



A-LEVEL MATHEMATICS

MS1A - STATISTICS 1A
Report on the Examination

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General

There was a welcome increase in the proportion of high achieving candidates and a decrease in those demonstrating only minimal knowledge. Candidates made good use of both their calculators' statistical functions for regression and of the provided booklet of formulae and tables. It was pleasingly rare to see an answer, other than those for the gradient and intercept in Question 4, not supported by some indication of method; this is crucial for the awarding of part marks if an answer is not correct.

Question 1

All candidates started correctly by first ordering the given data and many then proceeded to score full marks. When marks were lost, it was almost always for using inconsistent methods to determine the two quartiles.

Question 2

Candidates generally scored highly on this question although the usual errors were seen at times in parts (a) & (b):

- **not** including 15 in 'at most 15';
- **not** equating 'more than 12 but fewer than 18' to '17 or fewer minus 12 or fewer'.

In part (b), the many candidates who correctly found the mean to be 14 invariably then opted to use the formula correctly rather than use tables.

Question 3

There were very few incorrect answers in part (a) with almost all candidates able to deal confidently with independent events. The combinations of independent and dependent events in part (b) caused more problems although the awarding of full marks was not at all unusual. In part (b)(i) to (iii), marks were lost for an incorrect conditional probability for 'Clare attending' or for 'Clare not attending'. In part (b)(iv), almost all candidates scored at least one (method) mark for two numerically correct combinations one of which was usually a candidate's answer to part (a)(iii).

Question 4

It was rare for candidates not to score the six marks in part (a)(i) where the use of calculators' in-built regression functions was almost universal. Where marks were lost, it was usually for plotting the correctly calculated line inaccurately, either by eye or by using only the point (\bar{x}, \bar{y}) , instead of using two calculated (end) points. In part (a)(ii), most candidates attempted interpretations in context with the strongest candidates identifying the value of b as time in hours per ridge tile and that of a as, for example, preparation time. Answers to part (b) almost without exception scored the one mark available. However, answers to part (c) often showed clear evidence of a lack of understanding of residuals. In part (c)(i), the value of the pmcc (r) was sometimes calculated. Where some idea of a residual was in evidence, a few candidates substituted 6, instead of 20, in their equations. Even correct substitutions had about half of otherwise correct answers with the incorrect sign. In part (c)(ii), almost no candidates appreciated that the sum was zero. Common responses included 'extrapolation' or a repeating of 'gives no useful information'.

Question 5

Most candidates answered parts (a)(i) & (ii) correctly either by use of tables or, less frequently, direct from calculators. A minority omitted the area change in part (a)(ii). Part (a)(iii) caused more difficulty; this despite its similarity to requests on previous papers. This was almost entirely due to 1.81 being both the value of x and μ . Having found that $z = 0$, weaker candidates then used 0 instead of 0.5 as a probability. Only the strongest candidates scored well in part (b). In part (b)(i), most candidates stated a correct value for z but some failed to derive the equation. In part (b)(ii), some candidates stated $z = (+)1.96$ and then apparently were not concerned when, as a result, $\sigma < 0$. Attempts at solving the pair of simultaneous equations were at times laborious and involved dubious algebra. The most straightforward approach in this context was to subtract one equation from the other to 'eliminate' μ , solve the resultant equation for σ , and then, by substitution into one of the original equations, find μ .

Question 6

Answers to this question covered much of the range of marks available. In part(a), a slightly larger proportion of candidates than on previous papers standardised correctly using $\frac{10-10.15}{0.3/\sqrt{12}}$ although

a few then failed to carry out the area change. In part (b), the calculation of the confidence interval was usually based on a correct expression even if not numerically correct. The most common mistake was the use of an incorrect z -value. A minority of otherwise correct answers lost the final mark for ignoring the accuracy instruction. In part (c), candidates were much more successful in justifying Claim 1 than Claim 2. Most realised that, for the former, they had to compare 300 with their confidence level, but some candidates score no marks for a comparison of a claimed mean value with a sample mean. In justifying Claim 2, most candidates made incorrect references to the confidence interval including only 99% of pouches or vague comments regarding the sample mean and standard deviation. Only the strongest candidates considered $\bar{x} - n_s$ and even then did not always explicitly compare the result with 300.

Coursework

The coursework was dispatched as requested and all appropriate paperwork was completed by Centres. The administration was good and no transcription errors were noted.

It was pleasing to see a good range of tasks attempted and candidates used a variety of appropriate methods in their write ups.

There was still a tendency for candidates to be too brief in the write up of their design of their tasks. The description of the sampling methods used, especially when using secondary data, often lacked the detail and explanation necessary for the highest marks to be awarded.

The standard of the analysis seen in a number of the scripts sampled was excellent. However, some candidates did not take their analysis far enough, which hindered the opportunities for meaningful interpretation to take place. It was pleasing to note that the interpretation was appropriately assessed by Centres.

Overall the centres did a good job in assessing the coursework in this session, and no adjustments were recommended by the Principal Moderator.

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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