General Certificate of Secondary Education
June 2012

Mathematics 43651F

(Specification 4365)

Paper 1 (Foundation): Non-calculator

Report on the Examination

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General

This was the first examination in the new Linear specification so there were a greater proportion of functional and problem-solving questions. However, many students appeared to have been prepared for the new style of questions. A significant number of weaker students showed little or no working out. As this was a non-calculator paper, poor arithmetic skills were often evident.

Topics that were well done included:

- reading a bar chart
- solving a number puzzle
- number algorithm
- finding a factor
- conversion graph
- using and interpreting timetables
- plotting points.

Topics which students found difficult included:

- squares and square roots
- metric/ imperial conversion
- expanding and factorising
- interpreting a scatter diagram
- perimeter and area problem.

Question 1

Parts (a) and (b) of this question were well answered. In part (c), many students had attempted the area, or used incorrect lengths from the diagram.

Question 2

There were many correct answers to all parts of this question. The arithmetic was not always correct in parts (b) and (c), and not all students showed their working. A common error in part (b) was 10 × £1.20 = £10.20. In part (c), students did not always make a decision, but some clearly communicated the justification for their decision, for example showing that 50 × 2 = 100. Some students compared daily totals or takings and others incorrectly totalled the coffees sold, despite being given the value.

Question 3

These basic number calculations caused few problems

Question 4

Students appeared to find this number puzzle question accessible, with most giving fully correct solutions. Many realised the most efficient strategy was to start with 7 in the top right box.

Question 5

The majority of students made a good attempt at this question. However, many students substituted but also left variables in their expressions, so $6a + 35b$ and $41ab$ were often seen. A few students worked out 3 + 2 and 5 + 7, or simply replaced the variables in the expression, giving 32 + 57.

Question 6

Part (a) was mostly answered correctly, but part (b) was often incorrect with 26 frequently seen.

Question 7

Part (a) was very well answered with the majority of students giving a well presented fully correct answer. Whilst most were able to follow Vicky's method, sometimes poor arithmetic meant an incorrect total was obtained. In part (b), although the majority of students realised that they were required to divide 4032 by 8, the calculation was often poorly executed with answers such as 54 and 540 commonly seen. Some students attempted to build up using Vicky's method, but the working was often unclear.

Question 8

Although the numbers in this question were relatively straightforward, many arithmetic errors were seen. The most successful method was to find 10% and then multiply by 8. Some found 50% and 30% but made arithmetic errors in adding the two. It was common to see 50%, then 75% + an adjustment, which was not 5%.

Question 9

Most students were able to find a factor of 900. Students found choosing a prime number easier than finding a cube number, where the common incorrect answer was 25.

Question 10

Part (a) was well answered but students found part (b) challenging. Many attempted to build up from 10:15 to 15:02 but the working was usually unclear and the answer was often incorrect. Some calculated the usual time of the journey and forgot the 4 minutes extra for that day. Occasionally, clock faces were drawn and this did help some students. Part (c) was better answered but there was often evidence of a 100 minute hour with the answer 17:14 common. Some students were unable to select the appropriate train time from the timetable. A few worked out the correct arrival time but did not state a final decision.

Question 11

This question was poorly answered by most students.

Question 12

Fully correct solutions were rarely seen in this problem-solving question. Working was not always clearly shown but those students who added dimensions to the diagrams often made progress. Many students were unable to find the lengths of the sides of the internal rectangle in part (a). Perimeter calculations were seen, as were calculations of the area of the large rectangle or the four framing rectangles. Part (b) was a good discriminator. Few students realised that the cross-pieces were 3.5 cm in length. However, some were able to calculate their perimeter accurately, so 36 cm was a common answer. Some students included the internal edges of the shape.

Question 13

This question was well answered, particularly part (a). In part (b) most students appreciated that they needed to use a value from the graph and then use proportional reasoning to find 100. However, the presentation of the solution was often unclear with a list of numbers being added

that appeared unrelated. Those who read off a value of 0.7 bars frequently gave the answer 70, even if they stated that they were multiplying by 10. Those who used (20, 1.4) usually understood the need to multiply by 5 but often made errors in the arithmetic. Some students used a combination: 2 × the answer to part (a) + a reading for 20.

Question 14

Students at this tier found the algebra challenging. Factorising in part (b) was beyond the capability of the vast majority. In part (c) there were a small number of promising solutions seen. In these, often three of the four terms were correct and some went on to collect their terms correctly. Students' presentation was sometimes unclear, with some working on the brackets separately and usually omitting the subtraction sign.

Question 15

Students had limited success with this question. Most plotted the points accurately and scored well in part (a). Although a straight line of best fit was inappropriate for the full data set in this functional question, it was accepted as a method for part (b). However, many students simply gave a value as their answer, with little or no working to support it. In part (c), few students looked separately at the winter sales and did not appreciate that these sales were fairly constant. It was common to see *Yes* ticked, with a reason that used the idea of positive correlation. For example, 'They sell more as the temperature rises.' Those who ticked *No* often gave a reason such as 'It is too cold to eat ice cream in winter.'

Question 16

Part (a) was well answered. In part (b), $\frac{3}{6}$ was a common error when students used the whole team. The answer was often given in words such as '3 in 5', '3 out of 5' or 'likely'. Very occasionally the incorrect use of ratio for probability was seen. Part (c) was very poorly answered. Some students attempted heights rather than weights. Many averaged the two given weights.

Question 17

This question was poorly answered. Some students did not appreciate the need to find the radius of the given circle before being able to attempt the area. Although for many students, this was their only success. There was much confusion over the correct area formula with $2\pi r$ and $(\pi r)^2$ often used. The instruction to leave the answer in terms of π, to ensure that students did not need to perform a complex multiplication, was usually ignored. The request for units was ignored by many, while others stated cm or cm^3.

Question 18

This final question proved to be a step too far for most Foundation tier students. The few who did manage to access the question, usually scored full marks. There were very few algebraic solutions seen, and many attempts at trial and improvement. Unfortunately, students were frequently finding the perimeter. Successful students often appeared to estimate the answer and then check whether it would lead to the correct area.

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