

# 1

91037



NEW ZEALAND QUALIFICATIONS AUTHORITY  
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## Level 1 Mathematics and Statistics, 2018

### 91037 Demonstrate understanding of chance and data

9.30 a.m. Tuesday 20 November 2018  
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of chance and data.	Demonstrate understanding of chance and data, justifying statements and findings.	Demonstrate understanding of chance and data, showing statistical insight.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

**You should attempt ALL the questions in this booklet.**

Show ALL working.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–16 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

**TOTAL**

ASSESSOR'S USE ONLY

## ELECTRICITY



<https://martherev.wordpress.com/2011/09/05/pylons-i-have-known/>

## QUESTION ONE

- (a) When the supply of electricity stops, there is a power outage.

The table below shows:

- the number of power outages during 2015 in the North Island together with the identified cause of each power outage
- the number of power outages during 2015 in the South Island together with the identified cause of each power outage.

	Cause				Totals
	Weather	Animals	Vehicle accident	Other	
<b>North Island</b>	18	5	14	7	44
<b>South Island</b>	10	2	3	5	20
<b>Totals</b>	28	7	17	12	64

- (i) What was the probability that the weather caused a power outage in either the North Island or the South Island in 2015?

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- (ii) There was a power outage in the South Island in 2015.

What was the probability this was **not** caused by a vehicle accident?

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USE ONLY









- (ii) State whether the North Island or the South Island has the greatest variation in the number of changes per month?

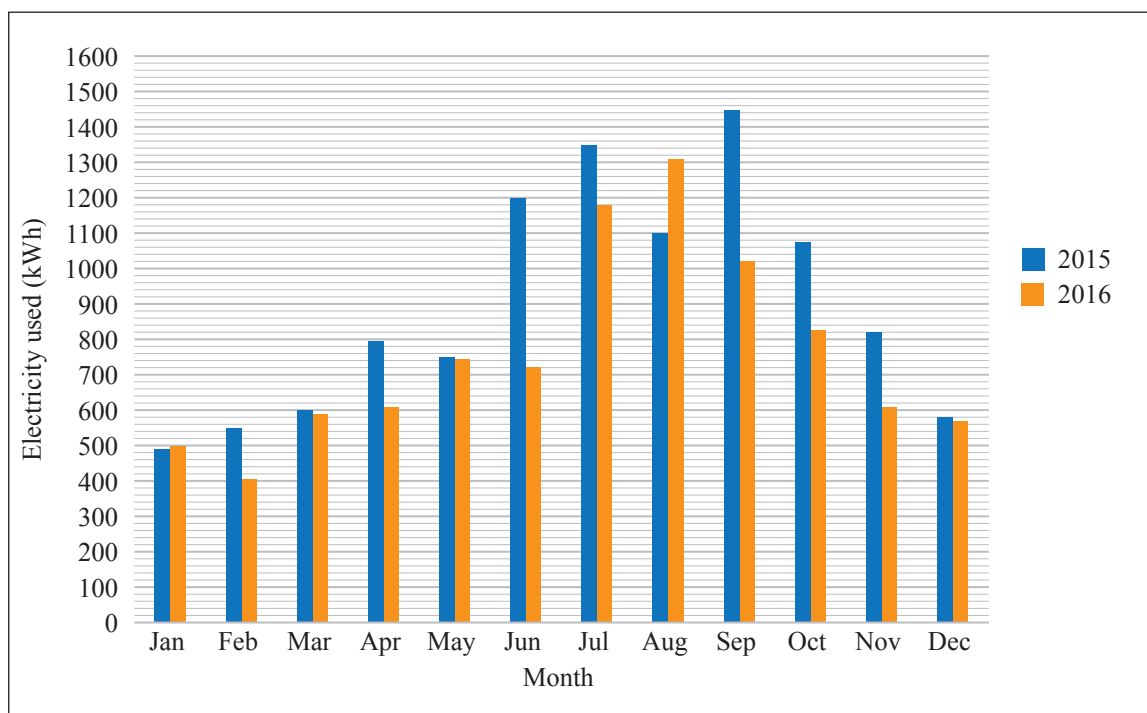
*Give statistical reasons for your answer.*

**QUESTION THREE**

- (a) Nicole's electricity provider created the graph below of her electricity use from January to December for 2015 and 2016.

The electricity used is measured in kilowatt hours (kWh).

**Nicole's electricity use – monthly**



- (i) Did Nicole tend to use less electricity in 2015 or 2016?

*Justify your answer with statistical reasoning.*

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- (ii) Approximately how much electricity (kWh) would you have expected Nicole to use in July 2017, based on her usage in the previous two years?

*Justify your answer with statistical reasoning.*

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- (iii) Comment on any other trends or features evident in this display of Nicole’s electricity use.

*Explain what may have caused these trends or features.*

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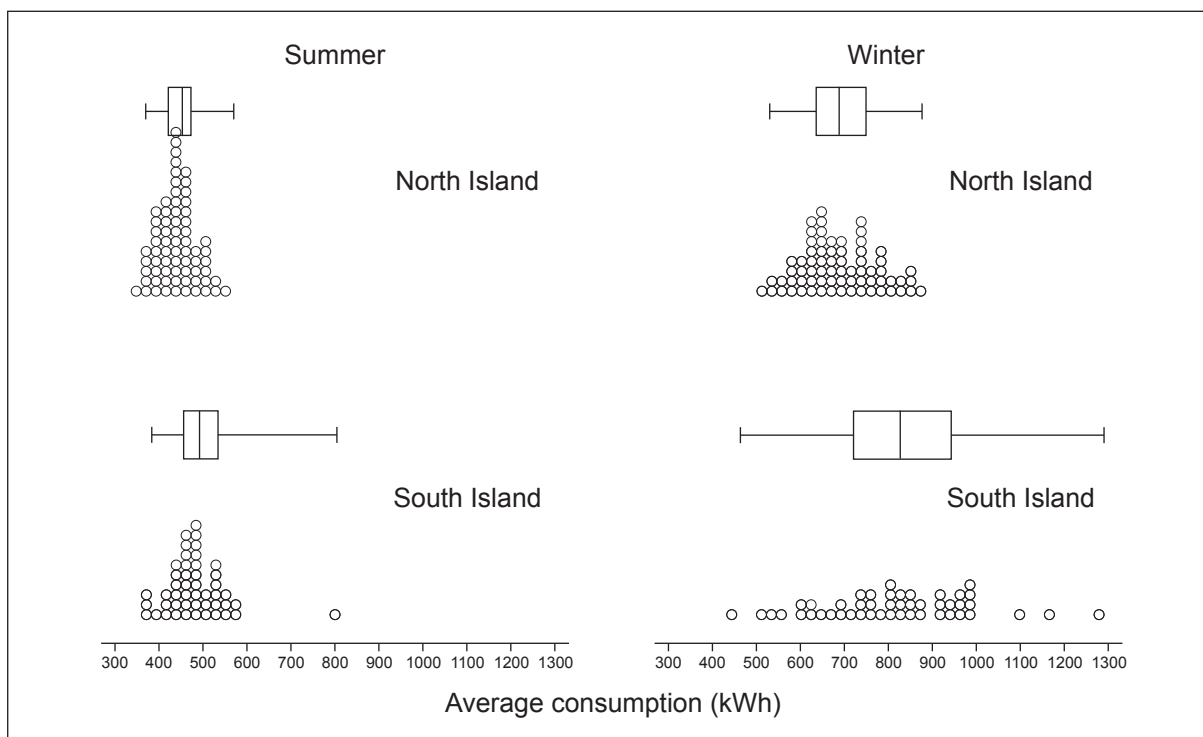
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- (b) The graphs below show the average electricity consumption (in kWh) of a sample of electricity regions in the North Island compared to a sample of electricity regions in the South Island, in summer (December, January and February) and winter (June, July and August).

### Comparison of energy consumption



- (i) In which season (summer or winter), is energy consumption for electricity regions more consistent in the North Island and South Island?

*Justify your answer with statistical reasoning.*

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