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Examiners' Report
March 2013

GCSE Mathematics 5MB3F
Foundation (Calculator)
Paper 1

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Introduction

The paper proved to be accessible to most candidates with the vast majority of candidates attempting all questions. Candidates appeared to be able to complete the paper in the allotted time.

Premature rounding without first showing the unrounded answer lost many candidates marks. This was often seen in Q2(c) (6.9 or 6.86 were seen), Q21 (7 ÷ 9 = 0.7) and Q23 (answer of 6.9).

It was encouraging to note that candidates seemed to give fuller explanations than seen in previous series for quality of written communication (QWC) questions.

Reports on individual questions

Question 1

Most of the candidates wrote the correct answer to part (a). The most common incorrect responses were $\frac{1}{100}$ or $\frac{0.1}{100}$.

In part (b), most of the candidates correctly wrote $\frac{1}{4}$ as 0.25. Common incorrect responses were 0.4 and 1.4, with quite a few 2.5 and even 0.75.

Question 2

This proved an accessible question with the majority of candidates scoring three marks for parts (a), (b) and (d).

Part (c) had a slightly lower success rate, mainly due to candidates not writing the full answer of 6.859, and writing 6.86 or 6.9, which did not score.

Question 3

The majority of candidates could change 300 cm to metres. The most common error was 30.

Just over half of candidates could change 5800 g to kg and around 60% of candidates could change 8.5 cm to mm. A significant number of candidates multiplied 8.5 by 100, giving 850 as their final answer. Another common incorrect answer was 0.85 where the candidate divided by 10 instead of multiplying.

Question 4

Around three-quarters of candidates got each part correct and it was pleasing to note that 'hexagon' was spelled correctly by most. The most common incorrect answer was pentagon even though the same candidates went on to say that a pentagon had five sides in part (b).

Question 5

Most candidates found this to be an accessible question with over half the candidates scoring all four marks and only a very few candidates failing to score. A further few candidates succeeded in gaining at least one mark, usually for showing a correct method for working out the morning sales of either daffodils or tulips.

Many candidates had more difficulty working out the total afternoon sales and made mistakes in subtraction or by multiplying 0.2 by 60 and 45 rather than the numbers of daffodils and tulips remaining after the morning sales.

A minority of candidates chose to treat the sales of each type of flower separately and several of these failed to get the third method mark because they did not work out the profit/loss on both types of flower. The accuracy mark was lost by several candidates for failing to put £130 down anywhere in the answer.

Question 6

In part (a), virtually all candidates correctly completed the reflection of the shape in the mirror line.

However in part (b), only about three-quarters of candidates could write down the correct scale factor of enlargement with 3, 4 or 9 being the most common incorrect responses.

In part (c), the majority of candidates could draw a pair of parallel lines, although many perpendicular lines were drawn. A large number of candidates drew either a rectangle or a parallelogram, but most failed to score as very few indicated distinct pairs of parallel lines.

In part (d), the majority of candidates could identify one of the pairs of congruent shapes. However some candidates did not seem to understand the concept of congruence and appeared to look at the shapes as if being asked for the odd one out. As a result, many of the incorrect responses were **C** and **H**, as they were the only two without straight edges.

Question 7

This question was answered by nearly all candidates. Some candidates understood the need to add the four values, scoring the first method mark, but then failed to add with consistent and correct use of units. Many candidates struggled to identify that 750 m equalled 0.75 km. A common error was to represent 750 m as 7.5 km or add on 750 km. Other candidates added $\frac{1}{2}$ of 8 instead of 8.5. Overall over a half of the candidates scored all three marks, with only a few failing to score.

Question 8

Around three-quarters of candidates scored both marks and about a quarter gave one correct answer. A common incorrect net identified in this question was net **E**.

Question 9

This was a fairly well attempted question by candidates with only about a quarter of candidates failing to score. A few candidates were awarded just the first mark, generally for 90 × 0.2 and just over half the candidates scored all three marks. Many candidates divided 90 by 0.2, leading to an incorrect answer of 450.

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Candidates should always check that their answers are realistic. For example, in this question, some candidates worked out 90 ÷ 0.2 = 450 and wrote this as the number of packets of soup needed to make 90 bowls of soup.

Question 10

Over half of the candidates failed to score on this question, mostly for thinking that 1 litre = 100 ml, which led to answers of 'yes' with 1.4 litre.

Others wrote 1 litre = 1000 ml without any further comment. Nearly a quarter of candidates scored both available marks for 'no' and a correct conversion or a clear explanation with 1 litre = 1000 ml.

Question 11

In part (a), half of candidates failed to identify the need to subtract the two meter readings with most adding instead, giving an answer of 14 864 rather than 2436. A few candidates divided the two numbers, in either order, and a few, who knew to subtract, made an arithmetic error in their working and so lost the mark.

In part (b), the vast majority of candidates recognised the need to multiply their answer from part (a) by 11 or 0.11 with less than a quarter failing to score. Of those that did calculate 2436 ×11, most left their answer correctly as £267.96 with around a third of candidates scoring all three marks. Some candidates scored two marks either for 14 864 × 11 or 0.11 and getting the digits 163 504, or failing to put any units with their digits 26 796.

Question 12

The majority of candidates were successful in solving each of the three equations. Common incorrect answers to part (a) were 6 or 18, to part (b) were 4 and occasionally 8, and a very common incorrect answer to part (c) was 21, where candidates subtracted the 7 from 28 to give 21, instead of dividing 28 by 7 to give 4.

Most candidates answered part (d) well to gain full marks. Common incorrect responses included 10 + 12 = 24, replacing x and y to make 25 + 34 and performing 2 + 5 and 3 + 4 instead of multiplying.

Question 13

This was another very well attempted question with over half of candidates scoring three or four marks, and only about a fifth failing to score. The correct answer was seen on a fairly frequent basis but was not as commonly seen as 84, 75 and 70.5. A few candidates seemed to grasp the need to divide 112 by 8 and then multiplied their answer by £6 to get an answer of £84 but getting no further working correct. Many of these candidates then went on to 'buy' part tins, which was not acceptable. A high number of candidates then went on to find the costs of five lots of three-litre tins (£75) or three lots of five litre tins (£70.50). Only a few candidates actually attempted to mix tin types, which could have led them to the correct answer of £68.

Question 14

This question was well answered with a number of candidates scoring all three marks and only a few candidates failing to score. Most mistakes were made in drawing the 50° angle, suggesting that those candidates had difficulty using a 180° protractor.

Question 15

It was pleasing to note that over 40% of candidates scored all four marks. Many of those candidates who scored no marks were able to calculate the value of 192.6 or 2692.6 for scheme A, but then failed to negotiate the percentage element of scheme B. Many candidates used a chunking method to find 3% of 2500, mostly with success. Some candidates used a compound interest method correctly and some gained two marks as they then correctly compared both schemes using the same time scale. One common error was for candidates to add £5.35 and 2500, then multiplying this by 36.

Question 16

This question was very well answered with most candidates scoring both available marks for six (or more) correctly tessellating shapes. A significant number of candidates only added five additional shapes. Around a quarter of candidates failed to score, often because they mixed the orientation of the shapes, with some in a vertical direction and some in a horizontal direction.

Question 17

The majority of candidates correctly wrote 30 as their answer to part (i) but in part (ii), only about a quarter of candidates realised that the size of angle *A* remained unchanged after the enlargement, with $40 \times 3 = 120$ being by far the most common incorrect answer.

Question 18

In part (a), quite a few candidates gained the method mark for writing a correct expression but then failed to complete their proof.

Candidates were most successful in part (b) with many correctly solving the equation. These candidates often showed their working to part (b) in part (a), thinking that was what was required in the proof. Several candidates used trial and improvement to solve the equation rather than an algebraic method and lost the method mark if their answer was incorrect. Some candidates gained the method mark from a flow chart. A few candidates added 1 to 19 rather than subtracting 1 from 19.

A smaller number of candidates were successful in part (c). Many failed to realise that they needed to use their answer from part (b). Those that had an incorrect value in part (b) could still gain full marks in part (c) on follow through.

Overall just under half of the candidates scored four or more marks on the three parts with around a quarter failing to score.

Question 19

Over 40% of candidates were successful in shading the correct region where Gilda could plant the elm tree but nearly half of the candidates failed to score mostly for using two perpendicular lines rather than an arc. Common errors were shading the wrong side of the arc and also having no shading at all. There was evidence that some candidates did not use a compass.

Question 20

This question was very poorly attempted with around three-quarters failing to score. Candidates commonly mixed the methods for finding interior and exterior angles, and only about a fifth of candidates actually arrived at the answer 144 from fully correct working. A very common incorrect answer was 216, where candidates had found each interior angle to be $360 \div 5 = 72$, doubled 72 to get a sum of 144 and then subtracted this from 360, giving an answer 216.

Question 21

Many candidates were able to find 7.5% of £92 000, but several used a breakdown method of finding 10%, 5% and then $2\frac{1}{2}$%, and often made errors in the process.

This led to the loss of the first method mark. When finding $\frac{7}{9}$ of 10 800, several candidates tried to convert to a decimal but truncated their answer to 0.7, so using an incorrect method and losing both the second and third method mark.

There were a number of candidates who assumed that goods should be halved as well, because they treated them as an expense. These candidates were still able to score the method marks and often did so.

There were a few candidates who included the difference in rent rather than the rent itself when reaching their overall total.

A minority of candidates compared the increase in wages to the net savings in the other items when making their decision. These were often successful.

The final mark was only awarded where correct values were calculated to support the decision made. Overall around a quarter of candidates scored three or four marks, and around a third failed to score.

Question 22

In part (a), writing down the possible values of n was well done with just over half of candidates scoring both marks. About a fifth scored one mark, generally for not including the -2 in their answer. Surprisingly many of the candidates who scored one mark missed out the 0. A number of candidates drew inequalities diagrams as an aid to help them find the values.

In part (b), most candidates scored no marks. The most common error was to just list the integer values whilst some wrote inequalities without any letters. A few candidates either got the inequality signs mixed up or only got one of the signs the correct way and so only scored one mark. Many candidates used n or N rather than x, but were not penalised for this.

Question 23

A fairly small number of candidates achieved full marks on this question. Candidates often arrived at a correct final answer between 6.86 and 6.88 from an incorrect method. The majority of candidates who arrived at the final answer gave it to three decimal places as opposed to three significant figures, but were not penalised for this.

It was disappointing to note that a number of candidates failed to score. Candidates commonly used the wrong formula for calculating the area of a circle, finding the circumference instead. A small number of candidates were able to find the area of the circle correctly but then failed to halve this, scoring no further marks. This question highlighted many candidates' poor knowledge of formulae associated with circles.

Question 24

Most candidates made good attempts at this final question. A small number of candidates scored one mark for getting at least one value in the table correct but then not plotting at least five of their points correctly. The most common error in completing the table was to write −5 instead of 5 for the value of y when x was −3.

Most candidates were able to plot their points from the table accurately to gain one mark in part (b). Many went on to draw a correct curve to gain the second mark and in some cases recovered from incorrect values in the table.

Around a third of the candidates scored all four marks with many of the candidates who scored three marks either failing to join their correctly plotted points or joining their points with straight lines.

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Candidates should know that a quadratic expression gives rise to a parabola. In part (a), many calculated the y-value to be −5 when x was −3. This resulted in a curve that was clearly not a parabola. This should have alerted candidates to realise they had made an incorrect calculation.

Summary

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

- Candidates should always write their unrounded answer before any rounding takes place. As guidance, six digits should suffice unless candidates are instructed to write down all the digits on their calculator display.
- Candidates should use the S-D button on their calculators so that answers are given in decimal form rather than fraction form.
- Candidates should check that their answers are realistic.
- Candidates should be aware of the difference between the exterior and interior angle of a pentagon.
- Candidates should know that a quadratic expression gives rise to a parabola.
- Candidates should be reminded to write their solutions within the boundaries provided on the paper and not in the margins.

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