

Scholarship

2014 Assessment Report

Statistics

COMMENTARY

Overall the standard of candidates' answers was satisfactory given the change in emphasis of the content being examined. The best answered questions were on probability in Question four which involved straight calculations. The hardest questions were Question Two involving randomisation and bootstrapping, and Question Five involving statistical literacy. Many candidates were able to start these two questions however their ability to complete them by providing clear explanations in context was a deciding factor in order for them to achieve high marks.

SCHOLARSHIP WITH OUTSTANDING PERFORMANCE

Candidates who were awarded Scholarship with Outstanding Performance typically:

- realised that predictions should not be made from inappropriate models for bivariate data involving spurious correlation
- recognised that Q.1 (b) (i) required a single prediction, not two predictions based on the separate factors. They noted that one of the predictions was based on very weak evidence
- discussed confidence intervals and re-randomisation clearly
- gave a clear and accurate explanation for how the bootstrap distribution is formed for the difference between two means, in context
- used more than just the trend to make a prediction
- knew the meanings of statistical terms e.g. validity
- used percentage change or indexes to compare the overall change for differences in the obesity rates over two time periods
- communicated clearly each step of their probability calculations so Q.4 was answered well recognising conditional and relative risk
- compared the trends between countries in Q.5. Also they suggested at least one acceptable improvement
- wrote fluently and succinctly.

SCHOLARSHIP

Candidates who were awarded Scholarship but not Scholarship with Outstanding Performance typically:

- showed a reasonable understanding of statistics but often failed to fully relate their answers to the question
- recognised that the overlap in confidence intervals in Q.1(c) meant that the apparent increase in obesity rates may in fact have been a decrease
- made at least three acceptable comments about the relationship shown in Q.1. They also discussed the spurious association in context in Figure 3. They described features of bivariate data including strength, type, direction, range(s) and rate of change, all in context
- discussed random allocation and correctly described bootstrap confidence intervals
- explained why random assignment was used in Q.2 (a) (i) and in some cases made comments about all three of central tendency, spread and symmetry for Q.2 (b) (i)
- interpreted confidence intervals correctly to make comparison
- made at least three acceptable comments about the time series graphs in Q.3 (a)

- compared different features of time series data for different sub-groups using numerical values based on trends
- calculated both forecasts for men and women in Q.3(b) and were able to comment on the validity, taking into account trend stability, seasonality and how far into the future the forecast is being made for at least one of their forecasts
- knew the requirements for a binomial distribution and were able to articulate these requirements in context
- used a range of probability methods including relative risk calculations
- were able to supply evidence for a number of trends in both overweight and underweight between two countries in Q.5.

OTHER CANDIDATES

Candidates who were not awarded Scholarship or Scholarship with Outstanding Performance typically:

- did not attempt all parts of questions. Confused terminology and lacked context
- described features of time series data without using numerical values
- used statistical terms incorrectly or did not use them at all. E.g., they wrote about a correlation with time series and a trend in scatterplots
- failed to discuss what the two surveys found out about the number of sugar-containing drinks consumed in Q.2 (b) (i). In many cases the central measures were discussed but not the measures of spread and distributions
- Did not know the difference between a proportion (0.137) and a probability (tail proportion of 0.084)
- could not sort out what numbers were “differences between proportions” and what numbers were “difference between means”
- took too long to describe things and hence tended to “waffle”
- were unable to write clearly or succinctly which made them repetitive in their answers, i.e. they stated the same point several times in answering Q.5
- did not understand randomisation and bootstrapping. They confused randomisation tests with boot strapped confidence intervals
- were unable to calculate forecasts with an appropriate corresponding validity comment about it in Q.3 (b)
- used generic statements and did not relate their answers to the question. For instance features of the bivariate data were described without referring to the context
- presented the conditions for a binomial probability distribution without linking these to the specific context
- disregarded sampling variability as an explanation for differences in Q.3(c)
- did not provide evidence or compare overweight and underweight trends between countries listed in Q.5
- misunderstood the meaning of the word “evidence” in the context of a statistical report
- restated the values of a provided confidence interval rather than providing an appropriate interpretation of the interval
- were unable to come up with ways of critiquing and improving in parts (b) and (c) of Q.5.

OTHER COMMENTS

- There was evidence that some candidates failed to use their basic statistical knowledge and were not familiar with statistics at Levels 1 and 2 especially when working with graphs, tables and probability distributions.
- Many candidates had difficulty writing clear and articulate answers.
- There was a general lack of rigour in students' writing. Students are advised to check read what they have written.
- In Q.5, many candidates compared the weights in different countries but failed to compare the trends.