Questions matter

Level 3
Certificate in Mathematical Studies

1350/1 Paper 1

Report on the Examination

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Question 1

Generally, this question was answered very well, with about 70% of students gaining full marks. Some students seemed not to understand what is meant by Debit, Credit or Balance. The most common errors were either in the 4th June balance or giving the final balance as the sum of 104.99 and 456.

Question 2

Part a was answered very well, with almost 90% of students choosing the correct option.

Just over half of the cohort gave a correct explanation in **part b**, by indicating that the samples were not in proportion to the year group sizes. Incorrect answers typically tried to explain what that sampling method was rather than answer the question of why it is not stratified sampling or were vague and just stated not representative.

Part c was answered well by the vast majority of students, with a small number thinking they should multiply each fraction by 20 not 60. The least able tended to divide by 60.

Question 3

This question proved very successful with students. It was very rare for the easier **part a** to not be awarded the mark, and many students were also successful with the 'reverse money exchange' and percentage commission in **part b.** Common errors were to add the commission rather than subtract, or to multiply or divide by 1.03. Some students used the exchange rate from **part a**, but could still gain some credit.

Question 4

In **part a** the cumulative frequency table was nearly always completed correctly, although a small number of students calculated frequency density. Plotting the graph saw a real mixture of attempts. Students struggled to plot the graph/curve in the correct place – plotting at midpoints was very common but students also plotted at the lower value of the interval. Continuing the curve to the age axis was often done incorrectly, with extensions to (0, 0) common, even from plotting upper class bounds.

Only about a quarter of the cohort gained full marks for this part, but about 40% gained 2 out of 3, usually losing either the mark for horizontal placing of points or for the curve. A few used straight lines to join the points, which tended to be more accurate. There were a small number of bar chart/histogram diagrams, which meant that **part b** was not accessible.

Students usually read correctly from their increasing curve to find the median for **part b**, but a small number either read from 50 or read 40 from the wrong axis.

Many students who chose to use interpolation from the table for **part c** were successful, though some used an incorrect proportion from the 60 to 70 class interval. Those reading from the curve usually gave the correct value, but some read the scale as 1 small square is 1 unit instead of 2. A small proportion of students worked out the percentage who were under age 55.

Changing values to percentages caused some problems, with a common error seen that 1% = 0.8.

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Question 5

This shorter estimation question was generally very well answered, with over three quarters of the cohort gaining full marks. These have been an integral part of the syllabus since the inception of the exam, and students are realising that marks are obtained by making simple, sensible estimates. Sensible assumptions were usually made, with a small number of students making errors in multiplying up to heartbeats in a day by multiplying by 60 twice.
A very small number of students only worked out the heartbeats for one year, despite often stating an assumption about lifespan.

A small number of students added detail which was not required, such as adding extra days for leap years or using different heartbeats for physical exercise, normal times and/or sleeping. These extra calculations waste time for the student and do not add anything to their estimation.

Question 6

The multi-choice **part a** was almost always answered correctly.

In **part b** the correct use of multipliers was seen in nearly all responses, with very few mistakes. The most common error was to use 1.0105 for adding 10.5%
Some premature rounding caused final accuracy errors, but also a significant number of students did not round to the nearest pound as required by the question. Over 70% of the cohort gained at least 2 marks.

Some students either added an extra year or missed out the year for 10.5% and just used 5.25%
The least able added 10.5and 5.25 and applied this percentage to 35 or to 36.89.

Question 7

In **part a** of this modelling and estimation question some of the students did not state all their assumptions clearly. This was particularly true for the numbers of people living in each type of house. Many used the number of bedrooms without stating whether this was actually people. Similarly, some just said assume the house was full, which did not indicate how many people they thought lived in each house size. Of those who did state the number of people, a small number over-complicated by stating, for example, that half the 4-bedroomed houses have 4 people and half have 5 people.

The amount of waste per person was usually shown, but a small number of students decided that children produced less waste, clearly not understanding that the average waste per person takes this into account.
Students had to choose this amount of waste by studying the data on the preliminary material. A small number decided that the waste would be quite a bit lower, even though many years showed an increase and only a few a decrease.

The preliminary material made it clear that the recycling percentage would increase, but a significant number of students used the 2020 value of 44%, which was not accepted. Some of these students tried to justify this by assuming that the housing estate was built in 2020, but the question paper was in 2024 and stated that the estate was being planned.

A significant number of students used total waste throughout, ignoring the recycling percentage.

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Final answers were often given as decimals which were not accepted as an estimation. All answers should be rounded at least to an integer with further rounding often very appropriate.

Just under half of the cohort gave a valid response to **part b**, but with those discussing recycling rates often inferring that greater recycling meant greater waste to landfill. Others did not discuss their own assumption but just made a general statement, for example that the numbers in each house might be different.

Question 8

Part a was generally well answered, with over 80% of students gaining full marks. The most common error seen was presenting the missing frequencies as 8 (from 0.8 x10) and 24 (from 2.4 x 10). Some of these students drew the missing bars correctly, but others followed the same calculation and drew 60-80 at height 2.4 and 80-100 at height 1.6.

There were many fully correct answers to **part b**, but some just compared class frequencies, in particular the fact that no-one waited over 100 minutes after the extra staff were appointed. A small number of students tried to just compare heights or frequency densities rather than actual numbers of people. There was quite a lot of poor arithmetic seen such as 6 + 16 = 21 or 24 – 18 = 8. A significant number used half the 60 – 80 class interval instead of three quarters of the interval.

Question 9

Almost 40% of the cohort gained full marks for this Tax and National Insurance question. Where errors were seen it was often the National Insurance that was incorrect, with the personal allowance being subtracted for NI as well as for tax. The majority of students used both the standard and higher rates of tax for both tax and NI, but a small number only used the higher rate.

A small number of students have been taught to multiply by 0.8 and 0.6 for income tax and then 0.88 and 0.98 for national insurance, but these students often became confused about what they needed to subtract, and subsequently ended up with an incorrect net pay.

Other common errors included using 0.2 instead of 0.02 for higher NI, using 12 570 instead of the 12 730 left or subtracting their tax and NI from 50270 rather than from the £63 000 gross salary.

A small number of students tried to work out the tax and NI for the previous (net) salary given in the question and some ignored the previous net salary altogether, just comparing the new monthly net salary with £825.

Question 10

This question differentiated well, with only the most able students being able to calculate both mean and standard deviation and make comparisons in context. The majority of students could work out the mean, but many did this by working out Σfx longhand. A small number thought the mean was 6 from 30/5.

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Students did not do as well with calculating standard deviation. It is expected that students use their calculator statistical functions to work out this value, but it was clear that some students did not know how to do this or did not know which value was standard deviation.

Comparisons of the means were usually correct, and quite a large number of students knew that the SD's showed the consistency of results, but some thought a higher SD meant greater consistency. A small number compared which value was closer to one, clearly mixing up measures of spread and correlation.

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Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

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