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Principal Examiner Feedback

Summer 2013

GCSE Mathematics Linked Pair Pilot
Application of Mathematics (2AM01)

Foundation Paper 1F

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Summer 2013
Publications Code UG035292

GCSE Mathematics 5AM1F
Principal Examiner Feedback – Foundation Paper 1

Introduction

This applications paper gave the opportunity for candidates of all abilities to demonstrate positive achievement with a good range of marks for the award of grades seen.

Candidates found the questions at the start of this paper reasonably straightforward, however many candidates found the questions towards the end of the paper more challenging.

Those candidates that resorted to trial and improvement methods for solving algebraic questions were usually less successful than those that used an algebraic approach.

A significant number of marks were lost where candidates did not use a coherent strategy to solve a problem. There were many cases where numbers were spread across the page and it was often difficult to follow the candidate's route through the problem.

Q1, Q2, Q4(a), Q4(c), Q7, Q9(a), Q9(b), Q9(c), Q10 & Q15 were tackled most successfully by candidates.

Q5, Q9(d), Q14, Q18(b), Q18(c), Q20, Q21 & Q24 were less successfully completed.

Report on individual questions

Question 1

This question on writing numbers correct to a power of 10 was well answered with a very good success rate.

Question 2

Finding information from a table was well answered with very good success rates in part (a) and (b) but this did drop off slightly with part (c) where the candidate had to juggle 3 variables.

Question 3

In this question on changing units candidates frequently made errors in the number of grams in a kilogram with only about half the candidates giving the correct answer to the weight of the baby in grams. This success rate improved to about two thirds when changing from centimetres to metres.

In part (c) there were again issues with changing between litres and millilitres.

Question 4

Reading scales was a well understood and well answered topic with very good responses given to parts (a) and (c).

The success rate was not quite so good in part (b) where the scales used negative numbers where each division was marked I 0.2 of a degree.

Question 5

Normally, questions on symmetry are well answered but the complexity of the shape in part (a) meant that few candidates gave the correct answer for the order of rotational symmetry.

Part (b) where line symmetry was being tested was very well answered though the shape was again complex.

It was rare to see a fully correct algebraic method for part (c). Whilst about half of the candidates gave a fully correct answer, there were a number of common errors and misinterpretations. The most common included 180 ÷ 3; assuming sum of angles was 360; taking $3x$ as 90 and then 90 ÷ 2 to find x.

Where candidates resorted to trial and improvement methods they were generally unsuccessful.

Question 6

The majority of candidates drew bar charts in this question testing drawing a suitable graph or chart.

These were usually drawn correctly, although the scaling of the vertical axis sometimes caused candidates problems, for example 2 squares = 5 units. Significantly the communication marks were lost for failing to label both axes.

A small minority chose to draw line graphs and frequency polygons. Whilst bar heights were correct, bar widths varied within individual diagrams on occasions which was condoned.

Question 7

This question on statistical measures was usually well answered.

Part (a), finding the mode was almost always correct but parts (b) and (c) were less well done with about two thirds of candidates gaining the marks.

Candidates made the usual errors in mixing up mean and median and often wrote 6 – 1 or 1 – 6 for the range without subtracting the numbers.

Question 8

Candidates usually knew what they had to do in this question but they often failed to read all values correctly from dual bar chart by assuming scale was in twenties or twos rather than two hundreds.

About three quarters of the candidates gave the correct answer to part (a) and the common mistake was to give the reading from the 2011 bar rather than the 2012 bar.

Many candidates did not write down their reading from the graphs and this lack of evidence of method and calculation meant method marks could not be awarded e.g. it was common to see 800 without the supporting10400-9600.

Question 9

This shopping list question was well understood and well answered. The vast majority of candidates gave fully correct answers in parts (a), (b) and (c). Where errors were made it was often as result of candidates working without a calculator e.g. 5 – 1.42 = 4.42.

In part (d) however it was rare to see fully correct answers using correct spread sheet notation (× was often used instead of *) with a significant number of candidates attempted to work out a numerical answer from values in the table, rather than writing a formula.

Question 10

This question on number machines was very well answered with almost all candidates giving the correct answer to part (a) and 9 out of 10 giving the correct answer in (b).

The vast majority of fully correct answers were often given with no method shown. Which was a pity as marks were lost as it was common to see £123.75 from candidates who had not followed the correct order of operations but may have gained a mark for writing down (125 – 25) ÷ 20

Question 11

In this bank account question only just over half of the candidates gained full marks. It was not because they did not understand the question it was how they processed the large amount of data they were presented with.

Errors often occurred with incorrect use of their calculator. Candidates would have been more successful if they had used a methodical approach to solving the problem.

Question 12

There was evidence that candidates sitting this paper had been well prepared for questions on time. About three quarters of the candidates gave a fully correct answer to part (a).

Some candidates lost the accuracy mark when there were errors in time notation between 12 and 24 hour clock on answer line. We had the usual problem with candidates thinking there are 100 minutes in an hour and their failure to convert 140 minutes correctly to hours and minutes led to 15 00 + 1 40 = 16 40 or 140 ÷ 60 = 2.3 hours interpreted as 17 30 in the final answer.

In part (b) many candidates gained the method mark for correctly dividing by 3 but this was not always followed through to a fully correct answer and £9.92 was often seen on answer line. Where candidates attempted to convert fraction to a decimal, errors resulted from use of 0.3 rather than $0.\dot{3}$. Only about a half of candidates gave a fully correct answer and a significant minority did not show understanding of how to calculate a simple fraction of an amount.

In part (c) about one in ten candidates were able to write $\frac{300}{450}$ as a fraction not in its simplest form with about a half of the candidature giving a full correct fraction.

Question 13

At the halfway point of the paper it was pleasing to see about three quarters of the candidates giving fully correct answers for this question. Common errors were to attempt to find 10% of £216 or incorrectly give 10% of £240 as £2.40

Question 14

Many candidates on the foundation tier appear to struggle with pie charts. Only about a third of candidates gave fully correct answers to this question with half the candidates scoring no marks at all. Some candidates calculated angles correctly but failed to draw angles accurately. There were many inaccurate attempts to draw pie charts with seemingly little understanding of the need for angles to total 360 degrees.

Question 15

Nearly all candidates scored marks in this question. Some candidates still confused data collection sheets with a questionnaire and some even tried to draw a graph. About half the candidates drew a fully or partially correct data collection sheet and labelled the columns correctly. However, clear headings were not always seen and there was some confusion about the difference between tally and frequency/total.

Question 16

This was a very well understood question; one where very few candidates scored zero. About three quarters of the candidates gave fully correct responses with full working, although some did lose marks when they gave the wrong answer and did not show working. Incorrect responses usually occurred when candidates failed to calculate hire of room first or added food, drink and room hire before multiplying by 4

Occasionally, correct working led to an incorrect conclusion and loss of the communication mark. Almost all candidates went for the total cost approach with few attempted the alternative method of finding cost per person.

Question 17

Just over half the candidates were able to give correct solutions to the flow chart question but surprisingly just over a third of the candidates scored no marks at all in this fairly straightforward example.

Question 18

Part (a) in this graphical interpretation question was well answered but candidates struggled with parts (b and (c).

In part (b) correct answers were relatively rare with many candidates attempting 60 ÷ 15 instead of 15 ÷ 60

This misconception may have derived from candidates being uncomfortable with dividing by a larger number to arrive at an answer less than one and candidates often had clearly not referred to the graph correctly.

In part (c) many candidates gained some method marks for correct calculation of tariff B but then failed to refer to the original graph to find charge for tariff A. There were many flawed attempts to calculate the cost of tariff A which seldom scored marks.

Question 19

The first mark in this question was given for working with weights written in the same unit however about a quarter of the candidates failed to score this mark but about half the candidates did score just that one mark in this question. Often little further working was seen, with candidates merely referring to 12p extra for 300g. Candidates should be aware that a 4 mark question requires further working.

Those who attempted to convert to comparable values often appeared to be untrusting of the answers they received or attempted to make the calculations more complicated than they needed to, suggesting lack of a coherent strategy to solve such problems.

Occasionally wrong conclusions were drawn from correct working resulting in the loss of the communication mark.

Question 20

About a third of the candidates failed to gain first mark in this question for converting units. The most common successful responses occurred when candidates calculated the number of rows and columns necessary to cover the wall, although some arrived at the incorrect conclusion of 60 and 80 because of failure to convert units correctly. Those that chose to calculate areas, often failed to arrive at a correct conclusion, because correct comparable units were not used. The final method mark was often achieved despite some candidates' incorrect previous working. It was pleasing to see that about a quarter of all candidates did give the correct solution to this functional question.

Question 21

Most correct responses for this question resulted from trial and improvement methods. Those that used algebraic methods often failed to arrive at a correct conclusion because of incorrect algebraic statements but they did score marks for correct statements such as $3x$ and $3x + 4$ or for forming a correct equation. Some candidates began with 158 ÷ 3 with little reference to the statements for number of marbles for each person.

Question 22

Those candidates who drew a two way table were often able to follow through to a correct solution. Of those who did not, many gained the first method mark for calculating the number of men but then failed to apply the other statements correctly. Often they subtracted the men who liked Chinese best correctly, then added rather than subtracting the men who liked Italian or failing to identify this figure correctly. They were also thrown by attempting to use women who liked Thai best when this was not necessary with this method.

Question 23

This question gave an equal success rate for marks of 0, 1 and 2. About a third gave fully correct responses, although significant number failed to include any response boxes or wrote several questions without any response boxes. Most included a time frame either in the question or the response boxes. Occasionally, there was confusion between questionnaires, data collection sheets and frequency tables.

Question 24

This whole question was poorly answered with only a quarter of candidates gaining full marks in (a) and about one in six in (b).

In part (a) candidates tended to get either full marks or no marks whilst in (b) many gained first method mark but then failed to follow through to a fully correct answer. Some attempted to find 4.6% of £3000 for the second and third years, failing to appreciate that the interest needed to be added each year.

It was rare to see the use of multipliers 1.04 and 1.046. Those that attempted to find 4.6% of a correct amount, often failed to process the calculations correctly.

Grade Boundaries

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