



**General Certificate Secondary of Education
January 2011**

Applications of Mathematics (Pilot) 93701H

(Specification 9370)

**Unit A1: Applications of Mathematics
(Finance and Statistics) - Higher**

Report on the Examination

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Unit 1: Higher Tier

General

The paper was accessible to the majority of candidates although some topics seemed to be unfamiliar, in particular the new topic of linear programming.

Candidates generally showed clear working and good use of calculators.

Topics that were done well included:

- Calculating loan payment
- Percentages.

Topics which candidates found challenging included:

- Linear programming
- Use of bounds
- Comparison of distributions.

Question 1

Part (a) was well done by the majority of candidates. A small number added 5000 to their answer or subtracted 5000 from their answer. In part (b) common incorrect methods involved dividing 1120 or 5000 by 60.

The majority selected a valid reason for their choice of bank in part (c).

Question 2

The majority of candidates could use the formula correctly leading to an answer of 4857.14... although some worked out $176\,000 - 142\,000 \div 7$ leading to an answer of 155714.

A large number of candidates who gained the correct value from the calculator could not then round to the nearest £5 with the most common incorrect response being 4860. A small number divided by 8 (including 2002 and 2009).

Question 3

This question proved to be more demanding than expected with the majority of candidates gaining less than half marks. Common errors included: not multiplying 45 by 3; adding 41.64 to 135, and mixing units when dividing by 4 pence.

Some thought that the first 350 units were for each month rather than one bill, showing a misunderstanding of this financial topic.

Question 4

Those who set up an equation usually gained success in this question, whereas trial and improvement methods often failed to reach the correct solution. Candidates should always be encouraged to use algebra in this type of question as part methods can gain method marks.

Again, in part (b), those who used multipliers were usually successful, although a small number used 1.2^6 which was the distance for the 7th week. Some candidates worked out each week separately and were also successful. A large number worked out 20% as 9.6 then used this increase for each week.

Question 5

In part (a) there was some use of the upper class boundaries but the majority who calculated Σfx used midpoints. The most common incorrect answer was 4 from $20 \div 5$. Less than half of candidates could explain why the mean value was an estimate, although some knew it was something to do with not knowing the exact time she irons for. A large number said that it was because it was a decimal or because it may change each week, showing little understanding of the reason for using midpoints in the calculation of the mean. In part (c), many candidates divided 130 by 5 but then gave the answer as 26 weeks. Those who multiplied their mean by £5 were generally then successful in completing the question although some rounded answers down giving insufficient weeks.

Question 6

Part (a) was well done but part (b) was less successful. The majority of candidates worked out the increase of 40 but then used this incorrectly - commonly as $40 \div 100 \times 65$. Some included the 117 from part (a) in their calculations.

Question 7

Candidates gave better criticisms of the response section than the question, usually stating that the boxes were vague or needed exact numbers. A small number thought that a box for 'fairly often' should be added. The majority criticised the question for not stating which cinema rather than the fact that there was no time period given. Part (b) was answered well with the majority understanding that asking people coming out of one type of film could cause bias.

Candidates who understand stratified sampling coped easily with part (c) but over half the candidates tried guessing at numbers in the correct order of size.

Question 8

Less than half of all candidates understood cumulative frequency with the majority simply plotting a frequency diagram. This made comparison of the two distributions very difficult although the table could have been used. Candidates need to be encouraged to show all values to support their reasoning in this type of question as a large number made a comment about the medians or inter-quartile ranges but did not state the values. Of those who did find correct values, some gave a comparison in context for the medians, stating that Greenfingers tomatoes were larger, but few referred to variation when comparing IQR's. There were a small number of comments about the difference being that one was a graph and one a box plot!

Question 9

Whilst there were a number of fully correct solutions to this simultaneous equation question, the majority of candidates found it too demanding. Those who set up simultaneous equations generally progressed well, but there were a number of misreads of the question, in particular using 488 instead of 448. Those who found and stated clear values for sugar and flour had the opportunity to work out the ratio. Again some were successful but many just divided 20 in the ratio 4 : 1.

Those candidates who tried trial and improvement were rarely successful.

Question 10

For candidates who understood frequency density, part (a) was very straightforward and full marks were gained. A large number divided 11 by 2 achieving one correct frequency density but then divided all the other frequencies by 2 as well. Some tried to plot frequencies and tried to extend or alter the given axes to fit the values on. A small number tried to work with midpoints.

It was still possible to answer part (b) without a histogram drawn in part (a) but very few did. The majority could not get to the value of 16 but some did know how to find the percentage from their 16.

Part (c) saw widespread methods of $18 \div 5 \times 4$.

Question 11

It seemed that few candidates knew anything about linear programming so only a very small number could make progress in this question. There were a large number of non attempts particularly for part (b).

A very small number drew correct lines and shaded correct regions - these candidates usually then successfully considered vertices and gave a correct solution. This is a new topic so over time it is expected that the more able candidates will become more familiar with this type of question.

Question 12

This question on the use of bounds was only attempted successfully by the most able candidates. A small number did consider bounds but few understood that to find the minimum petrol consumption they had to work with the minimum miles and the maximum petrol used. Of those who tried to give upper and lower bounds, more were successful with stating a correct bound for the petrol, with 335 and 345 generally used for the miles.

Mark Range and Award of Grades

Unit 1: 93701H

Tier	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
Higher Tier	80	80	30.9	14.4

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

Higher Tier (1048 candidates)

Grade	Max mark	A*	A	B	C	D
Scaled Boundary Mark	80	51	40	29	19	11
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).