edexcel

Examiners' Report/ Principal Examiner Feedback

Summer 2014

Pearson Edexcel International GCSE Mathematics B (4MB0/02R)

Paper 2R

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 UG039437

Principal Examiner's Report

International GCSE Mathematics B

(Paper 4MB0-02R)

Introduction to Paper 2R

It was pleasing to observe that, overall, the standard of presentation and clarity of work was high.

As in the previous summer examination, it would be prudent for centres to encourage their students, where possible, to answer the questions within the examination paper booklet. If students do require additional sheets, they are advised to state clearly in the examination book that they *are* continuing the question on another page.

The question paper did highlight the following problem areas, followed by their corresponding question numbers:

- Matrix multiplication (2 and 9(d and f))
- Probability (4(c))
- Deducing algebraic equations (7(d))
- Ratios of lengths of vectors (8)

Report on individual questions

Question 1

It was clear from the students' responses to this question that most of the students know how to calculate the length and gradient of a line. Some of the less able students got confused whilst trying to use the coordinates of the points in the Pythagorean formula, whilst others were confused by substituting the coordinates of the two points into the gradient formula usually resulting in sign errors.

Question 2

It was clear from the responses of a significant number of the students that calculating the square of matrix is challenging, even though many of these students proved that they were able to do the matrix multiplication required in question 9 correctly. Many thought that the elements of the square of a matrix were simply the elements of the matrix squared. This error usually meant that the only mark available to such students was the final B1 follow through. Many, though, did not suffer from this inability and collected full or nearly full marks.

Question 3

Most students were able to calculate successfully that the total income of the shopkeeper was £774 (scoring M1 A1). However, there was a significant number of students who then thought that the percentage profit was $\frac{£774-£360}{£774}\times 100$, losing the final two marks. Others calculated 115% but then unfortunately went on, perhaps thinking that 115% was too big, and subtracted 100% from this, losing the final accuracy mark.

Question 4

The Venn diagram was correctly completed by the majority of students and most of these went on and successfully collected both of the marks for part (b).

Part (c), though, was less well understood by most students and was thus a discriminator of the paper. Some students thought that the probability of a passenger travelling to Paris was the number of passengers travelling to both Paris and New York (their "8" from part (b)) divided by the total number of passengers (62), thus losing both marks.

Question 5

A number of students had difficulty with entering the correct probabilities for the second counter on the tree diagram, mostly thinking that somehow a denominator of 10 was involved, usually resulting in the loss of two of the marks for part (a).

Most of the students who successfully completed their tree diagram collected the three marks available in part (b). Those who had incorrect probabilities in (a), usually managed to collect the method mark in (b) but no more.

Question 6

Part (a) was correctly answered by the majority of students. Many students lost at least one mark in (b) because of incorrect algebra or lost both marks because they thought that $\mathrm{f}^{-1}(x)=\frac{1}{\mathrm{f}(x)}$.

The majority of students collected the method mark in (c) and then usually, the accuracy mark provided their algebra was fully correct.

Part (d) was well answered by most students including those who had difficulty with the other parts of the question, since this part was effectively independent of the other parts of the question. However, there were a number of students who did not show their full working and so those who did not arrive at the correct answers lost all of the marks for (d), except possibly for the B1 ft mark available for the first step of the solution.

Question 7

Most of the cohort managed to collect the three marks available for the first three parts but a number of these were not able to combine the information gained into an equation as required in (d). Of those that did, most then went on and usually collected the four marks available in (e). However, there were many who erroneously thought that the answer to (d) was $\frac{400}{x}-\frac{400}{x-60}=\frac{1}{3}$. These students were able to obtain the first method mark for removing the denominator of their answer to (d) and then usually the second method mark for attempting to solve a trinomial quadratic (usually $x^2-60x+72000$) but losing both of the accuracy marks.

Part (f) was answered correctly by nearly all of the cohort.

Question 8

It was clear from the answers received for part (a)(i) that many students did not understand how to use the ratio of lengths of vectors thinking that $\overrightarrow{OC}=5\mathbf{b}$ instead of 4b with the result that many of these lost a significant number of the following marks of the question. Despite this, most students had some idea of how to proceed with the rest of parts (a), (b) and (c), although losing marks as a result of their incorrect answer to (a)(i).

Many students, including those who had difficulties with ratios, knew what to do in part (d), but were unfortunately let down by their poor algebra when trying to write the components of vectors a and b.

Question 9

Many students collected most of the marks for parts (a) to (f), although the less able students usually lost marks because of their inability to perform matrix multiplication accurately resulting in the loss of marks in parts (d) and (f). Some displayed an inability to read coordinates from a 2×3 matrix and then transcribe them onto the grid. The students who managed to answer parts (a) to (f) correctly nearly always collected the two marks available in (g).

Question 10

It was clear from the answers received to this question, that most of the cohort have some understanding of how to use the Sine and Cosine rules and so many of these collected most of the marks available in parts (a) and (b).

These students usually went on and collected at least two of the marks for part (c). Very few students realised that the simplest way to find the area of ΔABD in part (d) was to subtract the area of ΔBCD from the areas of ΔADC and ΔABC. Instead, many students realised that they had to find either *AB* or *BD* in order to use the area formula for ΔABD and often gained the first two marks (M1 A1) for finding either *AB* or *BD* but then a number of these lost their way when trying to calculate the angle necessary for inclusion in the area formula and lost the final two marks.

Some students tried to simplify part (d) and erroneously assumed that $\angle ABC$ was a right angle whilst some others wrongly assumed that *AC* bisected $\angle BCD$, both assumptions lead to the loss of all of the marks for (d).

Question 11

Part (a) was another discriminator of the paper with most students having no idea of how to proceed, usually leaving y as their answer. Most then collected the B1 ft mark in (b) by multiplying their answer to (a) by x. Many students then restarted the question and correctly found that $S = x^2 + 4xy$ and then substituted $\frac{40}{x^2}$ for y and collected both of the marks for part (c).

The differentiation required in (d) was usually performed correctly by students who knew about differentiating leading to the collection of the four marks by many of these students irrespective of whether they had answered the earlier parts correctly or not.

The completion of the table required in (e) and the plotting of the result points in (f) were normally successful. Most of these students then managed to read off their x value of *S* = 75 correctly from their curve.

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