

# Principal Examiner Feedback

Summer 2016

Pearson Edexcel GCSE  
In Mathematics B (2MB01)  
Foundation (Calculator) Unit 3

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# GCSE Mathematics 2MB01

## Principal Examiner Feedback – Foundation Paper Unit 3

### Introduction

Many candidates were well prepared for the examination and were able to show what they could do. It was pleasing to see many who could use a calculator accurately and many could calculate with money and solve simple problems. Bearings continue to be a weakness with very few scoring even 1 mark on the relevant question. In addition, many candidates could not reduce a sum of money by 20%, which is a concern in terms of how they can function in life.

### Report on individual questions

#### Question 1

Many candidates were able to answer all parts correctly. In part (c), some got to the correct simplified fraction of  $\frac{21}{25}$  but then went on to 'simplify' it further, so losing a mark.

#### Question 2

Many candidates were able to find a route starting and ending at C. Many showed their route by writing down the arc lengths rather than the nodes. This was acceptable for part (i).

Most candidates were able to get a sensible answer, with 27.9 km (from CYHSC) being a close runner to 25.1 km (from CYSHSC) A significant number of candidates ignored the information for Gordon to visit all 4 villages and gave the route as CSYC (22.3 km).

Some gave the route that went round the top loop first and then the outer loop. CSYCSHYC (50.2 km).

#### Question 3

Success hinged on knowledge of the geometric terms 'congruent' and 'similar'. Many were able to score at least 1 mark on parts (a) and (b). For part (c) there were many fully correct answers but many students drew just two sides enlarged (usually the two sides originally the longest).

#### Question 4

The bill in part (a) was generally well completed - although occasionally the '12' as the number of light bulbs was omitted. A few candidates worked out the total price of the light switches by dividing by 5 instead of multiplying.

Similarly, many candidates got the correct answer to part (b), although there was the odd error of adding £64.83 instead of subtracting it. Some candidates thought they had to find 2.56% interest and then add it on.

#### Question 5

Most candidates did write 'pentagon' or a near variant. 'Hexagon' was a runner up. Virtually all candidates could draw a line parallel to the given line in part (b).

#### Question 6

Part (a) was almost always correct. There was an occasional error of constructing the image 2 cm from the mirror line rather than 1 cm.

The quarter turn clockwise about  $O$  instruction was not fully understood. Candidates should always use tracing paper to help them in such questions. Although there were many right answers, many candidates reflected the shape or more rarely gave a turn anticlockwise about the point  $O$ .

Part (c) proved to be a challenge - many candidates seemed to be unaware of the term 'tessellation' and so just drew 6 (usually identical) triangles. Some candidates drew triangles with indistinct boundaries which sometimes suggested gaps in their tessellations. A few candidates used right angled triangles in their tessellations.

#### Question 7

This was a well answered question with most candidates showing that they had first of all to work out  $5 \times 60$  and then  $8 \times 35$  followed by subtraction. A few candidates decided to subtract 35 eight times to get their 20

#### Question 8

This standard question was well understood by the candidates. They were able to invert the process and the order and so end up with the correct answer of 30. Several candidates selected the wrong number (usually 50) from an equation in which the correct answer was embedded and a few subtracted 10 from 50 and then divided by 2 giving an answer of 20

### Question 9

The algebra, as it involved a negative number and a fraction, albeit a simple one, proved to be a challenge for much of the entry. More correct answers were seen from the  $\frac{1}{2}t$  than from the  $3u$  with many, many candidates writing  $3 - 4 = -1$ .

Most students who got the  $-12$  and the  $9$  went on to give the correct  $-3$ , although a number got the answer  $-21$  from  $-12 + 9$

### Question 10

Part (a), which just involved measuring the length of a line was well done.

Part (b) was more of a challenge as the correct answer was the obtuse angle. In fact, there were few correct answers although credit was given for answers of  $70^\circ$  or  $290^\circ$ .

For part (c), it was clear that many candidates did not understand the question. The obvious answer of putting it at the midpoint of the line joining Skelton to Greystoke seemed not to occur to many. Several candidates placed the fourth village at the midpoint of the line joining Skelton and Catterten.

### Question 11

This was well answered. The majority approach was to work out the total cost of the trip and compare that with the revenue that would be raised from an individual charge of £45. A close second were those who worked out what would have to be charged to an individual to cover the costs of transport, ticket and meal and saw that it was greater than £45. Candidates who did not understand the context usually added the three given amounts of money and then divided by 24. Some candidates opted to calculate how much was required from each individual to cover the cost of the coach and compare it to the amount left when the ticket and meal costs were subtracted from the £45. Those that used this method were usually successful.

### Question 12

Part (a), which involved reading from the graph at the axis, was well answered.

Candidates struggled with part (b). Firstly many candidates measured time from 0 rather than from when the temperature was 80, so their first interval was wrong. Others could not read the scale on the time axis (going up in 0.2 minutes) or had problems when they converted to minutes and seconds, often treating the seconds as decimals. The most common error was to simply subtract their reading for 70 from their reading for 60 giving an answer of 2.5 minutes.

### Question 13

Candidates could either convert 80 acres to hectares and see it was less than 35 or convert 35 hectares to acres and see that it was more than 80. Either or both would score full marks with a correct answer and conclusion.

There was a minority of candidates who decided they had to change both the farm A area and the farm B area, often doing one correctly and one incorrectly, so they could not make a valid decision.

### Question 14

Parts (a) and (b) were well answered as most candidates could spot the correct numbers and knew that  $7n$  meant 7 times  $n$ .

Part (c) proved to be more challenging as it involves two processes. Still many candidates were able to get the correct answer of 36 by a process that did not involve any algebra. They scored full marks. A few candidates started to solve algebraically getting to  $\frac{t}{4} = 9$  but then selected the wrong operation to finish with  $t = 2.25$

### Question 15

This was competently answered - most candidates seemed to have a protractor.

The 7 cm was rarely drawn incorrectly although some candidates were drawing an angle of  $36^\circ$  in place of the correct  $46^\circ$ . A handful of candidates threw away a mark by failing to complete the diagram. That is PQ had been drawn the correct length and angle QPR the correct size, but Q had not been joined to R.

### Question 16

There were many correct answers showing competent use of a calculator. In most cases just the answer was written down, so candidates must be becoming adept in entering full numerical expressions in the calculator.

### Question 17

Only a few candidates understood that the starting point was to draw circles of the correctly scaled radius with centres M and N respectively. Of those that did this there was a substantial number who shaded the middle, overlapping part - without thinking. The correct answer is the major sector of the circle centred on N. They often lost two marks as they did not draw a full or even partial circle as they were so certain they knew the correct region.

### Question 18

Many candidates were able to come to the correct conclusion of 'yes' on this simple proportional question. The most common approach was to divide 15 by 3 and conclude that 1 litre of juice could fill 5 glasses.

Candidates then went on to state that 5 litres would fill 25 litres so there was enough (with 1 glass to spare). Other approaches involved working out how much juice there was in a glass (0.2 litres or 200 ml) and then multiplying by 24 to get 4.8 litres or 4800 ml and concluding there was enough.

Less successful was the approach which divided 3 by 15 and 5 by 24 as many of the candidates who did this could not interpret the numbers they had produced. The most common incorrect method was simply to calculate  $15 \times 3$  and  $24 \times 5$  and then say yes.

A few candidates produced a fully correct method but gave no decision and so lost a mark.

### Question 19

It was pleasing to see the candidates who had a well worked out strategy to do this question. However, getting 4 marks was rare. Those that got 3 marks either did not calculate a value when  $x$  was between 3.7 and 3.75 (inclusive) or worked to more than one decimal place for their value of  $x$ . Thus final answers such as 3.72 do not qualify for the 4th mark.

A few candidates successfully cubed their trial number but then just added on 5 to get their final value for the trial.

### Question 20

Many candidates could not reduce the cost of the car by 20%. They either ignored the 20% or worked out  $6720 - 20$  or even  $6720 - 0.20$ . They could still get the next two marks for subtracting 1500 and then dividing by 24. However, some missed the subtracting 1500 part and gained no marks.

It was not unusual to see a candidate work out 20% of £6720 correctly to get the answer £1344 and then follow it with  $£1500 - £1344$  followed by the division by 24

A number of candidates successfully arrived at £3876 but then divided by 12 rather than 24

## Question 21

There were some pleasing answers to this question and an interesting variety of approaches. Most successful candidates worked out the area of the surface of the pond and then compared their answer with the answer to  $20 \times 1800$

Another approach started by finding the area of the surface of the pond and then dividing it by 20 to compare with 1800

Some candidates did not understand the units of area, so tried to work out the area needed for 20 fish by  $20 \times 3240000$

Many candidates did not seem to know how to work out the area of the pond often using  $120 \times 120$  or even  $360 \times 120$ . A few used the formula for circumference rather than area.

## Question 22

There were some pleasing approaches to the solution of this problem. Successful candidates used properties of isosceles triangles to find the size of one of the base angles. If they got as far as this, the successful candidates invariably went to the angle PQR and solved the equation  $2x + 13 = 58$  to get  $x = 22.5$

Other approaches were tried but these were not successful as they were more algebraically complex.

The most common error was to say that the sum of the two base angles was 64 giving a starting point of  $4(x-8) + 2x+13 = 64$



## Summary

Based on their performance in this paper, students should:

- learn the meaning of the term 'tessellate' and be able to answer tessellation questions
- be aware that when dealing with units of area the number is NOT squared
- give their final answer to 1 decimal place when completing a trial and improvement solution
- appreciate that  $3u$  means 3 times  $u$  when substituting
- learn the formula for the area and circumference of a circle and have a way of distinguishing them



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