A-level
MATHEMATICS

Unit Statistics 4
Report on the Examination

6360
June 18

Version: 1.0

Further copies of this Report are available from aqa.org.uk

General

The general performance of the small number of candidates sitting this paper was similar to that of previous series. Whilst almost all candidates were able to achieve at least a Grade E, there was a small number of candidates whose performance was outstanding. Most candidates presented sufficient method to justify their numerical answers and made appropriate use of their calculators and/or the supplied booklet.

Question 1

Candidates either omitted the assumption or, more commonly, failed to include the word 'differences' in combination with 'normal'. The construction of the confidence interval was usually correct although a small minority of candidates gained no marks for attempting a confidence interval for two independent samples.

Question 2

In part (a), there was some confusion by some candidates as to the form of the χ^2 test statistic and, less so, the percentage columns for the required critical values. Answers to part (b) generally revealed a sound understanding of which hypothesis test was required, based on a correct justification.

Question 3

Answers to part (a)(i) and (b) were very impressive and the awarding of the full nine marks was not unusual. However, in part (a)(ii), some candidates apparently forgot that $\mathrm{P}(X < m) = 0.5$ and that $\mu = \frac{1}{\lambda}$. Such candidates attempted unsuccessfully an approach based on $\int_m^{\mu} \mathrm{f}(x)\,\mathrm{d}x$.

Question 4

In part (a), simply stating that the estimate of λ was 2.4 without showing any method did not score the mark. There were many fully correct answers to part (b) where candidates recognised the need to combine outcomes. Most such candidates then made appropriate adjustments to the degrees of freedom by deducting 2 from the number of terms in the χ^2 test statistic.

Question 5

Most candidates recognised the need for and carried out successfully an F-test in part (a) but a small minority stated an incorrect critical value. Again in part (b)(i), most answers scored at least five of the six marks. Invariably, marks lost were for either using 1.96 or not giving the limits to one decimal place as clearly requested in the question. In answering part (b)(ii), most candidates correctly based their conclusions on the fact that zero was included in their confidence interval.

Question 6

Save for a few incomplete proofs in part (a)(i), answers to parts (a)(i) & (ii) were sound. However in part (a)(iii), a majority of candidates either made no attempt or tried to fudge their proofs. Full marks were the norm in part (b) for those candidates who used $p = \frac{1}{37}$. For the several candidates who used $p = \frac{1}{36}$, only two method marks were available in part (b)(ii).

Question 7

Most candidates provided satisfactory proofs in part (a) by remembering, or perhaps noting from the supplied booklet, that $\mathrm{E}(X) = \lambda$ and $\mathrm{E}(Y) = 4\lambda$, and so as a result $\mathrm{E}(S) = n\lambda$ and $\mathrm{E}(T) = 8n\lambda$. However in part (b)(i), many such candidates appeared to have forgotten that for the Poisson distribution, mean = variance, and also the general rule that $\mathrm{Var}(aX) = a^2\mathrm{Var}(X)$. Answers to part (b)(i), revealed a sound understanding of the term 'consistent'. Most candidates applied a correct formula in part (c) but, due to errors in part (b)(i), obtained an incorrect answer.

Mark Ranges and Award of Grades

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

Converting Marks into UMS marks

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

UMS conversion calculator www.aqa.org.uk/umsconversion