

## Assessment Report

# New Zealand Scholarship Statistics 2017

### Standard 93201

#### Part A: Commentary

Most candidates made reasonable attempts in each question. Candidates forgot in many cases to start questions on a new page. Also, the standard of writing was poor in many cases which made it difficult to read candidates' answers. Some candidates resorted to writing in the margins when there were still plenty of blank pages to write on.

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#### Part B: Report on performance standard

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

- suggested and explained the effect other variables might have on data, describing the expected relationship
- formed a conclusion from bootstrap inference results, including interpreting the difference between means, a confidence interval, and whether there was sufficient evidence of a difference between the means of the two groups
- connected the percentage and the annual mean number of crashes in 2(b). Hence, they were able to calculate the average mean number of fatal road crashes that didn't involve alcohol as a factor
- calculated seasonality for Tuesdays in 2(d) realising that seasonal component can be related to days of the week
- calculated conditional probabilities, proved statistical independence, and determined relative risk
- discussed assumptions of different models
- recognised the mix of binomial and normal probabilities in the one question
- provided detailed descriptions and demonstrated understanding of experimental design features
- described and showed understanding of the randomisation test for experiments in their descriptions
- understood sampling variability, margin of error and how confidence intervals are constructed and interpreted
- described the meaning of "statistical significance"
- worked out the conditional probability correctly in Q5 (b) (iii).

Candidates who were awarded **Scholarship** commonly:

- interpreted a scatter graph in detail (association, strength, direction and scatter), and were able to recognise and describe subgroups. They included the key word of linear in their descriptions
- interpolated or extrapolate and also round their predictions appropriately
- included the mean in their description of confidence intervals
- made relevant statistical points from the time series graphs
- interpreted and described statistical reports, including graphs

- explained how the given information affected the trend and supply further information in Q2 (c)
- converted word problems into either two-way tables or tree diagrams
- knew how to test for statistical independence
- confirmed the normality of the data in Q3 beyond just calculating the mean and standard deviation
- understood the design characteristics in Q4 and were able to answer (a) to (d) correctly
- showed some understanding of randomisation test for experiments but were unable to describe fully enough
- interpreted the graphs correctly in Q5 and provided the required observations and comparisons
- recognised that conditional probability was involved in Q5 (b) and worked out the correct answer
- got Q5 (b) (iii) partly correct. Not many used the 18% or the 83%. Common error was to assume equal proportion of men and women and so produce 0.775 as a denominator.

Other candidates

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

- were unable to interpret a scatter graph (association, strength and direction) fully enough
- were unable to form a conclusion from the bootstrap inference results and conclude whether there was sufficient evidence of a difference between the means of the two groups
- were unable to extract a variety of observations from time series graphs
- were unable to recognise which probability distribution was applicable in solving a probability problem
- were unable to interpret or describe statistical reports fully enough, including graphs
- were unable to correctly convert word problems into either two-way tables or tree diagrams
- had difficulty in describing their assumptions and were satisfied in many instances with giving a vague answer with no context
- did not know or were unable to describe completely experimental design features. Their explanations were too brief and non-specific in many instances
- did not recognise the randomisation test for experiments and when it should be applied
- did not answer as the question was posed in Q5. They made statements about percentages but did not give the meaning of these numbers. In (iii) many answers lacked details on exactly how the graph was going to be constructed with no explanation
- had no idea of “sampling variability” or “margin of error”.

### Performance standard specific comment

The overall distribution of marks for each question was as follows:

Question	Percentage in Range		
	0 to 4	5 to 6	7 to 8
1	41.3	40.0	18.7
2	76.0	20.0	4.0
3	44.9	31.9	23.2
4	37.9	34.4	27.7
5	71.1	22.9	6.0

The most well-done questions were Q1, Q3 and Q4 where 59%, 55% and 62% of candidates respectively achieved scholarship standard. In Q3 and Q4, 23% and 28% of candidates respectively achieved outstanding standard. The most difficult question was Q2 where only 24% achieved scholarship standard.

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