Assessment Report

New Zealand Scholarship Statistics 2021

Standard 93201

Part A: Commentary

Candidates need to demonstrate a broad understanding of achievement objectives from across the Statistics strand of the curriculum up to and including Level 8, including statistical concepts and skills assessed by the NCEA Level 3 Statistics Achievement Standards. Successful candidates appeared to draw on familiar learning experiences with topics to demonstrate a deep understanding of statistical ideas (e.g., practised writing reports about investigations), rather than relying on rote-learned memorisation of notes or answers to previous examination questions. Candidates who applied statistical thinking by integrating contextual knowledge or considerations related to mobile phones into their responses performed well. However, candidates need to balance their responses to ensure statistical ideas are clearly communicated, and some candidates excessively discussed context at the expense of communicating statistical knowledge.

There was a large amount of variation between candidates with respect to their understanding and use of simulation-based inference methods, such as bootstrapped confidence intervals and the randomisation test. Some candidates confused the two approaches, whereas other candidates only appeared to be familiar with randomisation tests or bootstrapped confidence intervals, but not both. Candidates who clearly understood the use of randomisation tests within experiment-based studies versus the use of confidence intervals within sample-based studies provided stronger answers. Furthermore, candidates who connected underlying ideas for confidence intervals across single parameters (e.g., a single proportion) and types of measures (e.g., means, medians, proportions), were able to sufficiently support their answers with statistical reasoning and evidence.

Candidates need to be familiar with a range of statistical graphs, outputs, and other data-based visualisations, including tables. Beyond the information provided in the question related to these statistical representations, candidates need to spend time familiarising themselves with the labels and scales provided (e.g., the *y*-axis) and any legends or annotations and considering the nature of the data used. As in previous years, successful candidates demonstrated strong skills with calculations, particularly those associated with probability distributions. However, these candidates also demonstrated understanding of important modelling ideas which were informed by contextual considerations.

Part B: Report on performance standard

Candidates who were awarded Scholarship with **Outstanding Performance** commonly:

- justified their reasoning with numerical evidence and integrated contextual thinking
- communicated using correct statistical vocabulary that was linked to the situation or analysis presented
- demonstrated understanding of the structure of statistical models, and could discuss what might influence the models
- considered all five phases of the PPDAC statistical enquiry cycle when describing a potential investigation, clearly knowledge about how to pose a specific problem and how to plan data collection

- recognised the need for a confidence interval or comparison-based calculation in certain situations.

Candidates who were awarded **Scholarship** commonly:

- used specific numerical evidence with appropriate units to support their statistical reasoning
- identified and described key features of data visualisations, with consideration of the nature of the data
- demonstrated understanding of the conceptual differences between bootstrapping and randomisation, and were able to interpret and communicate with related statistical output
- indicated they had experience with applying experimental design principles to carry out experiments and analyse data
- communicated sound ideas about sources of bias, and how sources of bias were linked to conclusions involving generalising to populations.

Other candidates

Candidates who were **not** awarded Scholarship commonly:

- did not use numerical evidence when discussing key features of data visualisations
- confused statistical measures and parameters such as the mean and median, both between and within questions
- incorrectly interpreted, or failed to use, the values provided for correlation as part of their response
- thought that a sample size of 1000 for a national survey was too small
- did not discuss which comparison approach to take for different types of data (e.g., gradient, percentage increase, relative rates)
- struggled to represent written statements using tree diagrams or two-way tables
- did not identify that a situation required conditional probability calculations
- did not adequately describe, in context, how to carry out an investigation using the different phases of the PPDAC statistical enquiry cycle
- could not link the key features of time series data to the appropriateness of different statistical models for forecasts.

Subject page

Previous years' reports

2020 (PDF, 197KB)

2019 (PDF, 171KB)

2018 (PDF, 95KB)

2017 (PDF, 44KB)

2016 (PDF, 197KB)
