

## Assessment Report

# New Zealand Scholarship Statistics 2023

## Performance Standard 93201

### General commentary

Candidates must 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.

The examination included four questions, of which candidates were required to respond to all four. The questions covered the requirements of the 2023 assessment specifications which were that: questions would use real-life contexts; be set in the areas of statistics investigations, statistical literacy, and probability; cover content from more than one area; and have an emphasis on data analysis and interpretation. Data was presented in a variety of ways, using familiar and unfamiliar representations, and candidates were required to interpret features of the data in context. Each of the questions required an integration of statistical concepts, rather than standalone topics.

Candidates who were familiar with carrying out different types of investigations using a range of data and methods performed well. However, candidates need to demonstrate confidence in identifying potential limitations of different statistical investigation methods in context. This was particularly evident in Question Three (b) which required candidates to discuss the main differences between using an observational study or an experiment. Most candidates were able to identify that a causal claim could not be made with an observational study; however, most did not discuss the limitations of these claims or the extension of results from observational studies.

Successful candidates exhibited familiarity with a range of statistical graphs, outputs, and other data-based visualisations, and integrated contextual knowledge into their responses appropriately. They demonstrated strong skills with calculations associated with probability distributions and an understanding of important modelling ideas, which were informed by contextual considerations. Most successful candidates were able to demonstrate proficiency when discussing the differences between measures of central tendency; however, responses to Question Three (a)(ii) revealed a lack of understanding of standard deviation.

### Report on performance standard

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

- made insightful connections to context and across different data displays
- exhibited an in-depth understanding of central tendency and spread
- demonstrated the ability to identify appropriate parameters for various statistical models
- applied statistical models in context with a high degree of accuracy
- were familiar with the key aspects of experimental design and observational studies
- considered the limitations of the findings from both experiments and observational studies in a specific context
- identified the use of different sampling strategies
- reflected on the nature of the data and the appropriateness of the sampling methods used in its collection.

Candidates who were awarded **Scholarship** commonly:

- interpreted information from various data displays and test outputs
- evidenced comments and comparisons numerically
- created appropriate confidence intervals from correct margin of error calculations
- selected appropriate statistical models for analysis
- demonstrated an understanding of central tendency
- used tail proportions to make a causal claim, rather than just using the sample statistic
- used confidence intervals to make an inference about a population, rather than just using the sample statistic
- demonstrated understanding of the conceptual differences between bootstrapping and randomisation
- recognised the inability of observational studies to make a causal claim
- demonstrated understanding of the limitations of various sampling methods in a specific context.

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

- did not read graphs or questions carefully
- did not provide numeric evidence when making comments and comparisons about data
- showed weak understanding of measures of central tendency
- did not show understanding of spread, both deviation and standard deviation
- demonstrated a lack of understanding of key experimental and observational design principles
- did not identify appropriate statistical models or parameters for a specific context
- showed difficulty in identifying sampling strategies and associated issues with the strategies in context.