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General Certificate Secondary of Education
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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

Most students found the paper accessible, with marks scored across nearly all questions. Some AO3 questions proved to be challenging, particularly those involving algebraic manipulation.

Topics that were done well included:

- Venn diagrams
- changing from standard form to ordinary number
- substitution
- numerical problem-solving.

Topics which students found challenging included:

- gradient of a line
- locus of a point
- setting up and manipulating algebraic expressions
- reciprocals
- intersection of a circle and a straight line.

Question 1

Many students scored full marks on this question, although on each part some students used the wrong section of the Venn diagram.

Question 2

The majority of students solved this problem correctly. Those who didn't manage to generally got mixed up with the extra four coins on each pile.

Question 3

Both parts of 3(a) were well done.

In part (b) some did manipulate the expressions (often realising $18 = 2 \times 5 + 8$) but most students made up values for r, s and t which made the given equations work. They then wrote down another expression which worked for their chosen values. Sometimes this expression included only two of the three variables.

Question 4

In part (a), most students worked out the actual increase, but some did not know how to find this as a percentage of the original. A 'build-up' approach was quite popular, despite this being on the calculator section of the paper.

Many students scored full marks on part (b), although some used simple interest for their calculations. As in part (a), correct use of a calculator would have benefitted some students.

Question 5

This question proved to be quite challenging. Many students could work with 31 passengers, but failed to appreciate that there could be 62. Those who did double 13 to get 26 often used 72 instead of 62. Several students multiplied 72 by the probability given and worked in mixed numbers or decimals.

Question 6

Less than half of the students worked out the gradient of the line. Some gave the equation of the line, but did not identify the gradient. Fewer students again found the coordinates of *B*, with many going awry when drawing a line from *A* - more often horizontal or vertical than perpendicular.

Question 7

The usual manipulation errors were seen in part (a), along with an inability to work in inequalities. Several students solved this as if it were an equation, giving the answer 3. The word ‘integer’ seemed to confuse many students in part (b), with decimal numbers seen frequently.

Question 8

Whilst there was a reasonably good response to part (a), very few students got started with part (b). Many students attributed a value to the number of sweets and gave a numerical answer.

Question 9

Many students set up the proportional equation $y = kx^2$ but some made mistakes in calculating k, for example, multiplying 28 by 4 instead of dividing. Some students who found k correctly did not then write out the required equation. Just under half of all students ticked the correct box in part (b).

Question 10

Most students realised that Peter could win the first two games, with a probability of 0.16, but many of them went wrong thereafter, often thinking that only two games could be played.

Section B

Question 11

The usual errors made when multiplying a fraction by an integer were seen. Some students multiplied both numerator and denominator, some inverted the fraction and some tried to find a common denominator. A few students left the answer as an improper fraction. In part (b), only half of the students made the correct decision. Some discussed the relative differences between 5 and 9 and 11 and 20 and others made no decision or an incorrect decision from correct working.

Question 12

All parts were correctly answered by approximately two-thirds of the students. Some factorised part (a) by 10, some tried to put part (b) into two brackets and some made manipulation errors in part (c).

Question 13

There were many correct answers, but some students clearly could not connect the given ratios. 3 was a popular answer, but this should have then been subtracted from 9.

Question 14

The problem for some students in part (a) was not methodology, but accurate manipulation. $24 - 33$ proved to be a difficult calculation, with -11 a very common result.

There were many fully correct answers in part (b), but several students could not find correct values even when they had correctly substituted and simplified.

Question 15

A sizeable number of students found the missing relative frequency in part (a) and gave that as the answer.

Some students tried to give far too technical an answer to part (b), bringing in correlation, outliers and anomalies, when a much simpler response was required.

In part (c), many students talked about a comparison of the two sets of data rather than an amalgamation.

Question 16

Part (a) was well done. Most students used ordinary numbers to work out part (b) and then changed to standard form. Squaring 4000 proved problematic for many students. Answers starting 16 had varying numbers of 0s and 8000 was a popular wrong answer. Few students understood the word 'reciprocal', with many simply making the number part or the index from part (a) negative.

Question 17

Most students gained the mark in part (a), but the standard of curve sketching was poor, with many straight sections seen.

Question 18

Most students scored well on this question. Substituting a number proved a useful approach for many students although some could not evaluate using the -2 index

Question 19

This question was better done than most surd questions. A common mistake, however, was to think that $\sqrt{12} + \sqrt{3} = \sqrt{15}$.

Question 20

There were many correct answers to this question, but some relied on knowledge of circle equations and Pythagorean triples rather than the algebraic method envisaged.

Mark Range and Award of Grades

Grade boundaries are available on the Results statistics page of the AQA Website.

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