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Examiners' Report
November 2012

GCSE Mathematics (Linear) 1MA0
Foundation (Non-Calculator)
Paper 1

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Introduction

All questions on this paper were accessible by the great majority of the candidature. There were, however, two questions that proved more of a challenge: Q21, which was made more difficult by candidates using inappropriate methods, and Q22, where very few candidates understood the concept of drawing a plan in a 3-D configuration.

Poor presentation of worked solutions in some cases made it extremely difficult for examiners to follow. This was true particularly in Q14(c), Q15 (b), Q20 and Q21. Failure to show working in many cases prevented candidates from having the opportunity to gain method marks.

Reports on individual questions

Question 1

Most candidates were able to identify the sphere in part (a).

In part (b), although the spelling of 'cylinder' varied, most knew what shape A was. It was sometimes described as a 'tube'.

In parts (c) and (d) many candidates confused faces with edges and vertices. It was not uncommon to see answers of 3, 5 or 8 in part (c) and 5 in part (d).

Question 2

507 was given by most candidates as their correct answer to part (a).

Although 40 was by far the most common response to part (b), the most common error was to give an answer of 'tens', thus failing to give the value of the 4.

In part (c), 6400 and 7000 were often seen but usually the answer was correct.

Question 3

In part (a), many candidates made hard work of finding 50% of 86, ignoring the fact that 50% is equal to $\frac{1}{2}$.

In part (b), failure to take BIDMAS (bodmas) into consideration often left candidates with the most common error of 16 for their answer.

Estimating the square root of 60, in part (c), proved difficult for many candidates; 6 and 8 were common answers approaching the required answer, which did allow a range from 7.1 to 7.9. Many tried to square 60; halving 60 to give 30 was also common.

Question 4

Many candidates demonstrated competent use of a protractor and ruler in this question. However, the angle in part (a) was often incorrect as a result of poor reading of the protractor scale; 142, 41 and 42 were often seen.

Most candidates were able to draw an accurate line of length 5cm in part (b), although some candidates drew a 4cm line, measuring from 1 to 5 on their ruler instead of 0 to 5.

Question 5

The correct drawing of a pictogram was achieved by virtually all the candidates in part (a).

In part (b), misreading of the required days was the most common cause of error. The difference between Monday and Thursday was often seen; 1.5 was sometimes given as an answer.

Question 6

This question was often answered well in its entirety. It was rare to see working to part (c) but the answer of Wednesday was usually given. Friday was a fairly common incorrect answer (difference worked out as '9').

Candidates who showed their working found the calculations involving two negative temperatures difficult.

Question 7

In part (a), most candidates scored at least one mark for $\frac{9}{15}$.Too many, however, failed to gain the second mark as a result of not doing what the question asked, ie giving their answer in its simplest form. However, it was encouraging to see that almost all candidates gave their answer in the required format, very few using words or ratios.

In part (b), it was disappointing to see so many candidates unable to write $\frac{9}{10}$ as a decimal; 0.09 and 9.1 were the most common errors.

To gain the credit in part (c), in addition to recognising that Tania was wrong, candidates had to convert the given values into like formats, percentages or decimals being the most common approach. Many said that 75% is greater than 0.8, ignoring the % sign and just comparing numbers. Of those who did manage to convert 75% to a decimal, a large proportion still claimed that 0.75 was larger than 0.8. Some used fractions but not with common denominators, eg $\frac{3}{4}$ and $\frac{8}{10}$. Some based their reason on the proximity to 1 or 100 or thought it depended on what they were finding 75% of. Some candidates contradicted themselves by answering 'Yes' when their explanation indicated a 'No' answer. Candidates need to be encouraged to check that they have answered the question set.

Question 8

Part (a) was usually correct.

In part (b), many candidates failed to read the question carefully and assumed line symmetry again.

Question 9

Most candidates gained the mark in part (a), showing a good understanding of a probability scale. Many estimated a value for the probability of the spinner landing on blue; others simply referred to the relative positions on the scale. However, some ignored the scale, thinking that blue and red would have the same probability as there were two colours. A few failed to answer 'No'.

Parts (b) and (c) were generally well done but many misread the demand in part (c) and gave an answer of $\frac{3}{7}$.

Question 10

Most candidates were able to score well in this question. Those candidates who realised that the purchase of a family ticket was the more economical route usually

went on to gain full marks. Others simply found the total of the individual tickets and found the change from £60, gaining 2 of the 4 available marks.

Question 11

Most candidates were able to write down correctly the coordinates of *P* and *R* although a significant number did write the coordinates in reverse.

In part (c), incorrect answers tended to reflect candidates' inability to complete a parallelogram. Those who did generally gave (3, –2) as their correct point although some did give (–3, –4). Very few opted for the point (–1, 6). It was not uncommon for candidates to transpose their coordinates.

Question 12

Both questions in part (a) were answered well, although answers of 'n + 4' and 'the difference is 4' were not uncommon. These gained no credit.

In part (b), most candidates found that 20 was the difference between the 10^{th} and 15^{th} terms even if these were never explicitly stated. Failure to score any marks here was usually the result of incorrectly stating the two terms without showing any evidence of their origin. Candidates who listed the 15 terms usually gained some credit even when their arithmetic was incorrect. Failure to add 4 accurately ten times was common. There was some incorrect use of 2 x 19 and 3 x 19 for the 10^{th} and 15^{th} terms respectively, thinking that the 10^{th} term is twice and the 15^{th} term three times the 5^{th} term.

Question 13

5f, 4f and 4 were the most common mistakes in part (a). Many candidates failed to score because of one of these answers.

In part (b), an answer of 5m was very common indeed.

Even though the demand was slightly greater, part (c) was answered well. The usual errors included answers of 4a + 5h = 9ah (or often just 9) or 4a, 5h or $3a^2$ + 5h or $3a^2$ + $5h^2$.

Question 14

Only a handful of candidates were unable to gain the mark in part (a).

In part (b), the answer was usually correct although poor arithmetic prevented many from gaining any credit.

Part (c) was the most demanding part of this question and it required some organised thought processes. There were very many pleasing solutions here, describing a plan with structure and accuracy. Those who failed to offer a correct complete plan usually ignored the requirement for the 3-hour stay in Swipe Crescent. Justification for a 3-hour stay needed to be explicitly stated. This was a requirement of the QWC element in this question. When referring to particular buses, candidates were expected to quote the departure and arrival times in each case.

There were many errors made by candidates' poor reading of the timetables; often buses were arriving before they had set off or they set off on one bus but arrived on another, the result of reading from the wrong part of the timetable. Many candidates added 3 hours to the arrival time and assumed there was a bus at this time, including some working out what time the imaginary bus should arrive. Quite a few candidates

also thought that they could follow a bus route from the bottom of one column into the top of the next.

Question 15

Most candidates accurately read from the conversion graph to give an answer of $32 in part (a); careless readings of 33, 31 and 30.2 were sometimes seen.

In part (b), completely correct answers were not the norm. Many chose to ignore their answer to part (a) and convert lower values, for example $10 (= £6 or £7), from the graph. These usually resulted in incorrect answers, although method marks were available if their conversions had been explicitly stated. Some misread the scale on the horizontal axis, assuming one square was £1 rather than £0.50. Some candidates seemed to think pounds and dollars were equivalent, with an answer of 40 being common. The omission of the correct unit of currency lost some candidates the final mark. Another common error was to correctly find $96 but then subtract 60. Converting £60 to dollars was usually more successful than converting $100 to pounds.

Question 16

Very few candidates knew that 3^4 is the same as $3 \times 3 \times 3 \times 3$ in part (a) and many who did know this could not actually compute an answer of 81 owing to arithmetical errors; 12 was the most common incorrect answer seen.

Part (b) was even less well done, 8 or 4^3 being the best of the incorrect answers.

Question 17

In part (a), the correct answer of 7 was given by most candidates.

Although the modal answer in part (b) was the correct answer 12, an answer of 1 was commonplace.

In part (c), there were very few pure algebraic solutions, most candidates realising that the answer came from adding 6 to 10 then dividing by 5, usually with the decimal answer of 3.2. Many found this division difficult without a calculator, answers of 3.1 and 3r1 being common. Candidates should be encouraged to write their divisions in fractional form. Most seemed unaware that $\frac{16}{5}$ is a valid answer. The correct answer was sometimes found by 'trial and improvement' techniques but more commonly this method failed.

Question 18

This question was usually well answered, although an answer of 7 in part (b) was common.

In part (c), the usual error was to subtract 15 from 50 or 0 from 9.

Question 19

Very few candidates gained the full 4 marks in this question simply because they were unable to give satisfactory reasons for their calculations. Many gave a commentary on what they were doing. Centres should be aware of the requirements in this respect and encourage candidates to correctly explain the theory that they often know very well indeed. Mark schemes identify the minimum 'word' requirement for these

reasons. Often the word ‘angles’ was omitted. The most common loss of the final communication mark was for using ‘circle’ rather than ‘angles at a point’. Many candidates thought the equal sides were parallel.

In this question, many candidates picked up 2 marks for correctly finding the angle of 55^{o}; some did then give one correct reason for an extra mark.

Common errors were to correctly find the angle of 70^{o} and then halve it or simply to say that y was equal to 70, or to stop once they had found 70 and simply state $y = 70$. Quite a few candidates thought that the triangle was equilateral and gave an answer of 60^{o}.

Question 20

Full marks in this question were not often achieved and this was usually the result of candidates’ inability to find $\frac{1}{3}$ of the correct amount, often finding $\frac{1}{3}$ of the number of bags once the first 30 had been accounted for. After gaining one mark for $30 \times 5 = 150$, candidates needed to work out the profit still required after the sale of the bags at £5 and £4. Having made the error concerning $\frac{1}{3}$ of the number of bags, many candidates were able to successfully attain a follow-through answer but often lost marks due to lack of clarity and an unsystematic approach in an otherwise correct method. Candidates should be encouraged to write down every step, however simple, in a multi-stage calculation.

Many candidates calculated the correct totals for selling the bags but then failed to take this into account and simply divided £75 by their remaining bags.

Question 21

The majority of candidates were unsure of how to start tackling this question; many simply manipulated the figures given with no real purpose. Candidates who worked separately with boys and girls often gained some success and those candidates who put the given information into a two-way table usually gained full marks. Candidates should be encouraged to use such methods with questions of this type.

Many candidates found the 19 girls who walked to school, but then failed to simply add this to the given number of boys, often choosing instead to add it to 14 (boys who came by car). Other candidates simply added up all of the numbers given and subtracted from 100 or subtracted the listed numbers from 49.

Question 22

Clearly very few candidates understood the concept of a plan. Many drew nets or 3-D configurations. These gained no credit. Many drew more than one rectangle, also gaining no credit. Many of the candidates who did simply draw a single rectangle often got the dimensions wrong, usually just copying one of the given elevations.

Question 23

This very common type of question was poorly answered. Many candidates tried to divide each amount by 16 and multiply by 24, not seeing a connection between the two figures. This did gain some credit. Others simply found the amounts for 8 gingerbread men but then never made any attempt to add to the 16 for the required 24. Some candidates simply added 8g to each of the amounts. Other attempts

included doubling the amounts or multiplying by either 16 or 24, or both. Some got the first answer wrong ('3 x 90 = 240') with the remaining three answers correct.

Question 24

Most candidates recognised that the scatter diagram illustrated positive correlation. Estimation of the arm length for a student of height 148cm was usually within the required range of values, despite many choosing not to draw a line of best fit. Some attempts to draw lines of best fit were poor, often starting from (60, 120) as their origin. Lines of best fit (although not specifically a requirement) were drawn by only a minority of candidates.

Question 25

Very few candidates used the given formula for the area of a trapezium to find the area of the garden, most choosing instead to find the sum or difference of the areas of a rectangle and triangle. Unfortunately, far too often, the area of the triangle was incorrect, usually simply 54 (6 × 9). Candidates who found the correct area usually went on to complete the solution correctly, although multiplication of £4.99 by 6 or 7 was often strewn with error. Some lost the final accuracy mark for rounding 7 x 4.99 to 7 x 5 and deducting the wrong number of pence, usually 5p not 7p.

Question 26

Most candidates were able to score at least one mark in this question. A time period, per day or per week, was the usual omission. Units of time, minutes or hours, were also required to gain full credit. Response box labels containing any inequalities automatically gained no credit although they were only required to be either non-overlapping or exhaustive. Most incorrect questions had left out a time frame. Some misread the question and asked about the number of books read or types of books preferred. Some asked how often they read rather than asking for specific timings. Many boxes overlapped or left gaps but most were exhaustive.

Question 27

It was encouraging to see a good number of candidates successfully finding the volume of this prism. However, many misread the question and attempted to find the surface area; others found the sum of all the edges, or just the perimeter of the cross section. Methods to find the area of the cross section varied but far too often $4 \times 7 + 9 \times 2$ (= 46) was calculated. Even when multiplied by 10, no credit was given. One mark was available for candidates attempting to find the volume of part of the prism, $4 \times 7 \times 10$ or $9 \times 2 \times 10$, etc.

Question 28

This question was very poorly answered, with only a few candidates understanding the need to construct loci about the given points. Those who did were usually accurate. A few candidates clearly realised arcs were needed but had no compasses. A few constructed the arcs correctly but shaded the complement of the intersection.

Question 29

Candidates who realised the need to divide 180kg in the ratio 1:3:5 often succeeded in gaining at least 3 out of the 4 marks available. Often candidates would find the

correct amounts required but then incorrectly compare them with the amounts already there. Many tried to divide 200 (15 + 85 + 100) in the given ratio. Others just thought that 200, being greater than 180, was sufficient.

Some candidates correctly found the sum of 15, 45 (3 × 15) and 75 (5 × 15) but were unable to correctly determine that more cement was needed.

Many weaker candidates chose the easier option of totalling the ingredients, gaining no credit.

Summary

Based on their performance on this paper, candidates should:

- be reminded to read the questions carefully so they answer the question that is set
- carefully check their arithmetic
- be encouraged to show their working in a clear and ordered way.

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