AQA

LEVEL 3
CERTIFICATE IN MATHEMATICAL STUDIES

1350/1 Paper 1
Report on the Examination

1350
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General points

The majority of the students attempted all of the questions, with no evidence of a lack of time to complete the paper. Working was usually clearly shown, with explanations or conclusions included where necessary.

Question 1

Part a testing knowledge of the type of data being collected was answered quite well, with only about 10% of students failing to gain any credit. The difference between qualitative and quantitative data seemed to be well known, but there was less certainty about the difference between discrete and continuous data.
Students knew that to find a stratified sample value (**part b**) they must work out a fraction of 80, with over 60% doing this correctly. The most common error was to use the fraction of 129 out of 530, using the total number of males rather than the total number of students. Those who did use the correct fraction of 80 generally understood that they should round their answer to a whole number of students.

Question 2

Part a was answered correctly by about half of the students. The most common error was to use 3.6% per month rather than dividing 3.6 by 12. A small number of students did divide by 12 but then used 0.3 instead of 0.003 when using as a percentage. Rounding or truncating of values was allowed, as this is what happens in real life. However, a small number of students did not round or truncate correctly.

In **part b,** the students who used the first method on the mark scheme were usually more successful. Those who tried to find differences each month made various errors including
- using 7 months instead of 6
- using half of 3.6% for the 6 months, so finding 1.8% of the total amount.
- finding the difference between each monthly value, so taking no account of the £920 paid.

Just over half of the students chose the correct option for **part c,** with option 3 being the most common incorrect choice.

Question 3

The majority of the students could work out the summary statistics correctly in **part a**. Where errors occurred, they were usually in calculating the quartiles.

The vast majority of students knew how to draw box plots for **part b,** with about 80% gaining at least 2 marks. There were some inaccuracies in plotting values using the given scale, and failure to label their box plots resulted in the loss of full marks for a significant number of students.

The slightly different wording of **parts c and d** resulted in a higher number of correct responses than in previous years for this part of the specification. A significant number of students still do not understand that comparisons must be in context, not just a statement that one median value is larger than the other.

Question 4

Students generally found the error interval question (**part a**) challenging. The lower value was often correct, but students often gave 319.50 as the upper value. The other most common error was leaving the original £2000 in their answers, usually with values of 2318.50 and 2319.50 forming the error interval.

Part b was answered well by higher attaining students, with correct calculations given to show that the original percentage was incorrect. A large number of students gained credit for working out 1.024^2 and 1.031^5 but then added these values. Those students who chose an investment amount to apply the interest usually made some progress, but often could not work out the correct percentage increase from their final account balance.
The lower attaining students worked out 2.4^2 and 3.1^5 and made no further progress.

Question 5

Students usually stated their assumptions as required, and a large number made very valid assumptions about the time it takes for one washing machine cycle. The number of loads per week for an average household varied quite a lot, with some students trying to work out how many sets of clothes each person in the house would wear in a week.

Students should be aware that this is a Fermi estimation, so a fast rough estimate is all that is required. Students should also be aware that this was for an average household, so assumptions of 4 loads of washing every day throughout the year were not realistic. Using 54 or 56 weeks in a year was seen in a small number of scripts.

Question 6

This Income tax and National Insurance question only used basic rates, so the performance was better than in some previous series. Students generally know which calculations they need to do in order to work out the correct values.

It should be noted that those students who use, for example, 80% to work out the amount after tax invariably use incorrect values further through the question. They often work out the National Insurance on the salary after tax is deducted.

Common errors included
  • working out the 8% pension incorrectly as 80%
  • not subtracting the pension at the correct point
  • failing to subtract the personal allowance before working out tax
  • failing to subtract the NI free allowance before working out NI

The vast majority of students were able to make a correct comparison and conclusion between the rent and their net monthly income.

Question 7

Part a tested calculating the mean from a frequency distribution, which is a topic that regularly appears on GCSE papers. However, it was poorly attempted, with less than 40% able to calculate the mean. In this specification students may use the statistical functions on a calculator without showing working for the mean, but this was rarely seen.
If students quoted a mean of any value, they could then usually compare it successfully to a 15% increase in last year's mean, gaining both follow-through marks.

Various methods were seen for **part b,** with counting squares methods being less popular than class width multiplied by frequency density. For this second method the majority of students worked out the 200 to 220 and 220 to 260 values correctly, but did not use the correct portion of the 160 to 220 bar, with 188 often being read as one small square before 200. Counting small squares or centimetre squares sometimes led to errors, particularly in the portion of the first bar they had to use. Overall, around 40% of students achieved a fully correct result.

Question 8

Part a was well answered by students, with almost 80% giving fully correct answers. Most students confidently read off the value of 150 and increased £1.90 by 50%, but a significant number read off 150 successfully but then added 50p to £1.90

Part b was not quite as well answered, with about half of the students gaining full marks. The RPI graph was usually read correctly, but a common error was to read 200 and just divide £129 by 2. The least able students did not understand how or where to read the graph.

Question 9

The estimation **part a** was generally well done, with the vast majority of students making good progress. Students were usually proficient in making their assumptions about the number of hours of production and sweets made per minute. The more able students often stated these assumptions clearly at the start. For other students the values were just used and it was not always easy to see what the original assumption was. It was particularly difficult to see the amount of time the sweets were actually produced, rather than the machine operating hours.

Students also confidently used the formula for volume of a sphere, but often used surface area or area of a circle for the cylinder. This is a formula that they should memorise, as it is not given on the formula sheet. The most common error was to fail to consider any wastage, with these students only able to access a maximum of 7 of the 9 marks.

A small number of students worked out the volume of one sweet as 2.14 cubic centimetres, but then multiplied this by the total number of sweets made. This meant that part sweets were included in their overall calculation, leading to errors in the number of tubes needed. Similarly, some students worked out the number of sweets per tube as a decimal and used this decimal value for their calculation of the number of tubes needed.

In **part b,** about 40% of students gave a clear explanation of how their result was affected by an assumption they made. The rest of the students either simply stated one of their assumptions or made comments about how the number of hours may be different without reflecting on how their answer would alter.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.