Version 1.0

General Certificate of Secondary Education
January 2012

Methods in Mathematics (Pilot) 93652F

(Specification 9365)

Unit M2: Methods in Mathematics (Geometry and Algebra) - Foundation

Report on the Examination

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Unit 2: Foundation Tier

General

This was the second examination available to students. The questions which posed the greatest problems to students were those requiring an explanation. A number of marks were lost unnecessarily through students failing to read the question carefully. Another common problem was with the quality of students' written working. Many students either failed to show any working, meaning a single mistake resulted in losing all the marks for that part; or students did not show their working in sufficient depth. For example, many students adopt a trial and improvement approach to problem solving questions which is perfectly acceptable but failed to show a full solution for their guess, before proceeding to their next attempt.

The quality of answers to algebra questions was higher than that seen in the first examination series.

Topics that were done well included:

- coordinate plotting
- sequences
- parts of the circle
- translation
- angles
- area and perimeter.

Topics which students found challenging included:

- number puzzles
- geometric reasoning
- properties of quadrilaterals
- Pythagoras' theorem.

Question 1

This was a very well answered. A small number of students reversed the coordinates in their answers. The majority of marks were lost due to students confusing perimeter with area.

Question 2

This was very well answered. A significant number of students attempted to describe the rule for continuing the sequence by writing down the nth term, with varying degrees of success.

Question 3

This was well answered, the prime number in part (d) proving to be the most frequent incorrect answer.

Question 4

This was a reasonably well answered question.

Question 5

Parts (a) and (b) were generally successfully answered. Part (c) provided slightly more challenging than expected with many students failing to 'double' the lengths of all the sides, choosing to enlarge only 6 of them. Part (d) was poorly answered. Many students did not understand the meaning of tessellation and others incorporated squares into their design. A few students failed to draw sufficient numbers of the shapes on the grid to demonstrate the tessellation. Part (e) was very well answered.

Question 6

This was very well answered with the majority of students being awarded at least 2 marks.

Question 7

With the exception of parts (a) and (e), this was a well answered question. In part (a) many students appeared to fail to realise that the question did not necessarily require them to recall the conversion factor as they had values for 5 different rivers which they could use to calculate an answer. Part (e) was reasonably well answered despite its more challenging nature.

Question 8

This was also reasonably well answered although many students produced a multi-step solution which was fine if the '=' sign was used appropriately. Many students included repeated additions which they later performed the inverses of, resulting in particularly long calculations.

Question 9

This was poorly answered with many students failing to read the question correctly. A number of them completely ignored the 15 in the question and worked with the 4000 from the first line of the question. A number of marks from using a trial and improvement method were lost when students failed to demonstrate that their attempt was less than or more than the '15' required. This could have been avoided by simply writing in a total. A significant number of students chose a number, found a quarter of it and then subtracted it from, rather than adding it to, their initial value. Very few attempts to solve the problem using an algebraic method were seen.

Question 10

Part (a) was very successfully answered. Students struggled with parts (b) and (c) often failing to link the different parts of the question together.

Question 11

Part (a) was well answered with most incorrect solutions being '13' resulting from adding the 8 and the 5. Part (b) was well answered with the most common incorrect answer being 14, presumably as the result of a subtraction. Part (c) was also well answered. Part (d) was fairly well answered with most problems arising due to errors in rearrangement, with '$14z$' or '-1' often appearing. If only one of these errors occurred, students were awarded 2 out of the 3 marks if they correctly solved their subsequent equation.

Question 12

This was fairly well answered although a number of students calculated a 12% increase or decrease. The 'QWC mark' was awarded for 'correct notation' so the answer had to written to 2 decimal places. The most common approach was through the use of multipliers.

Question 13

Both parts were well answered by students. The main problem with part (a) was that many students translated the shape 4 units to the right instead of 3. In part (b) the main problem was confusion between area and perimeter.

Question 14

Part (a) was reasonably answered but many different answers were seen. Part (b) was poorly answered with many students failing to link these parts together. Part (c) was well answered. Part (d) proved very difficult for most students and this was very poorly answered. The better solutions usually included an appropriately labelled diagram of one of the isosceles triangles. Even then many students failed to choose the correct box. A large number of students chose to measure the length of the square despite the diagram 'not being drawn accurately'.

Question 15

This was a well answered question with the main issues being students failing to state two different acute angles or not making b the obtuse angle.

Question 16

Most students were awarded at least one mark, usually for stating that there were 32 full squares. Many then proceeded to indicate that there are a total of 60 squares with some shading, for the second mark. The QWC mark for explaining why the value of the area lay between the 2 values was often not gained.

Question 17

Part (a) was well attempted and the better solutions continued with this symmetry theme to correctly answer part (b) as well. However, a large number of students obviously had major difficulties with the properties of quadrilaterals with many putting the same reason for all three shapes.

Question 18

Parts (a) and (b) were poorly answered, although almost twice as many students were successful with part (a) compared to part (b). Many students obtained at least part marks on part (c). The most common error was expanding the brackets incorrectly and ending up with a '– 4' term rather than '+ 4', which with no further errors, resulted in the award of 2 marks.

Question 19

Part (a) was poorly answered but part (b) proved even more difficult to many students. A very common approach was by trial and improvement but again students failed to state clearly in their working exactly which values they were trying and often failed to write down the totals for their calculations before trying new values.

Question 20

This was poorly attempted but Pythagoras' Theorem was obviously familiar to many students. A common error was to add the squares of the given sides rather than find the difference.

Mark Range and Award of Grades

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

UMS conversion calculator www.aqa.org.uk/umsconversion