edexcel

Examiners' Report/ Principal Examiner Feedback

Summer 2016

Pearson Edexcel International GCSE in Mathematics A (4MA0) Paper 2F

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 2016
Publications Code 4MA0_2F_1606_ER

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 to paper 2F

This paper allowed students to demonstrate their ability across the assessment criteria. Many students showed good numerical skills but found interior angles and transformations challenging. Adequate working was usually shown although it is an area some students would benefit from improving.

Report on Individual Questions

Question 1

The vast majority of students were able to write down a multiple of 7 in part (a)(i) and a factor of 90 in (a)(ii). In part (a)(iii), recognising a prime number proved to be challenging for some, with odd numbers such as 21, 27 and 33 sometime chosen. Students were more familiar with square numbers in (a)(iv) than they were with cube numbers in (a)(v). In part (b), students often struggled to find two numbers that give 20 when written correct to the nearest ten. Some may have been confused with the fact that 16 had already been an answer in part (a) and others chose 10 and 13 as the numbers nearest to 10. More were able to find two numbers that multiply to give 429 in part (c).

Question 2

Very few students dropped marks in parts (a), (b) and (c). Part (d) was also answered well, although there was the occasional arithmetic error or misread of the scale. In part (e), those students who were able to form a ratio usually scored at least one mark for 10 : 4, although many simplified it correctly. Some wrote their answer as a fraction, such as $\frac{2}{5}$.

Question 3

In part (a), most students recognised the shape as a cone. Fewer recognised the shape in (b)(i) as a prism, with some saying it was a hexagon. In (b)(ii) and (iii), a significant number of students confused vertices with edges and so got the answers the wrong way round. Although many students correctly answered part (c), method leading to their answer was often lacking or unclear. Some just counted the number of centimetre cubes while other did split the prism into sections; an answer of 20 was occasionally seen for those who just found the number of cubes at the front of the shape. A common error was to subtract 4 rather than 8 from $6 \times 2 \times 4$ or to just write 44 as the answer. Others counted the number of faces and so found the surface area of the prism. A common mistake was to count the number of cubes at the front of the prism without then multiplying by 2.

Question 4

The vast majority of students correctly answered part (a), although the small number that made errors sometimes ordered the numbers as –2, –5, –12, 0, 1. Although Part (b) was more challenging, most answered it correctly; errors included 0 and 0.5. Approximately half of the students scored the mark in part (c), however, some thought –4°C is 10°C lower than 4°C. In part (d), some students chose Zugspitze, possibly misreading the question.

Question 5

Most students were able to write down the coordinates of point *B* and *D* in parts (a)(i) and (a)(ii), although some wrote (1, 3) and/or (3, –2) respectively. Part (b) was only accessible to those aiming for one of the higher grades, with many not knowing where to start. In part (c), about half of the students managed to find the area of the quadrilateral, with 9 being an error that was occasionally seen.

Question 6

This question was accessible to most students. Some were only able to go as far as adding the cost of a knitting pattern and the knitting needles. Others then subtracted this cost from the total cost but stopped at the cost of two balls of wool. Many, though, then proceeded to divide by 2 to find the cost of one ball of wool.

Question 7

In part (a), many students worked out $5 + 7 \times 8$ rather than $(5 + 7) \times 8$. This was because they used their calculator without considering the order of the operations. In part (b), those who realised the need to divide by 8 and then subtract 7 usually scored the mark because the order of the operations was not an issue as in (a).

Question 8

This question was answered well. Common mistakes in part (a) included 4 10 pm instead of 16 10 and misreading of the time on the clock as 14 20. In part (b), students often correctly added 55 minutes to their time in (a), although 5 5 was an error occasionally seen. Method in the working space for part (c) was often unstructured. Some, however, did attempt to find the time taken to finish Jacques homework by breaking the problem into simpler steps, such as 18 35 to 19 00 to 20 00 to 20 15 or 25 minutes + 60 minutes + 15 minutes. 1 hour 40 minutes was often seen as the final answer as was 2 hours 40 minutes. A small number of students attempted to subtract 18 35 from 20 15.

Question 9

Those who appreciated that 90° represented 135 students invariably scored full marks in part (a). Some simply multiplied 135 by 4 although others split the pie chart into four right angles and worked out 135 + 135 + 135 +135. In part (b), many students didn't appreciate the importance of their answer to part (a). Some measured the appropriate angle but didn't proceed to find how many students chose "action" as their favourite film type. Others tried to evaluate this angle by calculating $135 + 0.5 \times 135$ while others simply measured all of the angles.

Question 10

Part (a) was accessible to most students, although arithmetic errors were frequently made. Follow through marks were available in part (b) but it was common to see answers given as ratios or responses such as “likely” or “unlikely”.

Question 11

Most students scored one mark for this question, usually for either writing three of the fractions in the correct order or for converting at least two of the fractions to decimals. Some truncated their decimals to 1 decimal place, making it less likely that they could correctly distinguish between $\frac{3}{5}$ and $\frac{2}{3}$.

Question 12

The overwhelming majority of students were able to find the next term of the number sequence in part (a), although some also wrote down the sixth term. In part (b), most students were able to successfully communicate their use of the term to term rule, although the occasional response was general, and simply explained that the difference between the terms was added to 19, rather than specifying the value of this difference. Part (c) was accessible to most students. Many simply listed terms in the sequence although some did use working such as $7 + 10 \times 3$. A large number of students were not able to offer a full explanation in part (d). Some simply stated that 58 is in the sequence while others stated that 60 is not a multiple of 3.

Question 13

Many students used a numerical approach, such as trial and improvement, to solve the equation in part (a). This sometimes led to an incorrect answer of 1. Those who did attempt to use algebra often only got as far as $4p = 5$ before making an error. In part (b), students who couldn’t expand the bracket scored no marks. Those who could, then often didn’t have the algebraic skills to gain further marks.

Question 14

In part (a), many students attempted to calculate 20% of 485 (= 97) but then didn't subtract from 485 to get full marks. A relatively small number multiplied 485 by 0.8. Part (b) proved to be more challenging. Many tried to find 20% of 79 or stated that 79 = 80%. Only a small proportion of students realised that 20% represented 79.

Question 15

Part (a) was accessible to most students, with many scoring at least one mark, sometimes for 37.9 or 3.11. It was quite common, however, for method not to be shown and so one error could have led to the loss of two marks. In part (a)(ii), errors included answers to part (a)(i) truncated and answer to part (a)(i) rounded to 3 decimal places instead of 3 significant figures. Many students struggled to find the cube root of 9261 in part (b). Some found the square root while others found the cube. In part (c), one mark was often scored for 100 or 10^2 but this wasn't always followed by the correct answer of 2. Some students added or multiplied the powers and gave an answer of 5 or 6.

Question 16

In parts (a) and (b), many students were unable to write down the value of p and q. Some measured the angles despite the diagram not being accurately drawn and others got p and q the wrong way round. Part (c) was only accessible to students who were able to calculate the sum of interior angles. As a consequence, many students scored no marks. Those who were able to make a start usually attempted to find x by a numerical approach, rather than forming an equation. A correct equation was enough for the second mark but a complete numerical method was required for this mark. Students occasionally divided 164 by 2 rather than 4 and so only scored 1 mark.

Question 17

In part (a), partially simplified expressions were sometimes seen, such as $14d \times e$. In parts (b), (c) and (d), many students weren't competent at using the appropriate index

rule, with answers such asm^{10}, $c^{3.67}$ and a^{8}seen. Students who were able to expand brackets usually scored two marks in part (e). Some made an error with one of the four terms while others incorrectly simplified the like terms and so didn't score the accuracy mark.

Question 18

In part (a), relatively few students described the transformation fully correctly. Some recognised it as an enlargement and even occasionally stated the scale factor. However, it was unusual for the centre of enlargement to be correct. A number of students described it as an enlargement and a translation and so scored no marks because the question asked for a single transformation. In part (b), some students didn't understand what was being asked. Some had an idea, but translated **A** in the wrong *x* direction or the wrong *y* direction or both. Many students gained 1 mark in part (c) for the correct orientation but incorrect position while others rotated **D** 90° clockwise about (3, 1).

Question 19

Many students were unsure what this this question was asking for, with some just listing factors of 560. Those who did make an attempt to draw a factor tree sometimes made an arithmetic error and so couldn't score more than one mark. When a fully correct factor tree was drawn, the answer was often written as a product of its prime factors rather than as a product of powers of its prime factors.

Question 20

The majority of students scored no marks in this question. Some added the frequencies and divided by 5, while others added the midpoints. Those who appreciated the need to multiply the midpoints by their corresponding frequencies sometimes made an arithmetic error or incorrectly worked out some of the midpoints. The end points were occasionally used in place of the midpoints and the mean was sometimes found.

Question 21

Most students struggled to complete any the table in part (a) correctly, and so also scored no marks in part (b). Some partially completed the table (with $y = 5$ for $x = -1$ the most common error) and these students usually then plotted their points correctly in part (b). A small number completed the table and drew the curve fully correctly.

Question 22

Many students were unable to find the length of AC in part (a). Some assumed the triangle to be isosceles while others simply added the lengths of the other two sides together or found the area of the triangle instead. The relatively small number who used Pythagoras' Theorem usually scored either two or four marks. Some only went as far as finding the length of AC but most continued to correctly find the perimeter. In part (b), most students didn't understand what the question was asking. There were very few correct answers, although 13.4 and 13.49 were occasionally seen.

Summary

- Students would benefit from learning the difference between vertices and edges.
- A significant number of students found it difficult to differentiate between surface area and volume.
- Some students seemed unaware of the difference between a product of prime factors and a product of powers of prime factors.
- Some students should learn the main facts about interior and exterior angles as well alternate and corresponding angles.
- Many students were not able to transform shapes or describe transformations.

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