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General Certificate Secondary of Education
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Methods in Mathematics (Pilot) 93651F

(Specification 9365)

Unit M1: Methods in Mathematics (Algebra and Probability) - Foundation

Report on the Examination

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Unit 1: Foundation Tier

Section A

General

This paper was the first for this specification and nearly all candidates found the paper accessible and were able to score marks on a range of questions. It was pleasing to see some good attempts at the problem solving questions, particularly the ones relating to number, and generally candidates coped well with questions that had some novelty. There was no noticeable difference in performance between the calculator and non-calculator sections.

Topics that were done well included:

- Basic number work
- Coordinates in the first quadrant
- Drawing a straight line graph
- Correct probability notation
- Knowing and using the sum of the probabilities of all mutually exclusive outcomes is 1.

Topics which candidates found challenging included:

- Conversion of time from minutes to hours
- Percentage increase
- Working with ratios
- Interpretation of a quadratic graph
- Non-calculator addition of fractions.

Question 1

Most candidates multiplied 45 by 7 to obtain 315 minutes, but many could not then convert this to hours and minutes. A considerable number thought 315 minutes was 3 hours 15 minutes and a few even thought it was 31 hours 5 minutes. Of those who subsequently divided by 60, only about half could correctly interpret the answer of 5.25 as 5 hours 15 minutes.

Question 2

The vast majority of candidates answered part (a) correctly. In part (b) most candidates knew how to begin and many went on to obtain the correct answer. Some worked out that the remaining distances were 6 and 7 but then chose 6 as their answer instead of 7. The answer of 6 with no working was seen on quite a few occasions and this lack of working may have cost some candidates marks. There were a few arithmetical errors and a small minority divided 25 by 2 instead of first subtracting the other distances.

Question 3

Nearly all candidates were able to write down the coordinates of A and plot B correctly. Very few gave the correct answer in part (b), with many candidates selecting the word ‘positive’. In part (d) the fact that the x-coordinate of the midpoint was not a whole number proved problematic for many candidates who gave 3 or 4 as their answer. Some who correctly wrote 3.5 then seemed to think that the y-coordinate must also be a decimal, usually 2.5

Question 4

Many candidates correctly identified the coins in part (a). The main errors were to use more than seven coins or more than two different types of coin. A few candidates invented a 25 p coin. There were few problems for candidates with part (b). Only a small minority did not attain full marks, sometimes because 4.8 was interpreted as £4.08. A few candidates wrote 4.8 instead of 4.80 on the answer line.

Question 5

There were few difficulties for candidates with this question, the vast majority scoring full marks.

Question 6

For about half the candidates this was an easy question, but some incorrect methods were seen. Some candidates only found 1/5, others divided 145 by 3/5, or divided by 5 and then again by 3. A few even thought that dividing by 2 twice gave a fifth.

Question 7

The supposedly more challenging part (c) was often answered better than parts (a) and (b), where answers were not always simplified, eg an answer for (a) left as $2x + 5x$. There were some good attempts at part (c), but the subtraction involving negative numbers proved problematic for many candidates so that the number term was often 4, 2 or -2.

Question 8

There were many good straight line graphs to admire. Some candidates, however, plotted the points but did not join them up or tried to join them freehand. A few candidates plotted two points not related to the question, eg $(-3, 3)$ and $(2, 1)$, which were sometimes joined up. Others only drew part of the graph, ie they did not draw it from -3 to 3, and a few parabolas were seen.

Question 9

The most common method to find 23% was build-up, despite the fact that this question was on the calculator section of the paper. However, more often than not this was unsuccessful usually due to an inability to find 3%, either because of an error with decimals or because candidates tried to find it by dividing their 10% figure by 3. Sometimes 10% was incorrectly stated to be 46.8. Other candidates simply multiplied 4680 by 23, while some divided by 23. The correct answer was not seen too often and when it was, correct money notation was not always given on the answer line.

Question 10

This proved to be a demanding question. Many candidates identified that the remaining probabilities must add up to 0.9, but then simply wrote down three probabilities that did so, 0.2, 0.3 and 0.4 being the most common. Others simply wrote down three probabilities for which P(C) was 2 × P(B) and P(D) was 3 × P(B), ignoring the fact that they must add up to 0.9, thus 0.1, 0.2, 0.3 and 0.2, 0.4 and 0.6 were quite frequently seen. Some candidates misinterpreted the question by thinking that P(D) had to be 3 times P(C).

Question 11

Correct answers to this question were not seen very often. In part (a) quite a number of candidates simply wrote down answers (usually incorrect ones) without any working, but a common start for many was to divide 517 by 4 and 517 by 7. Of those who divided 517 correctly by 11, some then stopped or subtracted their answer from 517.

In part (b) many different calculations were seen. Some began by dividing 228 by both 5 and 12 and then tried to combine the answers in some way; others added the parts 5 and 12 as if they were dividing 228 in the ratio 5:12; some divided by 5 and multiplied by 12 and a few simply halved 228.

Question 12

Candidates appeared not to understand what was being asked for in part (a). Of those who attempted the question, many wrote down only one value, which was usually incorrect. Some tried to substitute a value for x into the equation, usually 1 or 2, and incorrectly worked this out as 0. Two correct answers were very rare.

There was more success at part (b) with 0 and 1 being the correct answers seen most often. Some candidates wrote down coordinates rather than an x value.

Section B

Question 13

Although generally well answered, numerical errors marred some candidates' attempt at parts (b), (c) and (d). In part (e) most candidates understood what was being asked and many correct answers were seen, by far the most common being 0. Of the incorrect responses given, 1 and -1 were the ones seen the most.

Question 14

Nearly all candidates answered part (a) correctly. In part (b) many candidates marked the position of the probability of a blue shirt in an acceptable position on the line, but quite a number put a mark on 'Evens' or to the right of this.

In part (c) some candidates thought a blue shirt had been worn the first day, while others thought the answer was white because picking a white shirt had a greater probability. In this question the quality of written communication was being assessed and to score full marks it was necessary for candidates to show that they clearly understood why choosing a white shirt would leave the same number of shirts on the second day, eg by referring to there being one more white shirt than blue on the first day so the same number would be left on the second day or by showing there were four of each on the second day. Some candidates simply referred to there being an even chance without explaining why this would be the case if a white shirt was chosen.

Question 15

Parts (a) and (b) proved very challenging for many candidates. Many different answers were seen from numerical answers to inequalities. In part (b) some candidates understood that $n + 4$ was a correct expression, but $n - 4$ proved more elusive and $4n$, $-4n$, $\frac{n}{4}$, n^4 were written almost as often.

In part (c) the correct answer was seen on many occasions. Some candidates did not give the biggest value of n but did receive some credit for finding a value for which the statement worked. A few candidates gave an expression as their answer, eg $5n$ or $n + 5$.

Question 16

Part (a)(i) was very well answered, with only a small number of candidates being unable to write down all 18 combinations or realise that 3×6 was the calculation to perform. A few seemed to interpret the question as meaning they should give the last combination, ie C6.

The correct answer was also seen on many occasions in part (a)(ii). 1/18, 6/18 and 3/6 were the most common incorrect answers given. Only a few candidates wrote answers such as 'unlikely' or '1 out of 6' instead of giving a fractional answer.

Quite a number of candidates did not seem to know how to approach part (b). Of those who did make an attempt, many simply added extra numbers to the three letters from the previous part. Some correctly identified that 5 letters and 6 numbers (or vice versa) led to the solution but many then gave 30 rather than 11 as their answer.

Question 17

Three main misunderstandings occurred in part (a). The first was to work out $12 - 7 = 5$, but then put $2x = 5$ and work out x, the second was to solve $2x + 7 = 12$ and the third was (having found $x = 5$) to evaluate $2x + 7$. Nevertheless, many candidates calculated the answer correctly.

In part (b) a variety of calculations was seen. Some candidates simply subtracted 2 from 60 while others began by subtracting 3 before going on to multiply or divide by 2.

Question 18

Most candidates made progress with this problem solving question, with some excellent attempts seen and many candidates obtaining correct answers. In many cases the working was not set out in an orderly fashion and so was difficult to follow, particularly when there were several attempts. The main errors were:

Not having b 2 more than a, not having d as a single digit number and not having four numbers which had a sum of 50.

Question 19

There were many correct answers to part (a). Most candidates were able to give probability as a fraction, decimal or percentage, but a minority wrote answers such as “25 out of 50” or “evens”. In part (a)(i) 18/50 and 1/25 were common wrong answers while in part (a)(ii) 12 instead of 13 was occasionally used for the numerator and some candidates did not appreciate that the counter had to be round, giving an answer of 25/50.

In part (b) many candidates did not realise that only the round counters needed to be added and continued with a denominator of 50 from the previous parts. Some candidates also added the number of blue counters, hence answers of 13/50 and 25/50 were quite common. A few used denominators of 48 or 49 and some thought the answer was 7/13 or 13/7.

Question 20

Few candidates gained marks on this question. Many seemed to think that all they were being asked was to find 20% of 120 and consequently did not proceed any further. Some divided 120 by 20 and thought this solved the problem.

Question 21

There were some good attempts at this question. Many candidates obtained 53 and were able to write down a required prime number and square number. However, of those who progressed that far, many candidates failed to score full marks because the numbers they selected had repeated digits, eg 531725.

Question 22

This question was not well done. The vast majority of candidates who attempted the question chose to add the whole number and fraction parts separately. However, it was very common to see the numerators and denominators respectively added to arrive at an answer of 3 and 5/7. Some attempted a common denominator but still kept the numerators as 2 and 3. Those who correctly added the fractions sometimes left their answer as 3 and 17/12 and occasionally this became 4 and 7/12 instead of 4 and 5/12.

Mark Range and Award of Grades

Unit 1: 93651F

Tier	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
Foundation Tier	80	80	39.3	16.0

For modules which contain only one component, scaled marks are the same as raw marks.

Foundation Tier (1746 candidates)

Grade	Max mark	C	D	E	F	G
Scaled Boundary Mark	80	47	37	27	18	9
Uniform Boundary Mark (UMS)	69	60	50	40	30	20

Provisional Statistics for the Award

Not applicable for January 2011.

Definitions

Boundary Mark: the minimum (scaled) mark required by a candidate to qualify for a given grade. Although component grade boundaries are provided, these are advisory. Candidates' final grades depend only on their total marks for the subject.

Mean Mark: is the sum of all candidates' marks divided by the number of candidates. In order to compare mean marks for different components, the mean mark (scaled) should be expressed as a percentage of the maximum mark (scaled).

Standard Deviation: a measure of the spread of candidates' marks. In most components, approximately two-thirds of all candidates lie in a range of plus or minus one standard deviation from the mean, and approximately 95% of all candidates lie in a range of plus or minus two standard deviations from the mean. In order to compare the standard deviations for different components, the standard deviation (scaled) should be expressed as a percentage of the maximum mark (scaled).