2015 NZ Scholarship Assessment Report

Statistics

Part A: Commentary

Overall the standard of the candidates' answers was improved from 2014. There were changes in the mark allocation with marks being awarded directly instead of the previously used codes. The best answered question was Question Three on bivariate data. The hardest question was Question Five involving experiments and randomisation. The percentage breakdown of candidates reaching both a scholarship standard (S) and an outstanding scholarship standard (O) per question is shown in Table 1 below:

	Question	1	2	3	4	5
Grade	S	24.7	22.7	25.1	23.1	18.7
	O	10.4	12.5	41.8	25.0	10.3

Table 1: Percentage Breakdown of Grade per Question (S: 5 or 6 marks, O: 7 or 8 marks)

Part B: Report on performance standard

Scholarship with Outstanding Performance	Candidates who were awarded Scholarship with Outstanding Performance commonly: • compared variables using percentage changes rather than raw data values • were clearly able to describe how to get a forecast • were able to discuss trend and seasonality with evidence and discuss how the prediction model worked • correctly calculated the House Price Index for Auckland in April 2015 for Question 2(h) • showed understanding of the difference between a mean and a median, the value of percentages versus raw data, and a sample versus a population census • discussed confidence intervals, bootstrap distribution and re-randomisation clearly knowing what was appropriate to the question • were able to discuss other potential variables that are likely to affect the value of a house • calculated probabilities correctly, including conditional probabilities and distribution parameters • were able to select probability distributions that fitted data provided and build a model along with calculating and discussing the relative fit of these distributions • could distinguish between re-randomisation and random assignment of groups • could interpret the outputs for inference and the outputs for experiments correctly • in Question Five were able to fully describe the context and details for part (a), the randomisation test output for part (b)(iii), and give evidence against a strong correlation being present for part (b)(iv) • linked their answers with the purpose and themes of the questions • showed a sound understanding of statistical terminology and the importance of backing their comments with evidence • wrote fluently, succinctly and in context.
Scholarship	Candidates who were awarded Scholarship commonly: • could discuss trend and seasonality of a given data set and make comparisons with data but not percentages • could answer Question 1(a), 1(b) but not 1(c) • suggested a reason why both median price and sales volume were compared in the extract in Question 2(g) and showed an understanding of the connection between volume and price • could find one supporting comment from the report in Question Two and discuss why the use of a median would be more appropriate than the mean • knew why the sample would be stratified in order to determine a housing price index

	• in Question Three recognised that Figures 4 and 5 were based on the means of values for each suburb and understood the implications of that • were able to discuss strength and direction of relationships between variables • were able to correctly discuss the differences between Figure 3 and Table 2 • calculated probabilities correctly, including recognising conditional statements and relative risks • were able to recognise and consider the model for the normal and triangular distributions to a set of data • were able to compare the medians and spread of experimental data in context • were able to justify reasons for randomisation and form correct conclusions from the output • showed a reasonable understanding of statistics but often failed to fully relate their answers to the question • wrote in context and were successful in linking statistical concepts • described some information contained in a graph in context but often omitted details like values and dates.
Other candidates	Candidates who were not awarded Scholarship commonly: • described features of time series data without using numerical values • used the term "seasonal trend" for "seasonality" and the term "spike" to describe a seasonal pattern • compared raw values rather than percentages in Question One, they used only the absolute change which wasn't comparable • were unclear whether they were discussing trend or raw data • were unable to identify components of a Time Series • were unable to discuss random selection, stratification, the difference between a sample and the population, and struggled with interpreting these key ideas in context • confused sampling ideas and terms (trend, season ('seasonal trend") and/or resampling/re-randomisation) • made general bootstrap comments but didn't answer the question in context • discussed the central measures in Question Three but failed to discuss the measures of spreads and distributions • wrote long passages speculating why something might have happened rather than describing what information was actually in the graph • mixed up features for different types of statistical investigations. For instance they wrote about relationships in Time Series and trends in Bivariate • failed to describe strength, direction and type of relationship for Bivariate • in Question Four could not work out the mean and standard deviation for the Normal • were unable to calculate conditional probability and relative risk • wrote in Question Five that Course Y had a higher IQR than Course X and thus concluded that X has a greater spread than Y • could not interpret the outputs of the experiments in Question Five • confused "random assignment" and "re-randomisation" • confused terminology and lacked context • often struggled to write totally clear concise statements backed up by evidence.
Standard specific comments	There was evidence that some candidates failed to use their basic statistical knowledge and were not familiar with statistics at Levels 1 & 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 candidates' writing. Candidates are advised to check-read what they have written. Many candidates didn't start each question on a new page despite the instruction at the top of each page. Several answers were devoid of context along with statistical concepts not being clearly articulated.