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Examiners' Report
March 2013

GCSE Mathematics 1MA0
Foundation (Calculator)
Paper 2

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Introduction

All questions on this paper were accessed by the great majority of candidates.

Presentation of work was much improved compared with that of November 2012, although at times it was difficult to distinguish between figures, eg 4 and 9, especially in Q19(a).

Failure to show working is still a major issue and this does prevent candidates gaining the marks their understanding probably deserves. This was particularly true in the quality of written communication (QWC) questions, Q4(c), Q14 and Q24(b), where many candidates lost marks by not explicitly showing their methods. Centres should impress upon candidates that, in these types of question, a written statement in conclusion that also includes correct units is often required, numerical answers alone being sufficient to gain full credit.

Candidates need to be aware that premature rounding can cause inaccuracies and marks lost in final answers.

Q20(b) and Q22(c) showed that very few candidates at this level understood the concepts of bearings and gradient.

Lack of equipment, including ruler, compasses and protractor, caused some problems. There appeared to be a large number of candidates who either did not have access to a calculator or chose not to use it for some arithmetical calculations. Centres need to encourage candidates to state explicitly where any calculation is being carried out with a calculator.

Question 1

Most candidates gained at least 3 of the 4 available marks in this question. For part (b), although most answered correctly, a common incorrect answer was ‘Nine thousand and fifty’. Although slight spelling errors are overlooked, candidates need to ensure that slips do not lead to ambiguity in meaning. In part (c), a common mistake was to write 28.75 to the nearest 10 (30) instead of the nearest whole number. In part (d), rounding up was not uncommon.

Question 2

This was very well answered with the majority gaining the full 3 marks. There were very few errors in parts (a) and (b); if marks were lost, it was usually for a poor explanation offered in part (c). ‘It goes up in 2s’ or ‘82 is not in the 2 times table’ were not uncommon incorrect explanations. Quite a number of responses demonstrated logic that would have been incorrect if the sequence had been $2n$ + anything other than zero.

Question 3

Reading of the dials in parts (a) and (b) was usually accurate but a significant number of candidates made mistakes with their placement of an arrow in part (b), with 225 and 120 appearing as common incorrect answers. Very few candidates indeed failed to earn the mark in part (c).

Question 4

Parts (a) and (b) were usually answered correctly. In part (c), the majority of candidates scored at least 2 marks, usually for correct addition. Many failed to achieve full marks as their solutions often did not include a statement explicitly stating who spent the greater amount of time on their mobile phone. Centres must understand that when quality of written communication (QWC) is being assessed, simply underlining or circling, in this case ‘Nick’, is not enough to gain the credit; nor was the statement ‘Nick used his phone for 64 minutes and Dave used his phone for 58 minutes.’ Centres should encourage candidates to double-check calculations to prevent the loss of the accuracy mark from arithmetical errors that are avoidable on a calculator paper.

Question 5

A very straightforward question, but many candidates failed to shade the required number of squares to illustrate three quarters; 3, 4 and 8 shaded squares were the most common mistakes. Some candidates risked losing the mark through very minimal or inconsistent shading styles, which might have made their intention unclear.

Question 6

This question was very well answered indeed with few candidates failing to achieve full marks. Any errors made were either arithmetical, which should not occur on a calculator paper, or in assuming that the 15 and the 9 were all getting on the bus.

Question 7

This question was, in general, answered well. Errors made were usually through dividing by 2 or 4 instead of 3 after subtracting Sally's share, or by dividing the full amount by 3, ignoring Sally's share. Arithmetical errors were also made by a significant number of candidates and some whose final answers were very close to the correct figure lost all marks through lack of working shown, despite the likelihood that a correct method had been used. It was not uncommon to see candidates using 'tally' marks to try to split the amount into equal shares, perhaps implying that candidates did not fully understand the concept of dividing the amount by 3, as this would have been a simple calculation on a calculator.

Question 8

Part (a) was usually correct, with occasional errors seen with one or two of the intervals or with completing the tally but not the frequency column. This is another example of where candidates could be encouraged to carry out a check of their work, in this case by checking their total frequency matched the number of candidates in the raw data given. Some less able candidates simply transcribed each of the test marks into the respective tally rows and then totalled each row to complete the frequency column. In many of these cases, however, part (b) was correct. Many of the errors in part (a) suggested that no simple checking had been carried out.

Question 9

Although the majority were able to construct an accurate circle of radius 5 cm, it is of concern that many candidates either did not have access to a pair of compasses or, if they did, were unable to use them efficiently. In addition, a few drew smaller circles, indicating possibly that they thought the diameter was 5 cm, ie confusing radius with diameter.

Question 10

Part (i) was usually answered correctly, but in parts (ii) and (iii) many candidates showed a lack of understanding of factors and multiples and the difference between the two. In part (ii) 5 and in part (iii) 90 were the most common mistakes made. In part (iv), 100 and 30 were common errors as candidates showed their lack of understanding of a cube number.

Question 11

Most candidates scored at least 1 or 2 marks here, usually for 9.39×10 and correct units in their answer. Mistakes were made, however, by candidates either failing to understand the need to buy just 10 cartridges or assuming that the pack of 3 cartridges could be readily split. So many found the difference between the cost of 4 packs (12 cartridges) and £93.90 and many found the 'cost' of one cartridge from the pack (£24.30 ÷ 3) and added this to the cost of 3 packs. It must be noted here that correct monetary notation is an issue; 9.39×10 often became £93.09 which led to unnecessary inaccuracies.

One independent mark was awarded in this question for correct units; the correct answer of £11.61 often came without.

As candidates have become more familiar with 'better buy' type questions, there was evidence that some did not read the question with enough care; many failed to find the difference in prices and some just identified the cheaper option.

Question 12

Very few candidates gained full marks in part (a); the majority, however, gained 1 mark for the selection of shapes B and D in either part (a)(i) or part (a)(ii). In selecting B and D in part (a)(ii) only, many candidates failed to show complete understanding of the differences between congruence and similarity.

Although the correct answer of 16 was the most common response in part (b), many candidates still mix up area and perimeter, with an answer of 7 being seen many times.

Question 13

All parts of this question were answered well. There were very few mistakes in part (a). In part (b), 10 was a common error, maybe through misreading am for pm. In part (c), errors tended to be either from calculating $-1 + 5$ or from a possible misread in using 10am instead of 10pm; however when an answer of -7 was seen, it had to be supported by explicit working before any credit was given. Calculating errors were common.

Question 14

The vast majority of candidates were able to score 1 mark for summing the given weights of the five ingredients. Very many candidates could go no further. The most common approach thereafter was to work out the number of pots the 96 kg of yoghurt could fill. This was usually correctly calculated but often the final mark was not awarded since the mark scheme did insist on a correct decision and the correct units being quoted for the two totals used for comparison; 'pots' was often omitted. Other equally valid methods were less common but again, in questions assessing Quality of Written Communication, full working and units used must be shown. Some candidates did not explicitly show how they arrived at 768 pots and scored only 1 instead of 3 or 4 marks.

Question 15

The completed two-way tables were usually correct. Most candidates gained at least 2 marks in this question.

Question 16

Many candidates are still confused between edges, faces and vertices of 3-D shapes. In part (a), the most common error was in getting the number of edges and vertices the wrong way round. In part (b), a reasonable sketch of the net of the pyramid was usually seen. Some were confused and offered a 3-D sketch or a plan view.

Question 17

In part (a), although the actual calculation was often performed correctly, many candidates were unable to write their answer correct to two significant figures. The most common error in part (a)(ii) was to write their answer from part (a)(i) correct to two decimal places. Some gave an answer of 13.0 or 13.00, showing that they do not fully understand the concept of significant figures. Some gave 12 as the answer instead of 13. Sometimes in part (a)(i), insufficient digits were written down to gain the mark.

In part (b), a surprising number of candidates failed to give a correct answer, with 50 or 1 million being the most common mistakes made.

Question 18

The most common incorrect answer seen in part (a) was 35 (28 + 7). Many candidates ignored the value of f given and simply tried to simplify the given expression, $9f$ being a much-seen example of this. In part (b), algebraic simplification was also attempted with answers such as $8gh$ and $15gh$ seen. The most common mistake made by candidates attempting the substitution was in the substitution of -2 into $3g$. Often $3 - 2$ or 3×2 were seen and no marks were then available. Even when the substitution was correct, it was not uncommon to see the error of $-6 + 20 = \pm 26$ made.

Question 19

Because of the nature of this question, many candidates attempted to find the actual amount of time Gill spent cutting the grass, so an answer of 2 hours was not uncommon in part (a). Those attempting to find a fraction often gave $\frac{40}{100}$ or $\frac{1}{8}$ or $\frac{1}{4}$. Some candidates simply gave the given angle of 40° as their answer. In part (b), many candidates gained only 1 mark for correctly working out the angle of the 'weeding' sector. Of those attempting to find the time, $3\frac{1}{2}$ and 5 hours were common errors. Often an answer of '4' was seen without any working. This did gain full marks in this question, but it is a risky strategy. Many candidates found the angle of 140° but were unable to go any further. Only a few candidates actually measured the size of the angle.

Question 20

In part (a), the correct measurement of 10 cm was usually seen or implied but with subsequent errors in the use of scale factor, including multiplication rather than division by 4. However, an incorrect answer of 2.2 km was common and with no supporting argument, showing clearly how it had been obtained, no marks were awarded. In part (b), the vast majority of candidates picked up 1 mark for plotting a point 6 cm from *B* (quite often actually on the line *BW*), but very few scored the second mark for a correct bearing. This clearly is a topic that candidates find difficult at this level. Even when knowledge of bearings was apparent, accuracy in the use of a protractor was often poor (or missing). Many took the bearing from line *BW*.

Question 21

Readings taken from the travel graph were usually correct and the majority of candidates gained full marks in parts (a) and (b). The success rate in the completion of the graph using the given information in part (b) was lower. Many correctly identified the 30 minutes when stopped but were often confused in knowing where 'home' was. Some lost marks by drawing lines that were broadly correct but inaccurate. Candidates need to be encouraged to take care with accuracy as some lost marks for drawing too long a horizontal line, with subsequent inaccuracies in the gradient of the return journey home, with the final section of the graph having a positive gradient rather than negative.

Question 22

Very few candidates correctly drew the equations of the given lines in parts (a) and (b). The best of the 'near misses' was to draw the graph of $y = 3$ in part (a) and $y = -x$ in part (b). Some candidates did not seem to understand that they needed to draw a line, as asked for in the question, rather than just plot a point.

In part (c), only a very few candidates showed any understanding of gradient. Many simply gave the coordinates of the intercepts on the coordinate axes, or just quoted ±2 and 3 without any real relevance. Many candidates just gave the coordinates (2, 3) or drew a right-angled triangle on the graph but failed to label each side with the correct length or go any further to calculate the gradient. Some specified the correct equation of the line with 1.5 as gradient but lost a mark for not specifying separately the actual gradient on the answer line.

Question 23

Only a few candidates showed any knowledge of the basic rules of indices; n^{15}, $8n$, $15n$ were the most common incorrect attempts in part (a). Similarly in part (b); $n^{3.5}$, $3.5n$, n^9, n^{14} and $14n$ were often seen. It was also not uncommon to see numerical answers only, where candidates had assigned a value to n. Some candidates, showing some understanding of indices, gave working such as $n \times n \times n \times n \times n$ and $n \times n \times n$ but could then go no further.

Question 24

Although the correct answer of 2.5 mph was often seen, many candidates worked out 15 × 6 (= 90) and some tried to use the information given in part (b) to convert to km, usually without success. Many candidates drew the formula triangle for distance, speed and time incorrectly and calculated 6 divided by 15 instead of the other way round. Part (b) was a QWC question and candidates were required to provide a correct statement and to show all of their working, including correct units. If this was not seen, full marks were not available. A significant number of candidates simply worked out 5 × 8 and gained no credit. A number of candidates correctly worked out 24 km but gave the answer 'no', mistakenly thinking the answer '= 20' was being sought.

Question 25

Most candidates were able to score 1 or 2 marks in this question for finding out how much oil was needed and then for calculating the full price. However, many candidates then demonstrated their inability to work out a percentage of a quantity. Many correctly tried to find 5% of either 43 680p or £436.80 or 67.2p by a 'build up' method. This was fine if their answers were correct but far too often they were not and often a clear method was not shown. If candidates find 10% first and then 5%, it is important to explicitly state that they are dividing by 10 and then by 2 and not leave it to the examiner to decide. A common error was to divide by 5, thus finding 20% instead. In this question also, many candidates clearly did not know the difference between 'of' and 'off', since they were happy just to find 5% of £436.80 and leave the result as their final answer. Candidates need to be aware of the units they are working with in a problem of this kind. Far too often an answer of £41 496 (expensive central heating running costs) was given; centres should encourage candidates to carry out a final check on answers by considering if they are reasonable in the context given.

Premature rounding caused inaccuracies in the final answer when, for example, 5% was given as 2180p rather than 2184p. Many using 'build up' methods lost marks because they rounded 10% to £44 or £43.70 before halving to find 5%.

Question 26

Most able candidates generally scored full marks in part (a). The most common error was to assume a single decimal place answer and give 0.3 or use a total probability of 10.

Sometimes it was evident from the sum of their probabilities in the table that the use of the sum being 1 was understood, usually by inserts of 0.3 and 0.4, with 0.4 as their chosen answer, but some candidates thought the whole was 10 rather than 1, giving 4.85 as the answer. However, 3.5 was also seen for the probability. Very few candidates showed incorrect working, suggesting that those who did not find the correct answer had little idea what to do.

Some candidates assumed the spinner to be unbiased and gave 0.25 as their answer. This error was also apparent in part (b), where the most common incorrect answer was 50 (200 ÷ 4), assuming the spinner to be fair.

Question 27

No parts of this question were answered well. Algebra is still an area of uncertainty for this level of candidate. In part (a), answers of $3x + 4$ and $7x$ were the usual errors seen. In part (b), $x^2 + 2x$ and $2x^2 + 2x$ were the best of the incorrect answers of candidates showing some algebraic manipulative ability. Some achieved the correct expansion but then incorrectly tried to simplify their answer, losing the mark.

In part (c), $x^2 - 6$, $x(x - 3)$ and $x(x - 6x)$ were the best of the 'near misses'.

Question 28

Few candidates were able to find the correct volume of this prism. Many attempted to find the surface area and many tried to find the volume by multiplying the perimeter of the cross section by the length of 20 cm. A significant number did start by finding the volume of one cuboid, usually 1540 ($11 \times 7 \times 20$) but failed to complete the task. Among the candidates who attempted to find the area of the cross section, errors included the use of incorrect dimensions (not usually shown on the diagram) or working such as $(11 \times 4) + (7 \times 5)$.

Summary

Based on their performance on this paper, candidates are offered the following advice. They should:

- ensure they have all necessary equipment, particularly a calculator when sitting a calculator paper
- show all of their working, however basic a calculation may seem
- avoid arithmetical errors by working or checking calculations with a calculator
- read questions carefully to avoid any misreads
- set out their working clearly and give full explanations, particularly in questions assessing QWC
- check answers and make sure that answers are realistic, eg a fuel bill of £41 496 is clearly not realistic
- avoid premature rounding of interim values that are then used to compute the final answer
- realise that topics such as bearings and gradient of a line are assessed at this level.

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