realise that 5000 was correct and wrote a contradictory statement, however, they did realise that they needed to show working out and not just offer a worded answer. Many candidates were unaware of the need to convert all the measure to the same unit hence failed to gain the second M1 for division as their values were the wrong way round.

### Question 16

This question was well attempted with most candidates realising that the ingredients needed to be multiplied or divided though not necessarily by the correct number. The most common mistake was to multiply by 3 or 2. Weaker candidates consistently added a constant, often 3, to the ingredients. Others attempted to use percentages but muddled 2 scones with 2%.

Many candidates were able to again M2 correctly calculating the correct amount for at least one ingredient or by showing correct numbers to divide and times by, even though they often made errors with their division.

Candidates who tried the unitary method  $\div 12 \times 30$  often were not able to gain full marks, given this is a non calculator paper, but could and did gain M2 because they showed their working. Only a few candidates attempted to calculate the number of scones for 15 people. Another common error was to half the ingredients and add it to one lot the original ingredients instead of two lots of the original ingredients.

### Question 17

Very few candidates were able to show a clear set of steps starting with correctly identifying the missing sides on the diagram, then adding their terms, arriving at  $6x + 10$  and then showing that this factorises to  $2(3x + 5)$ , however, they did realise that they needed to show some working out and rarely did candidates just offer a purely worded answer.

Many failed to attempt this question leaving a blank response. Some expanded  $2(3x + 5)$  but did nothing else so also achieved no marks. A few candidates did start by identifying the missing sides achieving b1 for  $x + 2$  or  $2x + 3$  and some went on to also achieve m1 for adding the sides, however, there were frequent examples of incorrect simplifying eg  $2x + 3 = 5x$  both in candidates working out and written by the diagram.

Some of these candidates did however manage to pick up M1 by demonstrating that they understood that for perimeter they needed to add all the terms for the side lengths though often failed to get A1 as they had incorrectly assigned numbers to the missing sides or incorrect algebraic terms.

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