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91585M



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 (Tauanga), Kaupae 3, 2019

91585M Te whakahāngai ariā tūponotanga hei whakaoti rapanga

9.30 i te ata Rāpare 28 Whiringa-ā-rangi 2019
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakahāngai ariā tūponotanga hei whakaoti rapanga.	Te whakahāngai ariā tūponotanga mā te whakaaro whaipānga hei whakaoti rapanga.	Te whakahāngai ariā tūponotanga mā te whakaaro waitara hōhonu hei whakaoti rapanga.

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.

Tuhia ō mahinga KATOA.

Tirohia mēnā kei a koe te Pukapuka Tikanga Tātai me ngā Tūtohi L3–STATMF.

Mēnā ka hiahia whārangi atu anō koe mō ō tuinga, whakamahia 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 2–21 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

TŪMAHI TUATAHI

E whakarāpopotohia ana i raro ko ngā raraunga o te rārangi ingoa ā-kura mō tētahi kura tuatahi porowini nō Aotearoa (Tau 0 ki te 8) mā te tau me te ira tangata (i te 1 o Hōngongoi 2018):

- E 343 ngā ākonga.
- O ngā ākonga kōtiro 149, e 31 kei te Wāhanga Paku (Tau 0, 1 me te 2), e 65 kei te Wāhanga Takawenga (Years 3, 4 me te 5), ā, e 53 kei te Wāhanga Pakeke o te kura (Tau 6, 7 me te 8).
- O ngā ākonga tāne, e 49 kei te Wāhanga Paku (Tau 0, 1 me te 2), e 73 kei te Wāhanga Takawenga (Tau 3, 4 me te 5), ā, ko te toenga kei te Wāhanga Pakeke o te kura (Tau 6, 7 me te 8).

Me kī, ka tīpakohia matapōkeretia tētahi o ēnei ākonga.

- (a) (i) I te mea kei te Wāhanga Takawenga te ākonga, tātaihia te tūponotanga he tāne ia.

- (ii) He nui ake te tūponotanga he tāne te ākonga mēnā kei te Wāhanga Paku ia, kei te Wāhanga Pakeke rānei ia?

Tautokona tō tuhinga mā ngā tātaitanga.

QUESTION ONE

The school roll data for a provincial New Zealand primary school (Years 0 to 8) by year and gender (as at 1 July 2018) is summarised below:

- There are 343 students.
- Of the 149 female students, 31 are in the Junior School (Years 0, 1, and 2), 65 are in the Middle School (Years 3, 4, and 5), and 53 are in the Senior School (Years 6, 7, and 8).
- Of the male students, 49 are in the Junior School (Years 0, 1, and 2), 73 are in the Middle School (Years 3, 4, and 5), and the remainder are in the Senior School (Years 6, 7, and 8).

Suppose one of these students is chosen at random.

- (a) (i) Given that the student is in the Middle School, calculate the probability that they are male.

- (ii) Is it more likely for the student to be male if they are in the Junior School or if they are in the Senior School?

Support your answer with calculations.

- (iii) Whakamahia ai e te tumuaki ēnei raraunga hei matapae ko tētahi ākonga hou ka whakauru mai ki te kura he tāne.

Tātaihia tētahi ōwehenga mā te whakamahi i ēnei raraunga e tautoko ana i te matapae a te tumuaki.

- (iv) Homai kia RUA ngā pūtake me tūpato te whakamahi i ēnei raraunga hei matapae ko tētahi ākonga hou ka whakauru mai ki te kura he tāne.

Pūtake 1: _____

Pūtake 2: _____

- (iii) The principal has used this data to predict that a new student enrolling at the school will be male.

Calculate a proportion using this data that supports the principal's prediction.

- (iv) Give TWO reasons why care should be taken when using this data to predict that a new student enrolling at the school will be male.

Reason 1: _____

Reason 2: _____

- (b) Ko te whakaaro noa he 50% o ngā ākongā kura tuatahi he tāne. Ko te whakaaro o te tumuaki o te kura tuatahi porowini nō Aotearoa i kōrerotia i te wāhanga (a), mā te whakamahi i tō rātou kura hei tīpakonga o ngā ākongā i te rohe, ko te ōwehenga o ngā ākongā tāne o te rohe he nui ake i te 50%.

Me matapaki ka pēhea te āwhina a tētahi whakataruna i te tumuaki ki te whiriwhiri mēnā ka taea ā rātou ākongā, hei tīpakonga o ngā ākongā mai i te rohe, te whakamahi hei tohu ko te ōwehenga o ngā tāne i te rohe he nui ake pū i te 50%.

Hei aha te hoahoa i te whakataruna.

TŪMAHI TUARUA

E kīia ana te kōrero he pānga tō te ngongoro i te pō ki te mahinga a te ākonga i rō whakamātautau. I kohia ngā raraunga kia kitea mēnā i whiwhi tētahi rōpū ākonga Tau 13 i te Paetae (pai ake rānei), kāore rānei, i tā rātou whakamātautau whakamutunga. I kitea mai i te 123 o ngā mea he ngongoro, 91 i whiwhi i te Paetae (pai ake rānei) i tā rātou whakamātautau whakamutunga, engari mō ngā tāngata 78 kāore e ngongoro, 68 o rātou i whiwhi Paetae (pai ake rānei) i tā rātou whakamātautau whakamutunga.

- (a) (i) Ka tīpakohia matapōkeretia he ākonga mai i te rangahau.

Me kī ko S te takahanga "he ngongoro te ākonga", ā, ko E te takahanga i "whiwhi Paetae (pai ake rānei) te ākonga i tana whakamātautau whakamutunga".

Whakatauritea a $P(E | S)$ me $P(E)$, ka whakamārama he aha te tikanga o tēnei mō te tūhāhā o ngā takahanga S me E .

- (ii) Me whakatau tata he pēhea te whakataurite i te mōrea o te whiwhi i te Kāore i Whiwhi mō te whakamātautau, i waenga i ngā Ākonga Tau 13 he ngongoro me ngā ākonga Tau 13 kāore e ngongoro.

QUESTION TWO

It is suggested that snoring at night has an effect on student performance in examinations. Data was collected on whether or not a group of Year 13 students gained Achievement (or better) in their final examination. It was found that for the 123 snorers, 91 gained Achievement (or better) in their final examination whereas for the 78 non-snorers, 68 gained Achievement (or better) in their final examination.

- (a) (i) A student is randomly selected from those in the study.

Let S be the event “student is a snorer” and let E be the event “student gained Achievement (or better) in their final examination”.

Compare $P(E | S)$ and $P(E)$, and explain what this means for the independence of events S and E .

- (ii) Estimate how the risk of receiving Not Achieved in their examination compares for Year 13 students who snore and Year 13 students who don't snore.

- (iii) Mō ngā ākonga he ngongoro, 32% o rātou he whakaoti i ā rātou mahi kāinga katoa. Mō ngā ākonga kāore e ngongoro, 65% o rātou he whakaoti i ā rātou mahi kāinga katoa. Me kī ka tīpakohia matapōkeretia ētahi ākonga tokotoru mai i tētahi rōpū nui o ngā ākonga Tau 13.

Tātaihia te tūponotanga kāore ngā ākonga Tau 13 katoa e ngongoro, ā, he whakaoti i ā rātou mahi kāinga katoa i ngā wā katoa.

Tautokona tō tuhinga ki ngā tauākī tauanga me ngā whakaaro whaitake tauanga, me te whakauru i tētahi, ētahi whakapae i tukuna.

- (b) (i) E 260 ngā ākonga Tau 11 mai i taua kura kei te mahi i tētahi whakamātautau. 127 o ēnei ākonga Tau 11 e kī ana rātou ‘he ngongoro’ anō rātou.

Ko te whakaaro, ko te mōreatanga o te whiwhi a ēnei ākonga 127 i te Kāore i Whiwhi mō tā rātou whakamātautau he ōrite ki ngā ākonga ngongoro anō o te Tau 13, ā, he ōrite te mōreatanga o te whiwhi i te Kāore i Whiwhi mō ngā ākonga Tau 11 kāore e ngongoro me ngā ākonga Tau 13 kāore e ngongoro, e hia ki ō whakaaro o ngā ākonga 260 Tau 11 ka whiwhi i te Paetae (pai ake rānei)?

- (ii) Tuhia kia RUA ngā kōrero mō te tika o te whakapae i (b)(i) ko te mōrea o te whiwhi a ngā ākonga ngongoro Tau 11 i te Kāore i Whiwhi mō tā rātou whakamātautau he ōrite ki ngā ākonga ngongoro Tau 13.

Kōrero Tuatahi: _____

Kōrero Tuarua: _____

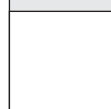
- (b) (i) A group of 260 Year 11 students from the same school is sitting an examination. 127 of these Year 11 students self-classify as 'snorers'.

Assuming these 127 students have the same risk of receiving Not Achieved in their examination as the Year 13 students who are also snorers, and that the risk of receiving Not Achieved is the same for non-snorers in Year 11 and non-snorers in Year 13, how many of the group of 260 Year 11 students would you expect to gain Achievement (or better)?

- (ii) Make TWO comments on the validity of the assumption in (b)(i) that the Year 11 students who snore have the same risk of receiving Not Achieved in their examination as the Year 13 students who also snore.

Comment One: _____

Comment Two: _____



TŪMAHI TUATORU

Ko ngā pae pāpāho pāpori e whakamahia noatia ana e ngā taiohi ko Kapoata (Instagram), Atapaki (Snapchat) me Pukamata (Facebook).

He tā Kapoata (he taupānga tuari whakaahua, ataata hoki) tata ki te 80% o ana kaiwhakamahi nō waho mai o Te Hononga o Amerika (ehara nō te US), ā, he wāhanga tino nui o ana kaiwhakamahi he takiuru mai i ia rā. O ngā kaiwhakamahi ehara nō te US, 47.5% te whakatau tata he takiuru mai i ia rā. O ngā kaiwhakamahi nō te US, 60% he takiuru mai i ia rā.

(a) (i) 1 piriona te whakatau tata o ngā kaiwhakamahi Kapoata puta noa i te ao.

E ai ki a Kapoata 0.8 piriona ana kaiwhakamahi he takiuru mai i ia rā.

E ū ana tēnei whakapae ki ngā mōhiohio kua tukuna?

(ii) Ina ka takiuru mai he kaiwhakamahi i ia rā, ka nui ake te tūponotanga he kaiwhakamahi nō te US, he kaiwhakamahi rānei ehara nō te US?

QUESTION THREE

Three of the social media sites commonly used by young adults are Instagram, Snapchat, and Facebook.

Instagram (a photo and video sharing app) reports that around 80% of its users are from outside the United States of America (non-US), with a large proportion of its users logging in daily. Of the non-US users, it is estimated that 47.5% log in every day. Of the US users, 60% log in every day.

- (a) (i) There are estimated to be 1 billion Instagram users in the world.
Instagram claims that it has 0.8 billion users logging in every day.

Is this claim consistent with the information provided?

- (ii) Given that a user logs in every day, are they more likely to be a US user or non-US user?

- (iii) Ka hangaia he tauira tūponotanga e ai ki ngā mōhiohio kua tukuna. I runga i tēnei tauira, ko te tūponotanga ka takiuru tētahi kaiwhakamahi Kapoata mai i te US i ia rā he 60%.

Matapakitia he aha te take kāore pea i te tika te whakamahi i tēnei tauira ki NGĀ MOMO KATOA o ngā kaiwhakamahi Kapoata nō te US.

- (b) Mēnā ka whakamahia e tētahi taiohi tētahi pae pāpāho pāpori kotahi, ko te tikanga ka whakamahia anō e ia ētahi atu pae.

Mō ētahi rōpū taiohi 300:

- 84 he whakamahi i ēnei pae pāpāho pāpori katoa e toru.
 - 12 kāore e whakamahi ana i tētahi o ēnei pae pāpāho pāpori.
 - 207 he whakamahi i a Atapaki.
 - 195 o ngā kaiwhakamahi Atapaki he whakamahi anō i a Kapoata.
 - 94 o ngā kaiwhakamahi Atapaki he whakamahi anō i a Pukamata.
 - 216 he whakamahi i a Kapoata.
 - 163 he whakamahi i a Pukamata.
- (i) Tātaihia te ōwehenga o ēnei taiohi he whakamahi i a Atapaki me Kapoata engari kaua i a Pukamata.

**Ka haere tonu te Tūmahi
Tuatoru i te whārangi 18.**

- (iii) A probability model is developed based on the information provided. Under this model, the probability that an Instagram user from the US logs in daily is 60%.

Discuss why it might not be appropriate to apply this model to ALL TYPES of US Instagram users.

- (b) If a young adult uses one social media site, they are likely to use the other sites as well.

For a group of 300 young adults:

- 84 use all three of these social media sites.
- 12 use none of these social media sites.
- 207 use Snapchat.
- 195 of the Snapchat users also use Instagram.
- 94 of the Snapchat users also use Facebook.
- 216 use Instagram.
- 163 use Facebook.

- (i) Calculate the proportion of these young adults that use both Snapchat and Instagram, but not Facebook.

**Question Three continues
on page 19.**

- (ii) Ko te whakapae mēnā ka tīpakohia matapōkeretia tētahi kaiwhakamahi pāpāho pāpori mai i te hunga i rangahautia he kaiwhakamahi Kapoata, ka rua whakareanga ake te tūponotanga he kaiwhakamahi Atapaki ia tēnā i te kaiwhakamahi Pukamata.

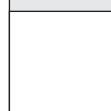
Kei te tika tēnei whakapae?

Tautokona tō tuhinga ki ngā tauākī tauanga e hāngai ana.

- (ii) It is claimed that if a social media user randomly selected from those surveyed is an Instagram user, they are more than twice as likely to also be a Snapchat user than a Facebook user.

Is this claim correct?

Support your answer with appropriate statistical statements.



English translation of the wording on the front cover

Level 3 Mathematics and Statistics (Statistics), 2019

91585 Apply probability concepts in solving problems

9.30 a.m. Thursday 28 November 2019
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Apply probability concepts in solving problems.	Apply probability concepts, using relational thinking, in solving problems.	Apply probability concepts, using extended abstract thinking, in solving problems.

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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.

Make sure that you have the Formulae and Tables Booklet L3–STATMF.

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

Check that this booklet has pages 2–21 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.