



**General Certificate of Secondary Education
November 2012**

Mathematics

43601H

(Specification 4360)

Unit 1: Statistics and Number (Foundation)

Report on the Examination

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General

Students appeared to have been well prepared for the examination. Calculator use was better than sometimes seen in the past. In statistics questions, students must appreciate that the word ‘estimate’ is used when not all values are known (in this case in the calculation of a mean of a grouped frequency distribution). It does not mean work out a rough answer.

Topics that were well done included:

- Listing outcomes of compound events
- stem-and-leaf diagram
- relative frequency
- tree diagram
- stratified sampling.

Topics which students found difficult included:

- mean of a grouped frequency table
- response section of a questionnaire
- cumulative frequency and box plot interpretation
- combined ratios
- standard form.

Question 1

This question was a familiar topic to start the paper, albeit with a more involved situation in part (a). The majority of students chose to list the possible combinations. Part (b) was less well done with some students deciding jelly was one out of six options or one out of two puddings, rather than using the combinations they had listed in part (a). Some used incorrect notation for a probability. Many were able to restart in part (c) and most of those who followed through from an incorrect probability realised the need for an integer answer.

Question 2

The simple arithmetic in this question meant that most students gave a correct solution. It was important to start by finding the number of green balls and those who did not do so usually could not solve the whole problem. The ratio and fractional work was generally well done.

Question 3

Part (a) was very well answered. Students who produced an unordered diagram in the working space, and then ordered it in the answer space, usually avoided making minor slips such as omitting a value. Many students aligned the data demonstrating that they understood the use of a stem-and-leaf diagram to show the distribution of the data. Part (b) proved to be a good discriminator with the marks being fairly evenly spread. Many candidates were able to find at least one of the correct values.

Question 4

Part (a) was well answered but part (b) and part (c) were less well done. In part (b), a large proportion of students found the mean of the midpoints themselves despite this question requiring a standard algorithm. Other common errors were dividing by 8 rather than 30 or multiplying by 0 incorrectly. Very few students appeared to have read the question carefully in part (c). Many gave the answer as the mean and explained why this was the better or more accurate average which is not what was asked. Many of those who correctly selected the modal class could not give a valid reason for doing so and simply stated the definition of mode.

Question 5

Most students found the actual increase in part (a) and then attempted to find the percentage increase. Those using a build-up method usually lost accuracy. Students who use a calculator method, which is more appropriate on this paper, performed better. A few students worked out 1250 as a percentage of 1430. Part (b) was poorly answered with many using boxes that overlapped or had gaps. Students who attempted to use inequalities often introduced errors. Those who used a large number of boxes tended to have errors as a consequence.

Question 6

There were many correct answers seen in part (a) but students should be reminded not to give a choice of answers when they are unsure. Many correct responses were seen in part (b) but some students gave the answers as decimals rather than rounding to the nearest integer.

Question 7

Part (a) was a good discriminator. Many students were able to complete the cumulative frequency column and most were able to plot the heights, although not always at the upper class bounds. Some students drew a frequency polygon. Part (b) was poorly answered. There were many errors introduced by reading off both diagrams at 109.5 rather than 109. Few students realised that as 109 was the upper quartile for the boys, 75% of the boys are allowed in. Interpolation attempts for the girls were often little more than guesswork.

Question 8

This accessible question was very well answered. The common error was to work out the probabilities with the results of the second toss being conditional on the results of the first.

Question 9

It was often very difficult for examiners to work out the methods that students had used because there were numbers written all over the working space. The most successful students were those who used amounts of money and then made sure that Ben had a matching amount in each ratio. Another method was to work out $9 \div 5 = 1.8$ and multiply 4 by 1.8 to give C as 7.2. The ratio of 10 : 7.2 was then found. However, students who used decimals often truncated or rounded without showing their method.

Question 10

This proved to be a challenging question for the majority of students. Many were unable to work out the probability of a coin landing on heads five times. Students rarely expressed the result in the correct form with most giving a value to 2 decimal places rather than to 2 significant figures.

Question 11

Many students worked out the group frequencies and some also showed that they were searching for the 500th value. Only a small number knew how to interpolate within the correct class interval to find the age of the person 80% into that class. Very few showed a method in part (b) but there were many fully correct responses. Students who transferred the frequency densities from the histogram should have been able to see that the total sampled was not 100.

Question 12

This novel question involved a reverse compound percentage. The common errors were to work out 9000×0.95^3 or $(100 - 15)\%$ of 9000. Although this question has a straightforward calculator solution $[9000 \div 1.05^3]$, many attempted to use trial and improvement often with only partial success.

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