Principal Examiner Feedback

Summer 2014

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Unit 3: 5MB3H_01 (Higher)

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2014
Publications Code UG039457

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

Introduction

This paper was of similar demand to those of previous series and students found all questions except Q11 accessible. Students had been prepared well and the standard of work was generally high. It was pleasing to see full explanations and conclusions to the QWC questions.

Report on individual questions

Question 1

In this question, the majority of students scored at least one mark and usually more. It was very common to see answers of £56.70 showing a correct method for working out 5% (or 105%) of £54 and the total cost of a single ticket. A number of students correctly worked out the booking fee but then subtracted instead of adding it.

Question 2

Many students did not read or fully comprehend the information given in this question. Some read 150 grams as the weight of a half of the hosepipe, many multiplied 20 by a half instead of dividing. A significant number forgot to add on the weight of the reel and left an answer of 6000g or 6kg. Some students did make mistakes in the addition of the 1.4, suggesting perhaps that a number did not have a calculator. Some students wrote their final answer as 7400kg and failed to gain full marks.

Question 3

The most common error in this question was to omit one or more of the descriptive elements, usually the centre of enlargement. Often the centre was quoted incorrectly; sometimes it was given as a vector. If the vector contained other than zeros, this was considered an element of a translation and thus a combination of transformations, gaining no marks.

Question 4

Students are becoming confident in their methods to solve "better buy" problems. The most popular method was to work out the cost of one tea bag for each box and this usually resulted in a fully correct solution. For those students that chose to work out the number of tea bags per unit cost, often the 'small' bag was selected as the best buy, having the least absolute value. There were many variations of a correct method which were usually successful.

Question 5

Most students scored at least one mark and usually more. Many simply found the circumference of a circle of radius 8 cm; some went one step further to correctly find the arc length of the semicircle but then fail to add on the diameter for the complete perimeter. A significant number of students found the area of the semicircle. This gained no credit.

Question 6

In part (a), when the correct algebraic expressions for the ages were quoted, full marks followed. When they were not, it was usual to see at least one correct, usually $2x$. More often than not, this part was ignored and students proceed to solve the given equation in the working space of part (a). This was acceptable provided there was no contradiction in part (b).

Question 7

This question was not well answered largely as a result of the inability of so many students to find the volume of a cylinder and $40 \times 90 = 3600$ was seen often. Formulae for the volume of a cone or sphere were also seen often. Many of those students who did find the volume of the container, then correctly converted to litres and subtracted the 65 litres to be removed, but were able to go no further. A significant number of students subtracted just one instead of 65 litres.

Question 8

The vast majority of 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 $x = 2.3$ and $x = 2.4$ or when they did, usually $x = 2.35$, then concluded that they needed to round 2.35 up to give an answer of 2.4

Quite a large number of students left their answer as 2.35 ignoring the instructions to give your answer to 1 decimal place. Students who did not trial a value of x between $x = 2.3$ and $x = 2.4$, explained that their trial for 2.3 was closer to the required figure (27) than their trial for 2.4. Students must be made aware that this is not an accepted explanation since $x^3 + 6x$ is not a linear relationship.

Question 9

This question was answered very well indeed with most students gaining full marks. The majority of students appeared to have compasses which they were able to use well to produce an accurate diagram.

Question 10

Most students scored at least one mark in part (a) for two correct entries in their table of values. Substitution of the negative x value was the usual cause of error. In part (b) it was unusual for students not to plot their points correctly and so gain again at least one mark. Part (c) was often left blank with many students not understanding what was required. Some tried to solve the quadratic equation by alternative methods, usually without success. A few students still joined the points up with line segments rather than attempting to draw a curve.

Question 11

Many students found this question challenging. There were attempts to find the gradient of the line but this was rarely followed by correct thinking. The most successful method was by using differences and taking steps up the line; for example steps of 4 units up for each 2 steps across. However this often resulted in an answer of 12, failing to get the correct answer by not adding the initial step of 4.

Question 12

Part (a) was often answered well with students scoring at least one mark. Many treated this as an equality which resulted in e = 2.25 for one mark. Many quoted $e > 2.25$ and then simply write 2.25 on the answer line. This was not penalised. Failure to conclude with a value of 2.25 or equivalent was generally a result of either poor arithmetic (12 – 3 = anything but 9 was common) or poor algebraic manipulation; many adding e to both sides of the inequality by mistake.

In part (b), many students were unable to draw the straight line $x + y = 1$. The most common error was to draw the lines $x = 1$ and $y = 1$ and then shade the positive quadrant formed. Many drew the line $x + y = 2$. In addition shading was often in error showing confusion with the inequality.

Question 13

Part (a) was usually correctly answered well with students showing a sound understanding of Pythagoras. A few did try to find an angle first and then work out the distance from the tree to the tower. In part (b), many students were able to correctly find the size of one of the angles but the understanding of bearings was poor. Some students insisted on finding an angle using either, or in some cases both, the sine or cosine rules. Often this lead to inaccuracies, as a result of premature approximations. A significant number of students simply measured the angle with a protractor ignoring the fact that the diagram was not drawn to scale.

Question 14

Whilst many students realised the 'compound' nature of the problem, many simply find the depreciation for one year and then doubled it for two. Some students worked out the value of the car at the end of a third year and some actually added on the 25% each year, thus increasing the value of the car.

Question 15

Many students were successful in finding the constant, 7.2, of proportionality but then could not apply it in order to gain any credit. The majority of students, however, gained full marks.

Question 16

Very few students failed to secure the mark in part (a). Some did give their answer as a fraction. This was not penalised provided 0.0045 had been seen. In part (b), students who showed their working generally scored at least one mark. Many who attempted the calculation on their calculator without showing their method often scored no marks at all. It was clear that many students did not know what was meant by the instruction "give your answer in standard form". Many wrote the correct answer in the working space but then wrote different on the answer line; e.g. $6.578... \times 10^{-6}$ in the working and 6.58 only on the answer line. This failed to score full marks.

Question 17

The students that translated the given information into a pair of simultaneous equations usually went on to score well, often full marks. Those students attempting trial and improvement/error methods usually failed to gain any credit. A small number of students wrote down the two initial equations but then did nothing with them. There were many responses using a ratio method, often initially dividing through by 9, which also failed to gain any credit.

Question 18

Even though the formula to find the volume of a sphere is given on the formula sheet, many used alternative formulae, often formulae for finding area. All methods using area gained no marks at all. Many students working with the correct volume and subsequent density failed to score the final mark with an incomplete conclusion. Students here were required to compare their calculated density to that given.

Question 19

Many students who were comfortable working with vectors generally scored at least 3 marks on this question. For the award of the final mark a full and complete proof was required. This question was often left blank many students.

Question 20

Seeing the correct bounds was rare and 225.5 and 175.5 or 230 and 180 were often seen as the upper bounds of *BA* and *BC* respectively. Many students however earned the first mark for a correct upper bound for the angle.

Use of $\frac{1}{2}absinC$ was good, however it was not uncommon to see the students' upper bounds for *BA* and *BC* and then sin 50^{o} used.

Question 21

Many students were able to make a reasonable effort at removing the fraction for one mark but very few were able to carry the algebraic solution any further. Some did get the correct quadratic but could go no further and some never quite got the quadratic, writing, for example $x^2 + 3x = 4$.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE