AQA

A-LEVEL
MATHEMATICS

MS2B – Statistics 2B
Report on the Examination

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General

Candidates generally demonstrated a high level of competence in the numerical calculations, but explanations often showed a lack of understanding of the significance of what had been calculated. Surprisingly, considering the use of calculators, figures were often rounded early in calculations resulting in a loss of accuracy.

Question 1

Most candidates worked with the correct Poisson in all three parts, and only the boundary values in part (c) caused any difficulty.

Question 2

A sizable minority gave k = 1/(b – a) in part (a). In part (b), many candidates ignored the advice about quotation of formulae, on the front of the paper, and wasted much time trying to prove the mean and variance formulae. The quality of algebra was poor, with most candidates considering only one solution of the quadratic equation, with no justification. Others, however, produced concise solutions recognising that b > a. Part (b)(ii) was not well done, with many candidates switching to the discrete situation, and others having forgotten the MS1B binomial content.

Question 3

Many candidates correctly calculated both confidence intervals, although some lost marks by rounding the calculated standard deviation to 2.4 grams. Having been asked for an answer to four significant figures, the illogicality of working to two significant figures did not worry these candidates. Part (b) was very poorly answered, with few actually understanding what the confidence intervals told them. A common misconception was that 95% of bags had a weight within the interval. A tiny minority appreciated that the intervals indicated where the **mean** weight of bags was likely to be. A similar small number noticed that one of the sample bags did weigh less than 907 grams.

Question 4

The vast majority of candidates thought that the sample must be from a normal distribution; this was unnecessary since the size of the sample allows us to assume that the sample mean will be normally distributed. The hypotheses in part (b) were generally well stated in terms of μ, and the calculations were often well executed. Some fudging of + or – signs occurred, even comparing a negative test statistic with a positive critical value. Such confusion was usually avoided by those who considered the relevance of H_1 and calculated the critical value before the test statistic. As in question 3, many candidates forgot, in their closing statement, that the hypothesis test related to the mean speed. This carried over into part (c), along with a lack of context, despite this having been requested.

Question 5

The hypotheses were generally well stated, and the calculations completed accurately. Inevitably, a proportion of candidates did not combine columns, while some worked to a low degree of accuracy, which was surprising as none of the expected values went beyond three decimal places. In part (b), there were many amorphous "more observed than expected" answers, but only a few were supported by figures from the tables, while others made comments with no reference to the stated belief.

Question 6

This whole question was well answered, with part (a) providing most challenge, some candidates doing inappropriate integrations. Otherwise, there was little confusion between F(x) and f(x).

Question 7

Despite the ease with which Question 1 was answered, the Poisson distribution presented in a different context proved to be very challenging. Many candidates assumed that the mean value for the table must be 2, and contrived to obtain the given values of a and b from this assumption. Others calculated E(X) correctly in part (b) then used this value to find a and b, overlooking the circular logic involved. As a result, most only scored a single mark for deriving $a + b = 0.323$. On the other hand, part (b) was well done, and a pleasing number of candidates went on to complete successfully the remainder of the question.

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