AQA

A-LEVEL
MATHEMATICS

MS2B Statistics 2B
Report on the Examination

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General

Students generally demonstrated a high level of competence in the numerical calculations, with working frequently well set out. Familiarity with standard procedures was well demonstrated, but less familiar requests caused difficulties. Reliance by some students on calculator functions without a real understanding of the process was apparent.

Question 1

Here, and in Question 7, there was considerable confusion between the probability density function $\mathrm{f}(x)$ and the cumulative distribution function $\mathrm{F}(x)$, with many students integrating the given $\mathrm{F}(x)$ and putting the integral equal to 0.75. In part (b), many recognised the uniform distribution and used the formulae for quick and easy solutions, whilst others spent unnecessary time using integration. Some showed, by their working, that they had found the median rather than the mean, so scoring M0 A0 for this method.

Question 2

In part **(a)**, the assumptions were often very poorly stated with unattributed "it" and "they" which might have referred to the sample or the population. When nouns rather than pronouns were used, it was apparent that many thought that the sample should have a normal distribution. Students should appreciate that shorthand answers such as "Random and normal" will earn no credit. The calculations in part (b) were often done well, although use of the wrong t-value, or even a z-value was a too common error. In part (c), though many students recognised that negative rainfall was the problem, others seemed to believe that a confidence interval could never include negative values (cf temperature in $^{\circ}\mathrm{C}$) or that it could never be a wide interval.

Question 3

Part (a) was generally done well but with the usual confusion about the end values in part (a)(ii). It was pleasing to see so many competent responses to part (b), where familiar knowledge was examined in a novel way.

Question 4

Most students knew what was required in part (a), although some ignored the request for two decimal places. In part (b)(i), many, as required, showed clearly the necessary calculations, whilst others merely gave some of the figures which occurred during those calculations. The same lack of precision was evident in part (c)(i) where the majority of students clearly identified the problem value, whilst others merely quoted the text book "An expected value is less than 5".

Question 5

Students who treated this question as a continuous variable question, with integrations, scored very poorly. Most students correctly found the value of c, but many had forgotten their binomial work from MS1B and struggled with part (b). In part (c), students were split between those giving full and clear explanations of the working for the variance, who often then proceeded to a successful solution to part (d), and others who gave a cursory hint at the working for the variance, and so often found part (d) to be beyond their capability.

Question 6

Some students did not seem to know that the null hypothesis should be a statement about the value of a population parameter, in this case the mean, but most did correctly express this in terms of μ. Solutions were generally good although confusion between variance and standard deviation, or between t and z, was too common. Students should be reminded that some indication of the context is expected in final conclusions.

Question 7

The sketch of the graph caused some difficulty, and some students decided that this was a uniform distribution, a belief which they carried through into their mean and variance calculations. A proportion of students clearly relished the calculus and progressed competently and speedily through this question. Others found it very challenging. The $\mathrm{d}x$ was almost universally omitted from the integrations, which perhaps explains why so many integrated the constant term a^4 to get $\frac{a^5}{5}$.

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.

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Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.
UMS conversion calculator