LEVEL 3 CERTIFICATE
MATHEMATICAL STUDIES

1350/1 Paper 1

Report on the Examination

1350

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General

The exam was accessible to the students with no evidence of a lack of time. Generally, students seemed familiar with the topics for this paper. Working was usually shown clearly and the majority of students attempted all questions.

Topics that were done well included:

- percentage from a stem-and-leaf diagram
- explanation of an unrepresentative sample
- calculating interest
- Fermi estimation.

Topics which candidates found challenging included:

- reverse percentages
- calculating AER
- calculating mean and standard deviation using calculator functions.
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Question 1

Part (a) was answered very well and in part (b) the majority of students either found the median or worked out that 62% were above average. A large number did not then make a clear comparison in context with the national average. A small number of students compared the English results with the maths results.

Question 2

This question was poorly attempted by many students. The most common incorrect answer came from working out 80% of 498.

Question 3

Students generally coped well with the large amount of information in this holiday-booking question with many fully correct answers seen. For Packages for U, the most common error was to consider the 10% discount on the holiday and the 3% fee on the final payment as a 7% discount. For the booking independently version, the most common errors were to multiply 480 by 1.33 or to not realise that one price was in pounds and one in euros.

Question 4

There were many realistic assumptions made for this estimation question, with the majority of students choosing the population within the allowed limits. A small number of students thought that the population would be under 500 people and an even smaller number used very large figures such as 250 000.

Students should realise that Fermi estimation only requires a quick rough estimate. Quite a large number of students started breaking down the number of litres of liquid to men, women, children, people who did a lot of sports etc, instead of just assuming an average per person. Although this is a good refinement it is not required for a first estimation and is much more time-consuming. Generally estimates of the daily amount of liquid being drunk were realistic. Students should also remember to state how many days they are assuming per month.

Question 5

In part (a), a large number of students recognised the need to sample from different areas of London, but the majority then talked about cluster samples or stratified samples, stating that they would ask everyone in a street/area how much their house cost. Only a small number of students explained where Carin could collect her data from: estate agents, websites etc. Part (b) had a better response, with the majority of students realising that London is expensive so not representative of England. In part (c), those students who understood how index numbers work with a base year were usually successful and remembered to round to the nearest £100. Others could read the values from the graph but worked out the difference in price between 2002 and 2009 and assumed there would be a similar increase to 2014.

Question 6

Parts (a) and (b) were answered well, with students understanding how to complete the spreadsheet and the formula used. In part (c), the majority of students did not multiply the 3-monthly interest by 4 to get the annual rate to use in the AER formula. Those students who used the figures in the spreadsheet to work out the annual interest were usually successful.

Question 7

Students had a choice of frequency diagrams to draw in part (a), and all three possible choices were seen. Those who chose to draw a histogram usually did well, working out the frequency densities correctly and drawing a neat graph. There were a few poor choices of scale, with 1cm to 0.3 being a difficult scale to use for densities of 2.3 and 0.5.

There were more errors when cumulative frequency diagrams or frequency polygons were drawn. The most common error was having the axes the wrong way round, with frequency or cf on the horizontal axis. The other errors were usually about the horizontal positioning of the points, with midpoints of lower class boundaries being used for cumulative frequency and upper class boundaries being used for frequency polygons. A small number of students tried to draw a histogram with heights being the actual frequencies, often ‘adjusting’ the class intervals to be the same width.

In all types of graph there were a large number of poorly labelled graphs, with either the incorrect label on the vertical axis or the units being omitted on the horizontal axis.

In part (b), a large number of students did not read that they should be comparing the number of children who now consumed less than 30g, the daily recommended value. Most of these students just gave general trends in the data and did not calculate any values for the under 30g consumption. Quite a few of those who did work out the number now consuming under 30g failed to compare it to the figure from the previous set of data.

Question 8

This tax and national insurance question differentiated well between students, with the more successful students coping well with all the information and calculations required. However very few students realised that as Samir’s pay was already over the threshold for tax and NI, the most efficient method was to just calculate the tax and NI he would pay on the extra 50p per hour or £20 per week. There were a large number of students who started by working out the tax and NI for Samir’s current wage and so calculating his net pay as £243.15, the value given to them in the

question. These students either stopped there — so had not answered the question at all — or then repeated everything for the new wage, thus gaining credit but losing time.

Many students understood how to work out tax and national insurance, and usually could find the correct figures for the data sheet. The most common error was to work out the gross salary by multiplying the weekly wage by 4 then by 12. This only gives 48 weeks in a year so in real life terms is a large error. Students should avoid this by using 52 weeks in a year at all times.

Question 9

The majority of students did not manage to find the mean and standard deviation using their calculator statistical functions. However, in part (a) some could work out $\sum fx$ and subsequently the mean. As no formulae are given, these students could not work out the standard deviation. The teacher guidance states that students are expected to be able to work out these values just using their calculator. In part (b), a large number of students said to either do their calculation again or take more samples. Comparing the distributions was again badly answered, with only the more successful students stating the reduction in time per swim and indicating that he was now faster. A small number of students realised that the decrease in standard deviation meant that his swims were more consistent. Students should be reminded that comparisons must be in context, so simply stating that the mean had decreased was not sufficient.

Question 10

Part (a) differentiated well between students, and many good attempts were seen. The majority used the occupancy rates correctly to estimate the occupancy in April and the cost of laundry for their number of rooms being used. There were a large number of errors with pillowcases though, with the worst being to only include one pillowcase for a total of 20 double rooms. The biggest errors were with the number of sheet changes that would be needed in a month. Students either did not consider this at all, or, for example, assumed that all guests would stay for 4 nights so there would be 4 sheet changes needed. Students should realise that this is an estimation question so using figures such as 20.8 double rooms and 7.5 sheet changes per month is not sensible. Final answers should always be rounded, at least to the nearest pound.

In part (b) there were some very sensible comments, particularly about the number of nights stay being different to that assumed and therefore affecting the cost. However, quite a large number of students simply stated an assumption they had made without explaining how their answer could have been affected.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

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