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91037M



910375



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

SUPERVISOR'S USE ONLY

Te Pāngarau me te Tauanga, Kaupae 1, 2018

91037M Te whakaatu māramatanga ki te tūponotanga, raraunga hoki

9.30 i te ata Rātū 20 Whiringa-ā-rangi 2018
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki te tūponotanga, raraunga hoki.	Te whakaatu māramatanga ki te tūponotanga, raraunga hoki me te parahau i ngā kīanga me ngā kitenga.	Te whakaatu māramatanga ki te tūponotanga, raraunga hoki me te whakaatu i te matatau ki te tauanga.

Tirohia mēnā e rite ana te Tau Ākonga ā-Motu (NSN) kei runga i tō puka whakauru ki te tau kei runga i tēnei whārangi.

Me whakamātau koe i ngā tūmahi KATOA kei roto i tēnei pukapuka.

Whakaaturia ngā mahinga KATOA.

Mēnā ka hiahia whārangi atu anō koe mō ō tuhinga, whakamahia te (ngā) whārangi wātea kei muri o tēnei pukapuka, ka āta tohu ai i te tau tūmahi.

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–31 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

ME HOATU RAWA KOE I TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

MĀ TE KAIMĀKA ANAKE

HIKO



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

TŪMAHI TUATAHI

(a) Ina weto whānui ana te ratonga hiko, he kotinga hiko tērā.

E whakaatu ana te ripanga i raro:

- te maha o ngā kotinga hiko i te tau 2015 i Te Ika-a-Māui me te pūtake i tautohua o ia kotinga hiko
- te maha o ngā kotinga hiko i te tau 2015 i Te Waipounamu me te pūtake i tautohua o ia kotinga hiko.

	Pūtake				Tapeke
	Huarere	Ngā kararehe	Aituā waka	Tētahi atu	
Te Ika-a-Māui	18	5	14	7	44
Te Waipounamu	10	2	3	5	20
Tapeke	28	7	17	12	64

(i) He aha te tūponotanga ko te huarere te pūtake o te kotinga i Te Ika-a-Māui me Te Waipounamu i te tau 2015?

(ii) He kotinga hiko i Te Waipounamu i te tau 2015.

He aha te tūponotanga **ehara** ko te aituā waka te pūtake o tēnei?

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	
North Island	18	5	14	7	44
South Island	10	2	3	5	20
Totals	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?

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

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

- (b) 75% o ngā kāinga kei runga i te ratonga hiko ā-motu o Aotearoa kei Te Ika-a-Māui. Ko te toenga atu kei Te Waipounamu.

Ka whakamahi hiko te 70% o ngā kāinga i Te Ika-a-Māui me te 80% o ngā kāinga o Te Waipounamu hei whakamahana.

- (i) Tātaihia te tūponotanga o tētahi kāinga i kōwhiri matapōkeretia mai i Aotearoa whānui kei te hono ki te ratonga hiko ā-motu i Te Ika-a-Māui ME te whakamahi hiko hei whakamahana.

Āta whakaaturia ō mahinga.

- (ii) 1 500 000 ngā kāinga puta noa i Aotearoa (i Te Ika-a-Māui me Te Waipounamu).

Tātaihia e **hia** ngā kāinga kei te ratonga hiko ā-motu i Te Waipounamu **kāore** i te whakamahi hiko hei whakamahana.

Āta whakaaturia ō mahinga.

- (b) 75% of homes on the national power supply in New Zealand are in the North Island. The rest are in the South Island.

70% of homes in the North Island and 80% of homes in the South Island use electricity for their heating.

- (i) Calculate the probability that a home selected randomly across New Zealand is on the national power supply in the North Island AND uses electricity for heating.

Show your working clearly.

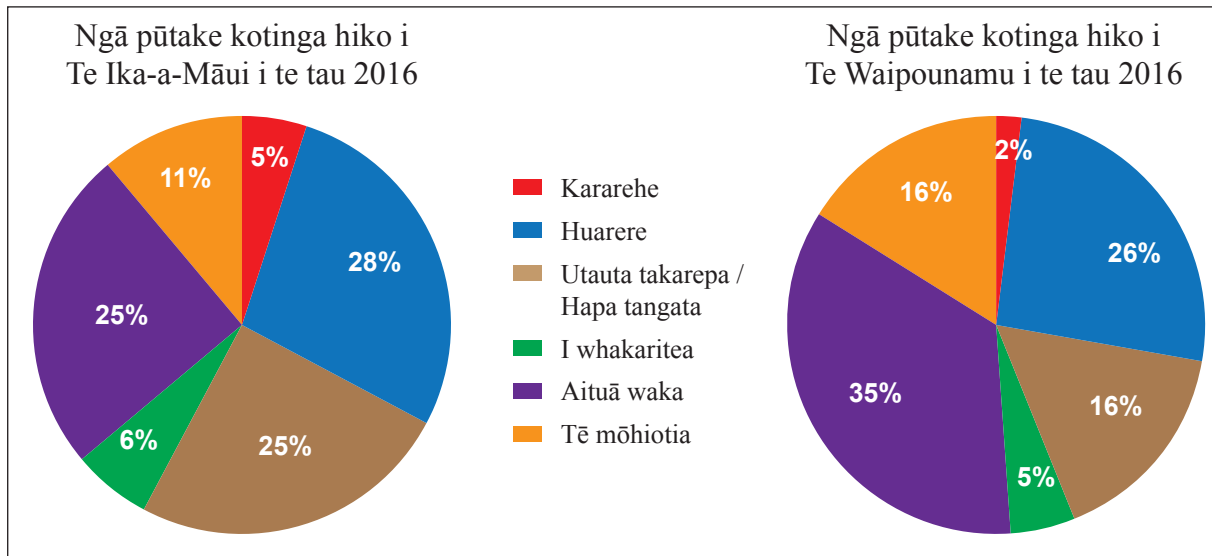
- (ii) There are 1 500 000 homes across New Zealand (both in the North Island and the South Island).

Calculate **how many** of the homes on the national power supply in the South Island **do not** use electricity for heating.

Show your working clearly.

(c) Ka taea ngā pūtake o ngā kotinga hiko te whakaatu ā-kauwhata.

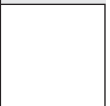
Mō ia motu, kei raro tētahi kauwhata e whakaatu ana i te ōrautanga o ngā kotinga hiko i te tau 2016 mō ia pūtake.



Nā ngā kauwhata porohita i puta ai te whakapae, “I Te Ika-a-Māui me Te Waipounamu, neke atu i te haurua o ngā kotinga hiko i ahu mai i ngā aituā waka, huarere rānei.”

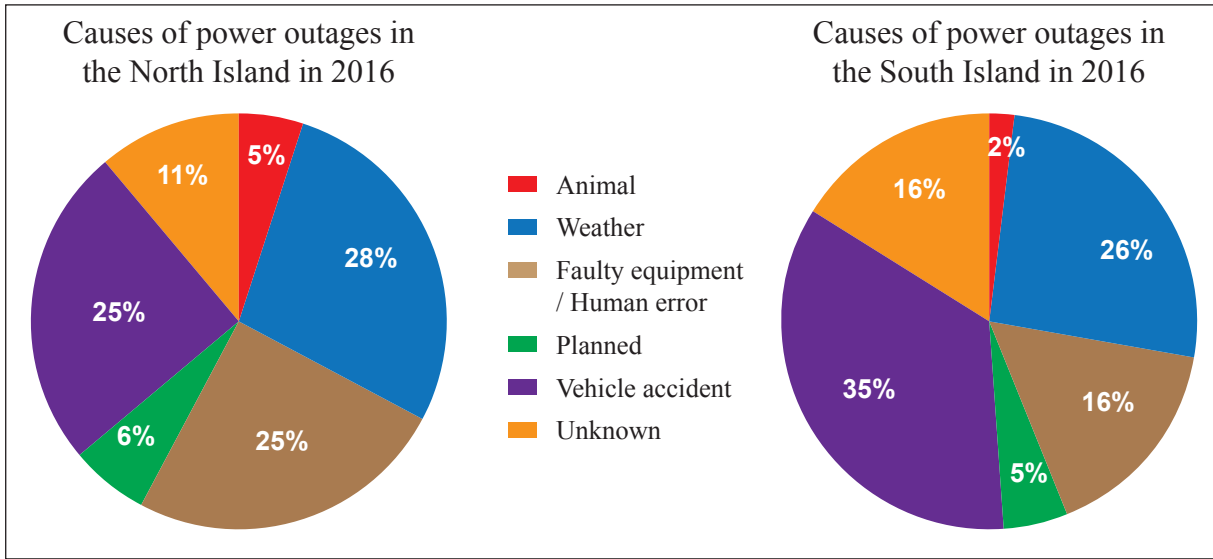
Whakamāramahia mai mēnā kei te tika tēnei whakapae mō ia tau.

Whakamahia te whakaaro whitake o te tauanga hei parahau i tāu tuinga.



(c) The causes of power outages can also be shown graphically.

For each island, there is a graph below showing the percentage of power outages in **2016** for each of the causes.



The pie graphs lead to a claim that, “In both the North Island and the South Island, vehicle accidents or weather are the cause of over half of the power outages”.

Explain whether this claim will be true for every year.

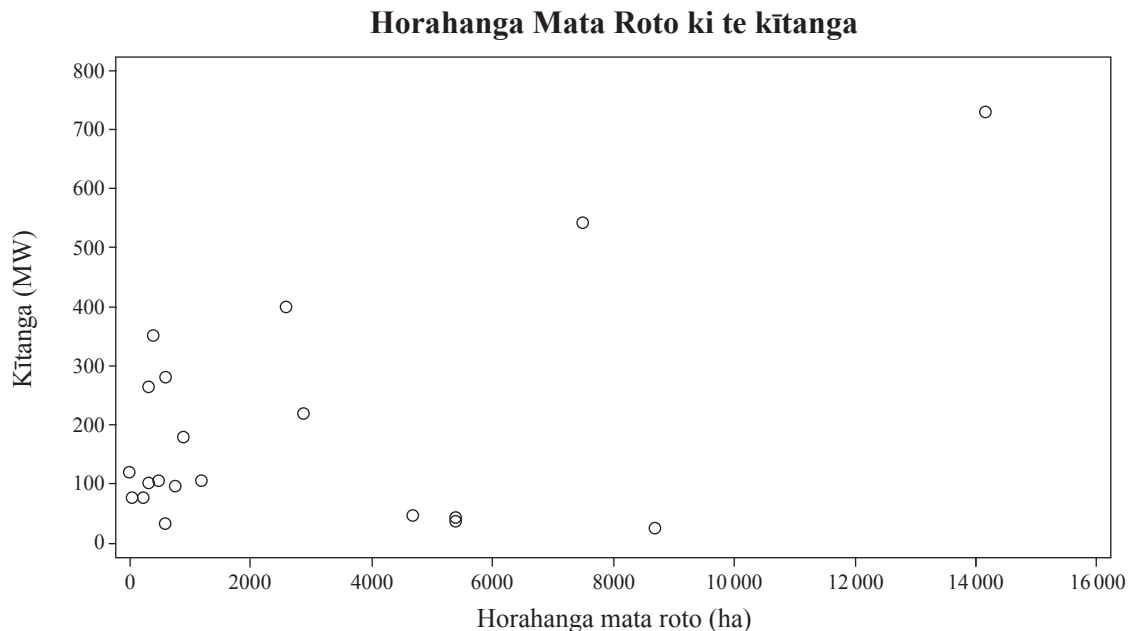
Justify your answer with statistical reasoning.

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TŪMAHI TUARUA

(a) Ka whakamahia ētahi roto i Aotearoa ki te mahi hiko.

I tuhia, i whakaaturia hoki i raro tētahi tīpakonga o ēnei roto ko te horahanga mata hei ha (heketea), me te kītanga ki te whakanao hiko e inea ana ki te MW (mekawata).



- (i) Ki te kauwhata i runga, porohitatia te pūwāhi **tika rawa** e tohu ana i tētahi roto e whakanao ana i ngā hiko iti nei engari he tino nui te horahanga mata.
- (ii) Tuhia te rahinga **tauwaenga** āwhiwhi o ngā hiko (ki te MW) e whakanaohia ana e ēnei roto i Aotearoa.

Āta whakaaturia mai i pēhea tō whakarite i tō otinga.

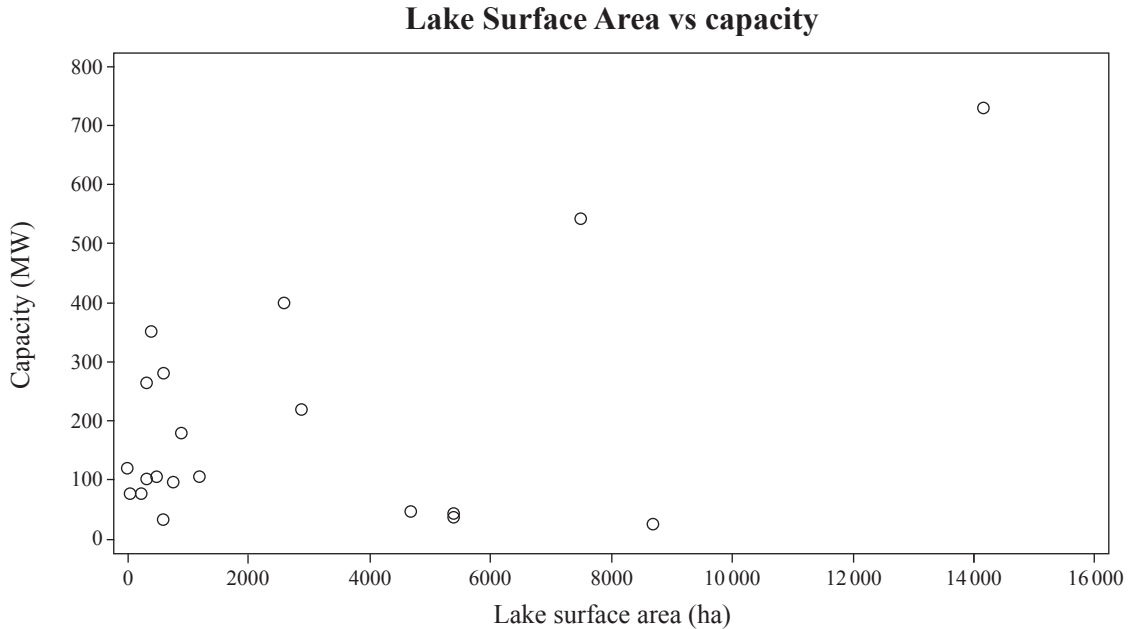
- (iii) He pēhea te whaitake o te whakamahi i te horahanga mata o tētahi roto ki te matapae i te rahinga whakanao hiko ka taea mai i ngā roto o Aotearoa?

Kia mārama te parahau i ō whakaaro.

QUESTION TWO

(a) Some lakes in New Zealand are used to produce electricity.

A sample of these lakes had their surface area in ha (hectares) and their capacity to generate electricity, measured in MW (megawatts), recorded and displayed below.



(i) On the graph above, circle the **most appropriate** point which indicates a lake which produces a small amount of electricity but has a large surface area.

(ii) State the approximate **median** amount of electricity (in MW) produced by these lakes in New Zealand.

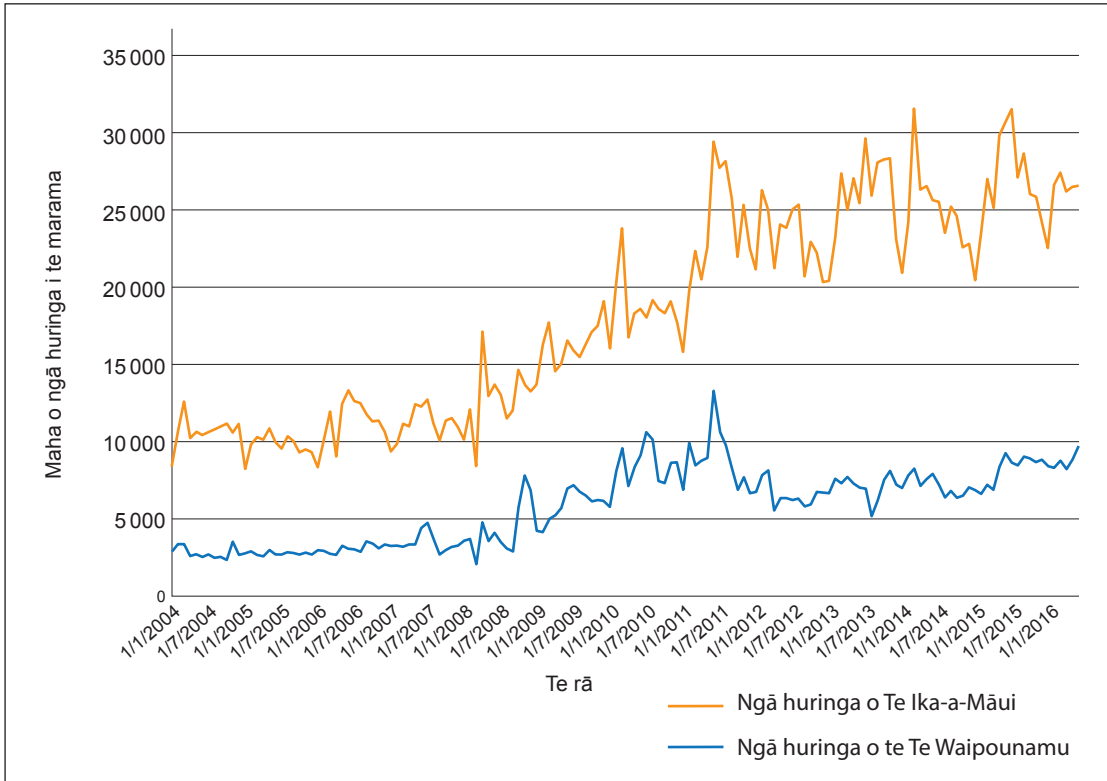
Show how you reached your answer clearly.

- (iii) How useful is it to use the surface area of a lake to predict the potential electricity generation of lakes in New Zealand?

Justify your reasoning clearly.

- (b) Ka taea anō e ngā kaiwhakamahi hiko te huri kaiwhakarato hiko e iti ake ai te utu ki a rātau. E whakaatu ana te kauwhata i raro i te maha o ngā huringa a ngā kaiwhakamahi hiko i te marama i Te Ika-a-Māui me Te Waipounamu mai i te tīmatanga o te tau 2004 ki te tīmatanga o te tau 2016.

Ngā ia o ngā huringa kaiwhakarato hiko



- (i) Āta whakamāramahia ngā āhuatanga hira o tēnei kauwhata, me te kōrero mō ngā wāhanga wā, mō Te Ika-a-Māui me Te Waipounamu rānei mēnā e tika ana.

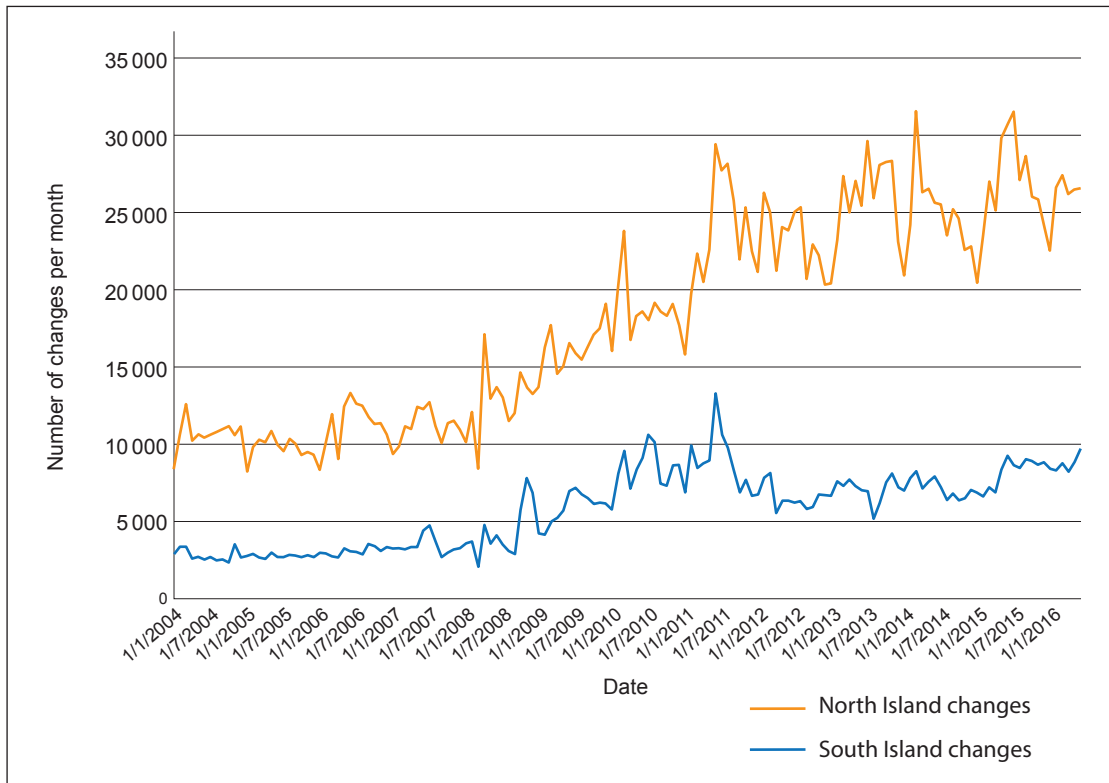
- (ii) Tuhia mēnā kei te Te Ika-a-Māui, Te Waipounamu rānei te taurangitanga nui rawa o ngā huringa i te marama?

Homai ngā take tauanga e hāngai ana ki tō tuhinga.

- (b) It is possible for electricity users to change electricity providers to get a cheaper deal.

The graph below shows the number of changes made by electricity users per month in the North Island and South Island from the start of 2004 to the start of 2016.

Trends in electricity provider changes



- (i) Clearly describe the significant features of this graph, making reference to time periods, or to the North and South Islands if necessary.

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

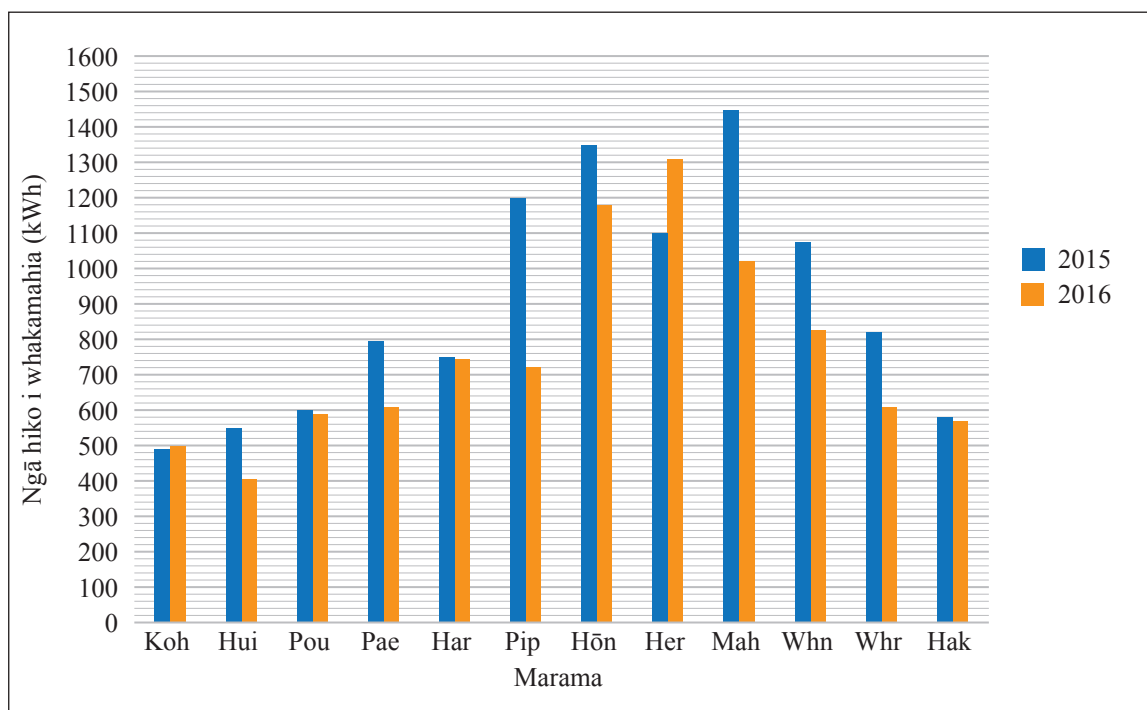
Give statistical reasons for your answer.

TŪMAHI TUATORU

- (a) I mahia e te kaiwhakarato hiko a Nicole te kauwhata i raro o tana whakamahinga hiko mai i te Kohitātea ki te Hakihea mō te tau 2015 me te tau 2016.

Kua inea te hiko kua whakamahia ki ngā haora kirowata (kWh).

Te whakamahinga hiko a Nicole – ā-marama



- (i) Ko te tikanga, i iti ake te whakamahi hiko a Nicole i te tau 2015, 2016 rānei?

Whakamahia te whakaaro whaitake o te tauanga hei parahau i tāu tuhinga.

- (ii) E hia ki ō whakaaro te whakamahinga hiko (kWh) āwhiwhi a Nicole i te Hōngongoi 2017, e ai ki ana whakamahinga hiko i ngā tau e rua kua hipa?

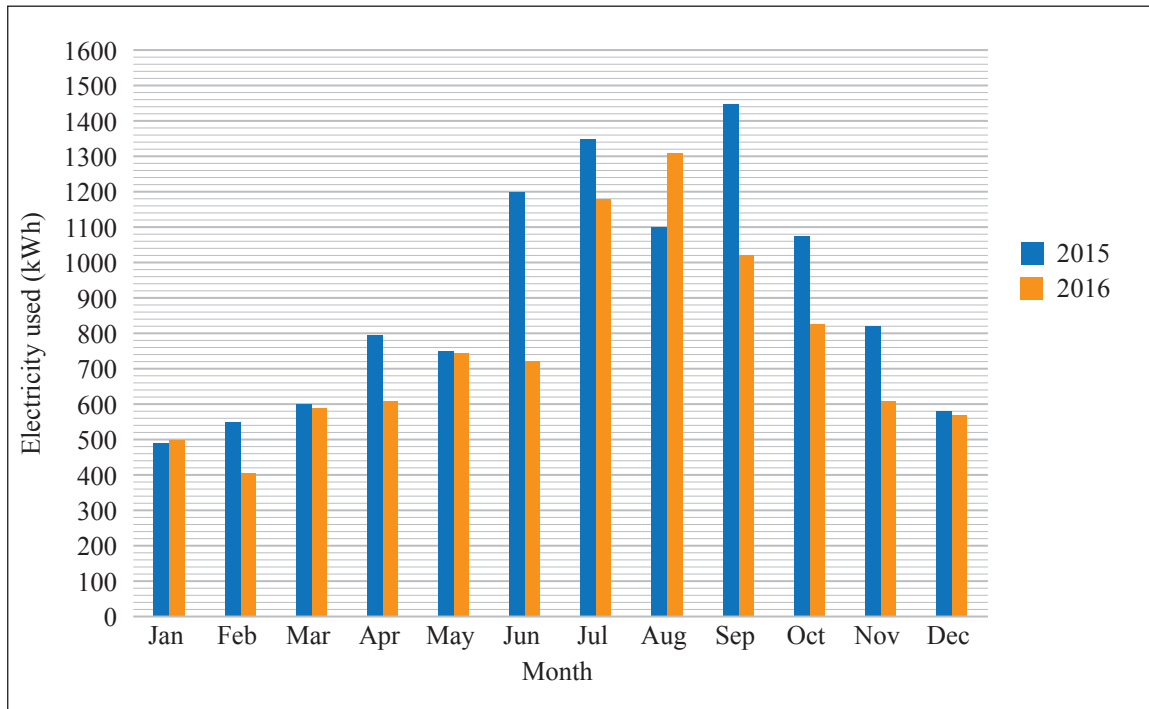
Whakamahia te whakaaro whaitake o te tauanga hei parahau i tō tuhinga.

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.

- (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?

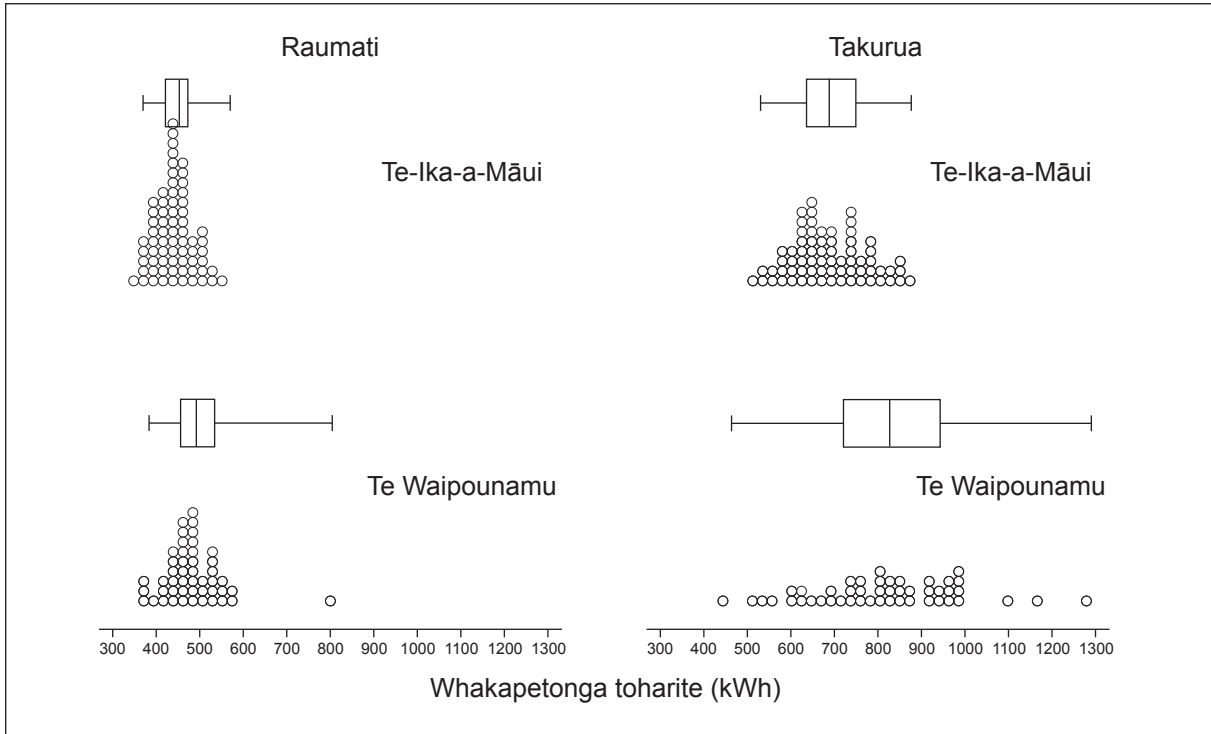
Justify your answer with statistical reasoning.

- (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.

- (b) E whakaatu ana ngā kauwhata i raro i te whakapetonga hiko toharite (ki te kWh) o tētahi tīpakonga o ngā rohe hiko i Te Ika-ā-Māui e whakatauritea ana ki tētahi tīpakonga o ngā rohe hiko o Te Waipounamu, i te raumati (Hakihea, Kohitātea, Huitanguru hoki) me te takurua (Pipiri, Hōngongoi, Hereturikōkā hoki).

Whakatauritenga o ngā whakapetonga hiko



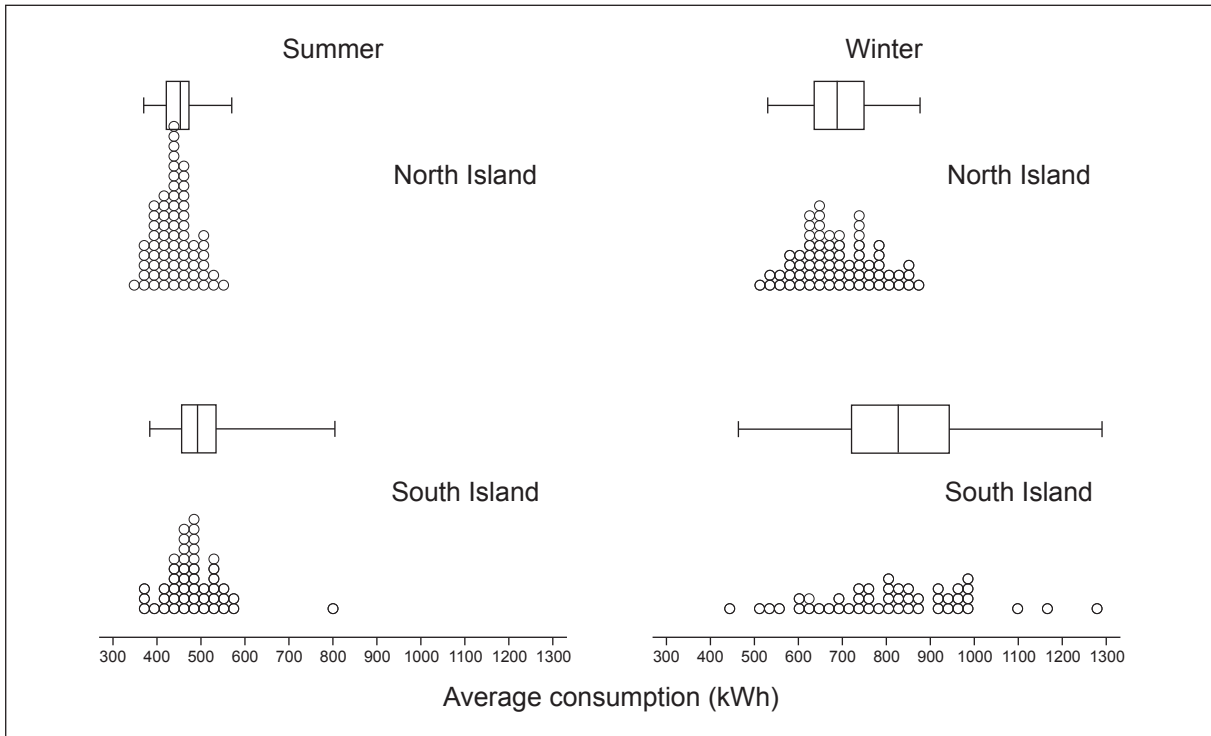
- (i) Kei tēhea wāhanga (raumati, takurua rānei) e ōrite ake ana te whakapetonga hiko o ngā rohe hiko i Te Ika-a-Māui me Te Waipounamu?

Whakamahia te whakaaro whaitake o te tauanga hei parahau i tō tuhinga.

- (ii) Āta whakaahuahia mai ngā āhuatanga nui o te tuaritanga o ngā whakapetonga hiko mō ngā rohe hiko i Te Ika-a-Māui ina whakatauritea ki ngā rohe hiko i Te Waipounamu i te **takurua**.

- (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.

- (ii) Clearly describe any significant features in the distribution of energy consumption for electricity regions in the North Island compared to electricity regions in the South Island in the **winter**.

English translation of the wording on the front cover

Level 1 Mathematics and Statistics, 2018

91037 Demonstrate understanding of chance and data

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

91037M

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 2–31 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.