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Principal Examiner Feedback

November 2014

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

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

Introduction

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

Students did, in most cases, show their working out well but, given the allowance of a calculator, did still make arithmetic errors.

Students generally attempted all questions so it was rare to see blank responses.

There was evidence to suggest that some students did not have a calculator, a ruler or a compass.

In starred questions, most students realised that they needed to show numerical working and very rarely offered unsupported worded responses. Many students clearly annotated their method with appropriate words to make the working out process clear.

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

Incorrect notation for money lost marks for some students in Q9.

Report on Individual Questions

Question 1

Students attempted part (a) well and it was rare to see incorrect responses, possibly because they were instructed to use their calculator. In part (iii) some students wrote $\frac{9}{5}$, which still earned them the mark.

Students were less successful in part (b) than part (a) though incorrect responses were still rare. Common incorrect responses were to repeat the given decimal 0.53, to write a fraction using 3 and/or 5 eg $\frac{3}{5}$ or $\frac{1}{5}$ or to guess a popular fraction eg $\frac{1}{2}$.

Students were least successful in part (c) and common incorrect responses were to write a decimal using 3 or 5 eg 3.5 or 0.35 or to write a commonly used decimal eg 0.25, 0.75 and 0.3

Question 2

Students attempted part (a) well and most correctly named the polygon as a pentagon. Common incorrect answers were hexagon and octagon. It was very rare to see incorrect responses that were not polygon names but if seen they were usually geometric words.

Students were less successful in part (b) than in part (a). A very common incorrect response was 6 and less common 8, 9 and 10.

Students attempted part (c) well and, even if they made arithmetic errors, they almost always attempted to add the angles and subtracting them from 360. Weaker students used 180 but this was rarely seen.

Students attempted part (d) well and incorrect responses were rarely seen. A repeated error was to say F and D were congruent.

Question 3

Students attempted this question well and many gained full marks. Those that only gained 1 or 2 marks, were often let down by their arithmetic or tried to solve the problem with one long chain of calculations and were unable to keep an accurate running total or missed a calculation out. The more able students realised that they could use the column or row totals, hence demonstrating a more efficient strategy and were more successful in solving this problem.

Question 4

Part (a) was very well attempted by all students and incorrect responses were very rare. The only common incorrect response was to draw a trapezium where the base was 5cm long, the top 9cm long and perpendicular height 2cm.

Part (b) was also very well attempted. A common incorrect response was 4 where students had stated how many rectangle As would fit in rectangle B, rather than the scale factor of enlargement.

Question 5

Students attempted this question well but in both part (a) and part (b) students were confused by what the sign posts were telling them about the distances between the cities.

Students were slightly more successful in part (a). A very common wrong answer was 786 where students had simply added all the distances.

Students were less successful in part (b) with a common incorrect, but almost correct, response being 58, where students demonstrated an understanding of finding the distance between the two signs but forgotten to half the distance they found. Weaker students were randomly adding or subtracting incorrect combinations of distances from the question.

Question 6

Students were reasonably successful in this question gaining at least 1 if not all marks, however, place value errors were common throughout parts (a), (b) and (c).

In part (a) common incorrect responses were 230 and 23 or simply repeating 2.3

In part (b) common incorrect responses were 3500 and 3.5 or simply repeating 350

In part (c) common incorrect responses were 270, 2700 and 2.7 or simply repeating 27 000. Students were least successful in this part of the question.

Question 7

This question was well attempted by most students and many gained the full 4 marks. If students lost a mark it was usually for incorrectly stating that Tony had enough mortar and bricks or vice versa having correctly arrived at 480 and 19.2. Where students lost marks for poor arithmetic this was more likely to be for not getting the answer of 19.2, as more students made errors calculating with the decimal values of mortar rather than the integer values for bricks. Occasionally, 580 was seen instead of 480.

Question 8

Students attempted part (a) very well. A repeated incorrect response was to write $x=3$.

Students attempted part (b) well. Repeated incorrect responses were to write $x=4$ ie $4\times5=20$, misreading + for × and $x=25$ ie $20+5$ instead of $20-5$.

Students attempted part (c) well. A repeated incorrect response was to write $x=40$.

Students were least successful in part (d) but did often gain one mark for $\frac{1}{2}f=7$ though then incorrectly divided 7 by 2 and gave the answer 3.5. Many students who had given the incorrect answer of 3.5 also lost the method mark as they had not shown their method in a way which indicated they had found 7 by subtracting 5 from both sides of an equation or by writing $\frac{1}{2}f=7$. Embedded answers were also seen and lost marks too.

Question 9

This question was well attempted by almost all students with a very large proportion scoring all 3 marks. Often it was not poor arithmetic that let students down but failure to read the question, as more students lost marks because they only found the cost, £4.44 of the pencils and did not even attempt to find the change. Where poor arithmetic was seen it was usually in their subtraction, when calculating the change from £5.00. Some students also lost the communication mark for not indicating the units of their answer correctly.

Question 10

This question was well attempted and many students gained full marks having drawn an equilateral triangle with the correct construction arcs. Some students were clearly not constructing the triangle using compasses and so could only gain a maximum on 1 mark for drawing an equilateral triangle. It was very rare to award 1 mark for seeing a correct construction arc without an attempt at drawing the triangle. It was obvious that some students were drawing free hand.

Question 11

Students attempted this question well and often gained full marks, though not needed, it was rare to see -6 as the other possible answer. Common errors included not using the inverse operations or, if they did, not performing them in the correct order.

Question 12

This question was attempted well by most students and the presentation of their calculations was very good. Many gained full marks, though weaker students made arithmetic errors or did not realise that they needed to check combinations of different carton sizes when solving the problem. Some students misread the question and found the best value carton which, of course, could have been used to help solve the problem but rarely was.

Question 13

Students attempted this question well and often gained full marks. Students that only gained 1 mark often made an arithmetic error when calculating the score for one of the rugby teams. Weakest students forgot to change the mark for each type of score and multiplied 4, 2, 1 and 2, 2, 5 by the same value when calculating the teams' total scores.

Question 14

Students were slightly more successful in part (a), though some students gined no marks in part (a) they were still able to go on to gain full marks in part (b) possibly due to believing that part (a) was more complex than it was. Common incorrect response was to apply inverse operations or the correct operations in the wrong order.

Students attempted part (b) well and most were correctly identified that they needed to subtract 4 then times by 20, though the weaker students performed these operations in the wrong order and got an answer of 1196. Another common error was 7 from $60 \div 20 + 4$.

Question 15

Students attempted this question well and it was rare to see wrong answers. A common error, though not seen that often, was to redraw the 3D pyramid or to draw a square with the diagonals drawn in (a plan view of the pyramid).

Question 16

Students were more successful in part (a) and they usually scored both marks. Only occasionally did students leave the fraction un-simplified or made an arithmetic error when attempting to simplify the fraction. Only the very weakest students failed to score and the most common incorrect response, in this case, was to write $\frac{65}{35}$.

Students were much less successful in part (b). Even those who clearly understood the method to find the percentage and clearly showed the method, often rounded or truncated their answer and hence did not find the correct answer of 15.625. The weaker students either misunderstood the question or misread the question as 1.25% of 8.

Question 17

Students attempted this question well and even if no marks were scored students performed calculations involving 180 or 90 hence demonstrating understanding of the sum of the angles in a triangle, if not of the algebra or ratio skills required to solve the problem. Students who chose to form an equation equivalent to $90 + 7x + 5x = 180$ and solve it, often gained full marks and were more successful than those using a ratio approach. Weaker students, pleasingly were using 180 but often did $180 \div 7$ and $180 \div 5$ to find a value for x.

Question 18

Students were most successful in part (a) and almost all were able to measure the distance between the bench and the fountain to gain the mark. Weaker students forgot to multiply their measurement by 2.

In part (b), students usually either gained the full 2 marks or 0, as those that did not understand bearings rarely drew anything on the diagram. There were however, a few that had drawn in the bearing then incorrectly measured the angle leading to an answer in the 70s.

Students attempted part (c) well and often, even if not worthy of any marks, were still using compasses to draw arcs. Many gained full marks or two marks having shaded the wrong region. Only the very weakest students were shading a square or irregular shaped region, though even these regions were shaded in-between the fountain and the bench, indicating some understanding of the problem even if they scored 0 marks.

Question 19

This question was well attempted by most students but only the more able gained full marks. Most were able to show a correct method to calculate 20% and go on to find the cost of using The Nail Company to score 2 marks but then struggled to know how to calculate the cost for The Hammer Company using the special offer correctly. A common incorrect response was to simply ignore the 25 free per 100, arrive at a cost of 64.90 then attempt to deduct from this or to count in multiples of 125 to 625, calculate $5\times4\times2.95 = 59.00$ and not realise that they had bought too many nails. The weakest students struggled to present their calculation well enough to keep track of their method and often made frequent arithmetic errors. It was less common to see responses from students who were able to find the cost for The Hammer Company but unable to correctly calculate a percentage.

Question 20

This question was well attempted by most students, but more often than not, they did not achieve full marks. Common incorrect responses were from students who did not realise that it was necessary to calculate the interior or exterior angle of the pentagon in order to calculate the value of x. Other common incorrect responses included, assuming all angles in the quadrilateral, *BCDE,* were equal to 72 or that all the angles in the triangle, *ABE*, were equal to 60. Some students simply did $72\div2$ which does lead to the correct answer but is clearly an incorrect and incomplete method and gained no marks. Another common incorrect response which gained 1 mark was where students correctly the found the interior angle of a pentagon then incorrectly did $108\div2 = 54$.

Question 21

Most students scored well on this question gaining at least 2 marks. Many students, following correct trials, scored just 3 marks either because they never trialled a value between $x = 2.6$ and $x = 2.7$ or when they did, usually wrote $x = 2.65$ as their final answer. It was rare that students lost marks for failing to evaluate their trials to an appropriate degree of accuracy.

Question 22

This question was well attempted by students though it was common to confuse area and circumference calculations and students who incorrectly calculated the area consequently gained no marks. Of those students that did correctly calculate the circumference of the circle almost all correctly multiplied by 34 but a few then went on lose the accuracy mark for either forgetting to convert their answer to metres or for using incorrect conversion facts, the most common being 10cm=1m or 1000cm=1m. Use of incorrect conversion facts was also seen where students had incorrectly calculated the area.

Summary

Based on their performance on this paper, students should:

- always makes sure they use correct money notation and, where pence are involved, 2 decimal places when writing their final answers
- read the question carefully and the information given in the question, especially when given in tables, before attempting the question
- practise solving problems by forming an appropriate equation to solve rather than by trial and improvement
- be able to apply their knowledge of constructions to loci problems
- show their calculations even when calculators are allowed and also check their calculations on their calculators
- learn formula for area and perimeter, especially for circles, and recognise the difference between them
- learn the metric conversion facts
- make their working out clear and possibly include helpful words eg area=…, angle ABC = …., when presenting the working and conclusions in QWC questions

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