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Methods in Mathematics (Pilot) 93651H

(Specification 9365)

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

Report on the Examination

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Unit 1: Higher Tier

Section A

General

Nearly all candidates found the paper accessible and were able to score marks on a range of questions. Performance in the new AO2 questions was marginally worse than in AO1 questions, but performance in AO3 questions was significantly better than in the other two types. The new QWC marks had little effect on performance, either in individual questions or in total marks.

Topics that were done well included:

- Venn diagrams
- Probability
- Tree diagrams
- Multiplying and factorising across a single bracket
- Increasing an amount by a percentage
- Ratio.

Topics which candidates found challenging included:

- Finding approximate solutions to an equation from a graph
- Working with algebraic fractions
- Direct proportion
- Sketching graphs
- Algebraic proof
- Laws of indices
- Circle equations
- Intersection of a circle and a straight line.

Question 1

Although this question was in the calculator section, many candidates seemed not to have used one in finding the answer. Of those who got to 19/12, over half could not then express this as a recurring decimal, with many truncating or rounding. A sizeable minority of candidates simply added the numerators and denominators, arriving at 7/12. They could have scored a mark for expressing this as a recurring decimal, but very few succeeded.

Question 2

The candidates who approached this question from a numerical point of view generally gained full marks by finding the number of blue and red balls in each bag, and hence the totals. Those candidates who attempted to find the solution purely by using probability inevitably lost all of the marks, usually by adding $\frac{1}{2}$ and $\frac{1}{4}$ to get $\frac{3}{4}$ and giving the answer as $\frac{1}{4}$.

Question 3

Despite the fact that Venn diagrams is a new topic in this specification, most candidates seemed at ease with it, scoring very heavily in parts (a), (b) and (c). Part (d) proved to be more difficult, but over half of the candidates scored at least one mark by giving the correct numerator or denominator.

Question 4

Part (a) was not well answered, with many candidates not knowing how to find the solutions. 1 and –1 were popular answers. Candidates found part (b) much easier, with many giving a correct value for x, usually either 0 or 1.

Question 5

Most candidates did well on this question, with very few scoring no marks. A few students seemed to lose marks by not showing any working and giving the answer as 1.5, 3 and 4.5.

Question 6

While candidates coped fairly well with part (a), with over half scoring 2 or 3 marks, they found part (b) challenging, with many having little idea of how to get started. A common mistake was to change the 2 and 6 on the left-hand side to multipliers of their own numerators. Working was often presented in a non-sequential manner, leaving the examiner to cobble together the pieces, and it is advisable that students approach such algebraic work in a more methodical way.

Question 7

As with the first question, many candidates eschewed the use of a calculator to help them with this question, invariably resulting in no marks. Those who got to 0.08 were usually able to express this in standard form.

Question 8

The vast majority of candidates scored both marks in part (a), and well over half also scored full marks in part (b). Those who went wrong usually added 0.8 and 0.3, often giving this as 0.11.

Question 9

Many candidates did not know how to approach this question. While a simple equation using k could gain one mark, the majority of candidates could not even do this. The most common mistake by far was to take direct proportion to R, rather than the square of R. Surprisingly, a few candidates did this in part (a) but then calculated the correct value of A in part (b).

Question 10

Part (a) was not answered well, with many candidates drawing a straight line resembling $y = x$. Part (b) presented even more of a challenge, with many weird and wonderful graphs presented. Several candidates had clearly tried to plot points and join them, but seemed unable to cope with the reciprocal of values between -1 and 1. Part (c) proved to be much more accessible, with over half correct on part (c)(i) and nearly as many correct on part (c)(ii). Candidates were generally awarded the mark if intention was clear. However, the standard of curve sketching was very poor indeed.

Section B

Question 11

Parts (a) and (b) provided most candidates with full marks, but in part (c) more candidates gave a partial factorisation than a full one.

Question 12

While most candidates scored full marks on part (a), several candidates correctly calculated 37.5 but neglected to add it to the original amount. Numerical mistakes were most common where candidates tried to find 1% and multiply it by 15. Candidates showed pleasing knowledge of how to find an original amount, with many gaining full marks in part (b). The most common mistake, of course, was to find 25% of 600 and add it on. Part (c) proved to be straightforward for most candidates, although some stopped after finding 24, and did not gain any marks.

Question 13

Most candidates adopted a logical strategy of listing possible numbers for each part and seeing which three worked. This usually led to the correct answer. Some candidates were able to find three suitable 2-digit numbers, but had clearly missed the instruction that the digits all had to be different.

Question 14

Several different methods were used to solve this problem, usually with a successful outcome. Those candidates who adopted an algebraic approach sometimes went awry by setting up an incorrect equation by using $5x + 2$ and $3x - 6$. A few candidates lost the QWC mark by simply giving the answer without working.

Question 15

The majority of candidates worked out the initial amounts of £32 and £40, but some could not make progress from there, often giving the answer as £8. A few candidates started by dividing 72 by both 4 and 5 and working from the result of those calculations, hence not gaining any of the marks.

Question 16

The majority of candidates did not confine themselves to one variable, hence restricting their possible score to 1 mark. Many achieved that mark, however, by giving $xy + 1$ or equivalent. A few candidates did not attempt any algebra and simply substituted other numbers to show it worked in one or more cases. This approach scored no marks.

Question 17

This question was fairly well done, with many candidates apparently able to just write down the answer. A common mistake, however, was to change $x^2 - 16$ into $(x - 8)(x + 8)$.

Question 18

This question proved to be very challenging. The vast majority of candidates gave 2 as the answer, and very few scored full marks. Some candidates tried to work out the actual values, almost always incorrectly.

Question 19

In part (a) some candidates appeared to be working with $\sqrt{45}$ without ever writing it down. For example, a common answer was $9\sqrt{5}$. Part (b) was not answered well, with the majority of candidates not knowing how to get started.

Mark Range and Award of Grades

Unit 1: 93651H

Tier	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
Higher Tier	80	80	38.9	14.1

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

Higher Tier (1488 candidates)

Grade	Max mark	A*	A	B	C	D
Scaled Boundary Mark	80	55	45	35	25	15
Uniform Boundary Mark (UMS)	100	90	80	70	60	50

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).