Pearson

Examiners' Report
Principal Examiner Feedback

November 2017

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Calculator) Paper 2F

edexcel

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

November 2017
Publications Code 1MA1_2F_1711_ER

GCSE (9 – 1) Mathematics – 1MA1
Principal Examiner Feedback – Foundation Paper 2

Introduction

A significant minority of students found this paper difficult, and were clearly unprepared for some of the questions. Indeed, it was clear that sometimes it was the content rather than the application of mathematics that was a problem for the students. Performance was not always consistently good across the paper, but with a good range of questions the paper was able to discriminate well.

Weakest areas included algebraic manipulation and derivation, percentage calculation and application of ratios and rates. There was also evidence that a number of students did not have a ruler for measuring lines, or a protractor for measuring angles. Most demonstrated the use of a calculator, though on some occasions it was clear that they did not have an understanding of the way in which their calculator worked. Unfortunately, some answers were spoilt by premature rounding, or taking an accurate answer from a calculator and rounding it sufficiently to make it inaccurate.

Questions which assessed the use of mathematics across a range of aspects of the specification were sometimes done poorly, such as Q15, Q18 and Q22, but in other cases done well, such as in Q11. There was also inconsistency of approach to questions that might be considered more traditional where the process of solution might be considered predictable, such as poor attempts in questions Q4, Q5 and Q16, yet good attempts at Q13 and Q17.

There were far fewer attempts using trial and improvement approaches. Approaches to questions that required some interpretation or explanation were inconsistent. Q4(b) and Q8 were questions in which most students scored well, but poor attempts were made in Q14 and Q18.

Students need to read the questions carefully. There were too many case where students misread the question and failed to give the answer asked for; equally too many cases where figures given in the question (and sometimes in their own working) were misread.

The inclusion of working out to support answers remains an issue for many; but not only does working out need to be shown, it needs to be shown legibly, demonstrating the processes of calculation that are used. This is most important in longer questions, and in "show that" questions. Examiners reported frequent difficulty in interpreting complex responses, poorly laid out, in Q15, Q17, Q19 and Q22.

Report on individual questions

Question 1

A well answered question to start, where the only common error was a misplaced decimal point eg 0.7 or 0.007

Question 2

Nearly all students gained this mark.

Question 3

In part (a) only a minority failed to simplify and left a "×" sign in.

In part (b) weaker students wrote their answer as $t2$ rather than t^2.

In part (c) it was encouraging to find most students were able to simplify this expression.

Question 4

Part (a) was generally well done, with the common error in not carrying out the final division by 90 correctly. Some students failed to extract all the information correctly, for example not finding the total weight of each item of fruit.

In part (b) the most popular choice of method was 75 × 15 with a conclusion. Some students showed 13 tomatoes at 975 and 14 tomatoes at 1050. The conclusion was sometimes written in part (ii), but marks were still credited for this in part (i).

The last part was very poorly done, with many students just repeating what they had done in part (i); it was clear few understand the mathematical concept of an assumption.

Question 5

Students had a good success rate with part (a), most giving $\frac{33}{60}$ as their answer, but some did simplify. The most common error was giving the probability of those that DID walk. Some failed to read the 60 in the question and added the total incorrectly.

In part (b) it was disappointing to see so little working shown, which would have gained many students an additional mark. There was evidence that students did not have a protractor, particularly when they showed the angles, but were unable to draw any angles accurately. Most students did show a pie chart with at least 2 angles drawn accurately.

Question 6

In both parts of this question there was confusion as to which numbers to include in their answer. In part (a) answers ranged from $\frac{3}{4}$, $\frac{4}{3}$ and the incorrect fraction $\frac{4}{7}$ for Annie.

In part (b) there was similar confusion with ratio being given the wrong way around (eg 1 : 3) or use of the wrong numbers (eg 1 : 4, 3 : 4).

Question 7

A large proportion of students gained full marks by correctly identifying the relevant prime numbers, but some failed in this process by including a non-prime number. Weaker students confused prime numbers with square numbers, and sometimes included numbers between 1 and 10.

Question 8

In part (a) a minority of students recognised the missing "30" on the vertical axis; too many made reference to the diagram as if it were a scatter graph. But in the second part it was the majority who correctly identified the trend as increasing, though some answers were spoilt by incorrectly referring to the trend as "positive correlation".

Question 9

Part (a) was done well, with the most common answer being 2.75. Most showed 5.5 × 0.5; there was some evidence that students did not have a ruler, and were guessing the length. There were a few students who, having shown 5.5 × 0.5, then gave their answer as 3. Students should be encouraged to write their accurate answer and not round it.

In part (b) some students appeared confused as to which angle they were giving the bearing for. But even when it was clear the correct angle was being found, the protractor was being read wrong (eg 130). There was also some evidence that students were estimating the angle (perhaps because they did not have a protractor).

Question 10

In part (a) is was not uncommon to find students missing off the units from their answer; this was far more frequent than those giving an incorrect unit (such as cm). There was some evidence of counting squares to get to the numerical answer, but this usually led to an inaccurate value. It was disappointing that a significant minority did not halve their value of 24.

In part (b) many students had difficulty in naming the shape, giving almost any quadrilateral other than "kite".

Question 11

Most students were able to arrive at the correct values of 250, 100, 500 to put into a ratio, though many then failed to simplify it correctly or fully. Some errors were seen in arriving at these values, most often the "100".

Question 12

This was very well understood and full marks were gained by the vast majority of students in both parts.

In part (a) a minority of students put the frequencies in the wrong order in (usually) two of the right-hand boxes; some gave the frequencies incorrectly as probabilities of 200.

In part (b) the most common incorrect answer was $\frac{13}{200}$ (which gained 1 mark) where students had not read the question properly. Very rarely did students use incorrect notation for the probability.

Question 13

This question was well answered. Students calculated the hourly rate for both people or calculated the equivalent amount earned for comparison with the £266; some did both! It was disappointing to find a common misread of the £266, usually replaced with £226.

Question 14

In part (a) students had to give an example by choosing two odd numbers in the given expression, and calculate an answer that was a multiple of 4. This was usually done well, sometimes using the same odd number, though errors were not uncommon. It was surprising to see even, rather than odd numbers being used, and merely substituted and not worked out.

In part (b) students had to show some reasoning by explaining how the use of (any) odd number in the expression could give a multiple of 4. Marks in this part were rare. Nearly all students thought that they just had to give multiple examples as in part (a). Some gained the first mark (only) by reasoning that doubling an odd number always gave an even number.

Question 15

Students had to read and analyse the information given in this question, and then formulate a strategy for its solution; for many this caused too many problems. The most common misconception was with students finding an incorrect amount of oil purchased in both November and February with very few finding the 1500 and then subsequently adding 400 to this value to gain the total value of 1900. Many gained the process mark for showing a method to find an increase of 4%, though again there were many common errors including use of a 1.4 multiplier, division by 4 and partitioning methods that failed to add to give a 4% increase. Very few students provided a full solution leading to the correct answer.

Question 16

This question differentiated well across the ability range. Both trial and improvement and the flow chart method rarely resulted in the correct answer. Many gained a mark for expanding the bracket, but most then were unable to perform a correct manipulation of terms to get the second mark. Some students stated the answer as $\frac{2}{3}$ rather than $\frac{3}{2}$.

Question 17

Responses to this question started well. Most were able to calculate the profit on either one bottle or 12 bottles. The £0.36 profit was often seen. A significant number of students stopped there, sometimes giving 0.36 as their answer. Many students erroneously took the base for comparison as their selling price, £6 rather than £5.64 cost price. Some appeared to get as far as 1.063 but then rounded to 1.1

Question 18

Few students scored any marks in part (a), with the commonest answer being 10, from $\frac{80}{8}$. Some scored 1 mark for working with the circumference; no marks were gained from using the area formula.

Part (b) was better answered with about half gaining credit from recognising that some aspects remained constant. Unfortunately, many answered "yes" because they thought the circumference had changed.

Question 19

When students worked with numbers of cubes initially they were more successful. Some students began by incorrectly writing the ratio of Y:B the wrong way around; another common mistake was to interpret the green cubes as 4 × yellow (instead of 4 × blue). Some algebraic attempts were seen but these were rare and lead to many mistakes in calculating G. The most successful methods tended to use possible numbers of each colour, eg 4, 2, 16.
It was not uncommon for students to use their own chosen values to represent the ratios which could also lead to the correct answer. Some marks were lost when working was not clear, or was sometimes contradictory when multiple methods were presented.

Question 20

Many students met with some success in this question. In part (a) there were some students who rotated the shape by 90° rather than 180°. Sometimes the shape was not accurately drawn in the correct position.

In part (b) students were not careful enough counting squares, and sometimes positioned the shape within one square of what was needed. Some failed to take account of the minus signs in determining direction of move.

Question 21

In part (a) addition was required; some multiplied and gave the answer as 3.

In part (b) multiplication was required; some added and gave the answer as 8.

Students very rarely scored marks in part (c). A clear lack of conceptual understanding of standard form (or indices) was evident with most students missing the powers of 10 link to gain the correct algebraic power. Many tried to solve the equation to gain a numerical value with the use of the 3 and 2 as coefficients of 100 and 1000 rather than showing their derivation.

Question 22

Only the best students were able to work through to a correct solution, but part marks were awarded to those who attempted to do something of worth with the diagram. Some started with Pythagoras on the left hand right-angled triangle, but of course only earned marks if it was of the form 7.5^2-6^2 (ie not added). It was not uncommon to find some attempting to find the area of the trapezium, which of course earned no marks. There was some (independent) credit for working with trigonometry. This could be done in the left-hand triangle (if the angle was made clear) or in the right-hand triangle (with their stated value for the base). But only a minority of students realised that trigonometry was needed.

Question 23

There was a poor success rate for part (a). It was clear that some were just entering figures on their calculator without any forethought as to how to get the calculator to process part values. Those who worked out the four values and wrote them out, then moving on to the rest of the process of calculation frequently gained the final correct answer. Some lost marks due to premature rounding of the figures from their calculator.

Good rounding in part (b) frequently led to the mark in this part being awarded. There were errors for some who used the wrong number of decimal places.

Question 24

In part (a) sight of a complete answer (both 6 and −6) was rare. Some credit was given where an answer was embedded, which was not uncommon. The main mistake occurred when students divided by 2 twice instead of dividing by 2 and then finding the square root.

In part (b) the majority were familiar with what was required but many failed to multiply the $3x$ by $3x$ correctly, often writing this as $6x$, but gained 1 mark if they multiplied their other terms correctly. Using a table format was very popular and generally successful for those students.

In part (c) very few were familiar with the requirements of factorising into two brackets so often tried to "factorise" using only one pair of brackets. Common wrong answers like $x(x + 6) + 9$ were frequently seen.

Summary

Based on their performance in this paper, students should:

- Present their working legibly and in an organised way on the page, sufficient that the order of the process of solution is clear and unambiguous.
- Include working out to support their answers
- Bring all necessary equipment to the examination, including ruler and protractor, and need to be trained in the correct use of their calculator.
- Carry out a common sense check on the answers to calculations; for example you should expect the number of £1 coins in question 6 to be a whole number
- Make sure they learn and understand algebraic manipulation and derivation, percentage calculations and application of ratios and rates when preparing for future examinations
- Spend more time ensuring they read the fine detail of the question to avoid giving answers that do not answer the question, and to ensure they use the correct figures as given in the question.

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 80 Strand, London, WC2R 0RL, United Kingdom