edexcel

Examiners' Report/ Principal Examiner Feedback

January 2015

Pearson Edexcel International GCSE in Mathematics (4MB0) Paper 02

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

January 2015
Publications Code UG040608

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

Introduction

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

As in previous examinations, it would be prudent for Centres to encourage their candidates to answer the questions within the examination paper booklet and not, if at all possible, on any extra sheets of paper but if they are continuing a question on a page which does not relate to the question that they are answering, they must indicate that they *are* continuing the question on another page in the examination paper booklet or on a separate sheet of paper *and* indicate that page number and then clearly identify the question on that page.

The question paper did highlight the following problem areas, followed by their corresponding question numbers, which should receive special attention by Centres:

- Reverse percentages (1(b))
- Compound probabilities (7(c))
- Matrix multiplication (8(b) and (d))
- Recognising the hypotenuse of a right angled triangle (9(d))
- Finding the volume of a solid (10(a and b), inequalities from a curve (10(f))
- Ratios of lengths of vectors (11b and 11d)

Report on individual questions

Question 1

The majority of candidates found parts (b) and (c) of this question difficult. Most candidates were successful in part (a), but some inverted the roles of 30 minutes and 60 minutes arriving at an incorrect answer of 4380 instead of the correct one of 17520 sales per year, whilst others left the answer as 48 sales per day (by forgetting to multiply by 365) or as 292 (forgetting to multiply by 60). In part (b), many found this reverse percentage calculation confusing and produced calculations of 80% (resulting in 14016 sales) or 120% of their answer to part (a). Part (c) was not well answered with only a small minority finding 18 hours or 17.28 hours obtained from an incorrect answer of 14016 in part (b) thus collecting only the method mark.

Question 2

As in previous examinations, histograms prove difficult for some candidates. Very few candidates showed how they calculated the scale factor for the frequency density although some evidence for it was seen on the histogram. Most did not, and then either indirectly guessed the scale factor or treated the histogram as a frequency diagram, in both cases usually gaining the first (B) mark. Most of those who had some idea of the scale factor managed to find 6 as the frequency for the class $80 < m \leq 100$ and then usually collected the mark for the frequency for the class $50 < m \leq 70$.

Question 3

Many candidates were successful on this question with several collecting full marks. A common algebraic error seen in part (i) was in the expansion of $-6(x+2)$ which appeared as $-6x+12$ instead of $-6x-12$. Part (ii) was less well answered with many believing that their denominator multiplied by 0 was still equal to the denominator, resulting in incorrect answers and usually gaining no marks for (ii).

Question 4

The candidates who deduced the correct equations in part (a) usually went on to complete the rest of the question correctly. A common error with the second equation of (a) was to reverse the roles of 4 and 16. Finding the inverse function was well answered with many collecting both marks as the A mark was follow through. These candidates usually went on to collect both marks for (c).

Question 5

Most candidates completed their Venn diagram correctly and many of these collected almost full marks, losing only the final mark for an incorrect answer of 39 instead of the 25 (which was actually given in the question). One common error was not including 15 in their equation for part (c) resulting in non-integer answers. Part (a) was usually correctly answered.

Question 6

Many candidates unfortunately assumed incorrectly that $\Delta\begin{matrix}ADE\\ABC\end{matrix}$ were similar in part (b) perhaps due to not reading the question carefully enough or because the angle at *A* was 90^o for both triangles. Fortunately this error did not prevent a significant number of candidates from gaining the 4 marks for parts (a) and also (c) as (c) could be done independently of (b). Nearly all the candidates collected the 2 marks available for (a).

Question 7

Candidates who completed the tree diagram in (a) correctly usually collected the 2 marks for (b). Of the others, many misunderstood the result of not replacing the withdrawn book and used 50 as a denominator in their probabilities for the second book or used a value of 48 instead of 49, usually collecting only 1 mark for their tree diagram. Many of these candidates, though, collected at least one mark for (b). Part (c) was not well answered with many of these candidates only giving two instead of three products or working with incorrect denominators of 50 and 49 instead of with 55 and 54. Part (c) was one of the discriminators of the paper.

Question 8

The question received a good response with many candidates scoring highly, and most of these demonstrating their ability to handle matrices confidently and then to draw the related triangles. However, there were a number of candidates who clearly had problems with the mechanics of matrix multiplication. Part (f) was problematic for a number of candidates who thought that a rotation rather than a reflection was involved.

Question 9

Overall, a significant number of candidates collected many of the marks available in parts (a), (b) and (c). Part 9(d) proved difficult for many though, and most of these candidates lost their way in finding the areas that could be considered to form *BCPQ*, usually collecting only the third method mark of the mark scheme. Most collected both of the marks for (a) but there was a small minority who thought that $\cos 15 = \frac{PQ}{11}$. In part (b), a larger number of candidates incorrectly interpreted the intersecting chords theorem as $11^2 = AO \times AP$, usually leading to an incorrect answer of 10.6. Nonetheless, it was pleasing to observe that many candidates

demonstrated their ability to use the cosine rule in part (c), gaining at least two of the three marks available there. Part (d) proved difficult for many candidates who didn't realise that finding either of *PQ, AQ* or *OQ* first was necessary to find one of the component areas. Of those that did attempt to find one of these lengths, many incorrectly thought that *AP* was the hypotenuse of ΔAPQ . This part was omitted by many candidates. Candidates should be encouraged to use at least 4 significant figure accuracy in their calculations - many premature approximations were seen.

Question 10

Parts (a) and (b) were poorly received with only the more able candidates collecting the four marks available. Many were unable to recognise the individual volumes needed for the volume of the solid *S*, some used area rather than volume expressions when trying to find their volume, and others in (b) were let down by poor algebra. These two parts were thus discriminators. Parts (c) and (d) were reasonably attempted with many candidates collecting a mark in (e) for reading off the maximum value of their curve. Part (f) was poorly attempted with many of the candidates who did read off their *h* values corresponding to the intersection of their curve with *V* = 60 failing to realise that a range of *l* values was specifically required by the question or that the *h* inequalities will reverse when translated to *l* inequalities. A final answer of $6.3 < l < 5.0$ was seen in some cases .

Question 11

Most candidates collected the two marks available for part (a). A number of candidates misinterpreted the ratio for *AP* : *AB* as *AP* : *PB* and so incorrectly stated that $\overrightarrow{AP} = \frac{1}{4}"\overrightarrow{AB}"$.

Many collected the mark for (c)(i), even if by a follow through mark. Provided that the candidate went on and equated their $\overrightarrow{OA}$ from (c)(i) to the given $\overrightarrow{OA}$ = **a**, at least three of the five marks for (c)(ii) were usually collected. Part (c)(ii) was, however, a discriminator. Having found a value for *k*, many then used it correctly in (d) to at least collect the method mark and then the answer mark if their *k* was correct. Several observant candidates made use of the given ratio, *AP* : *AB* = 1 : 3, to find that the similar triangles *BPQ* and *APO* had the length ratio 1 : 2 and hence the area ratio 1:4 leading to the correct answer.

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London WC2R 0RL