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91585M



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

SUPERVISOR'S USE ONLY

Te Pāngarau me te Tauanga (Tauanga), Kaupae 3, 2014

91585M Te whakahāngai ariā tūponotanga hei whakaoti rapanga

9.30 i te ata Rāpare 20 Whiringa-ā-rangi 2014
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 mehemea e ōrite ana te Tau Ākonga ā-Motu (NSN) kei tō pepa whakauru ki te tau kei runga ake nei.

Me whakautu e koe ngā pātai KATOA kei roto i te pukapuka nei.

Whakaaturia ngā mahinga KATOA.

Me mātua riro mai i a koe te pukaiti o ngā Tikanga Tātai me ngā Papatau L3–STATMF.

Ki te hiahia koe ki ētahi atu wāhi hei tuhituhi whakautu, whakamahia te (ngā) whārangi kei muri i te pukapuka nei, ka āta tohu ai i ngā tau pātai.

Tirohia mehemea kei roto nei ngā whārangi 2–15 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

HOATU TE PUKAPUKA NEI KI TE KAIWHAKAHAERE HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

MĀ TE KAIMĀKA ANAKE

PĀTAI TUATAHI

I kitea e tētahi rangahau o ngā wāhine e 2000:

- 1290 he pakeke atu i te 30 tau
 - 116 i te hapū me ngā māhanga
 - 32 i te hapū me ngā māhanga, ā, kāore anō i te 30 tau.
- (a) He aha te ōwehenga o ngā wāhine i roto i te rangahau kāore i te hapū me ngā māhanga engari he pakeke atu i te 30 tau?

- (b) E rua ngā wāhine o te rangahau i tīpakohia matapōkerehia ka mutu i kitea i te hapū rāua me ngā māhanga.

Tātaihia te tūponotanga he pakeke atu hoki ēnei wāhine e rua i te 30 tau.

QUESTION ONE

A study of 2000 pregnant women found:

- 1290 were over 30 years old
- 116 were pregnant with twins
- 32 were pregnant with twins and not over 30 years old.

- (a) What proportion of women in the study were not pregnant with twins but were over 30 years old?

- (b) Two different women from the study were randomly selected and both were found to be pregnant with twins.

Calculate the probability that both these women are also over 30 years old.

- (c) Whakaarohia ngā takahanga ‘i te hapū te wahine me ngā māhanga’, ā, ‘he pakeke atu te wahine hapū i te 30’.

Whakamāramahia mēnā he wehe kē ēnei takahanga.

- (d) He tikanga hauora te whakatōnga i rō ipuipu (I.V.F.) ka whakamahia hei āwhina kia hapū ai.

Mō tēnei rangahau:

- 160 o ngā wāhine hapū i whakamahi I.V.F.
- 24 o ngā wāhine hapū neke atu i te 30 tau, i whakamahi I.V.F. ka mutu i te hapū me ngā māhanga
- 20 o ngā wāhine hapū kāore i te pakeke atu i te 30 tau, i whakamahi I.V.F. ka mutu i te hapū me ngā māhanga
- 102 o ngā wāhine hapū neke atu i te 30 tau, i whakamahi I.V.F. ka mutu kāore i te hapū me ngā māhanga.

Ka tīpakohia matapōkerehia tētahi wahine mai i te taupori rangahau.

Tātaihia te tūponotanga kāore tēnei wahine i te hapū me ngā māhanga, kāore i whakamahi I.V.F, ā, kāore i te pakeke atu i te 30 tau.

- (c) Consider the events ‘a woman is pregnant with twins’ and ‘a pregnant woman is over 30 years old’.

Explain whether these events are independent.

- (d) In-vitro fertilisation (I.V.F.) is a medical technique that is used to aid pregnancy.

For this study:

- 160 of the pregnant women used I.V.F.
- 24 of the pregnant women were over 30 years old, used I.V.F. and were pregnant with twins
- 20 of the pregnant women were not over 30 years old, used I.V.F. and were pregnant with twins
- 102 of the pregnant women were over 30 years old, used I.V.F. and were not pregnant with twins.

A woman is randomly selected from the study population.

Calculate the probability that this woman is not pregnant with twins, did not use I.V.F., and is not over 30 years old.

PĀTAI TUARUA

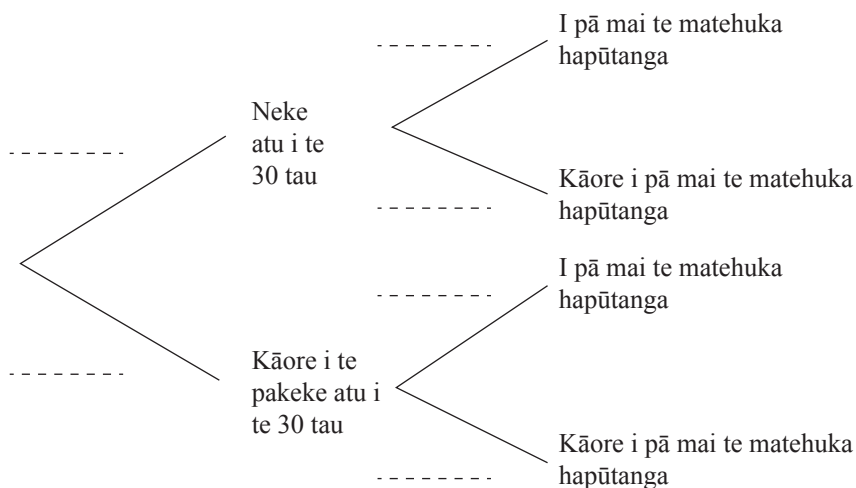
- (a) Ko te matehuka hapūtanga he mate kā pā ki ngā wāhine kāore he hītori matehuka o mua ēngari ka whakaatu i ngā taumata teitei o te huka i te toto i te wā o te hapūtanga.

E whakaatu ana te tūtohi i raro i ngā ōwehenga i ia wāhanga mai i tētahi rangahau mātakitaki o tētahi rōpū wāhine 400.

	Neke atu i te 30 tau	Kāore i te pakeke atu i te 30 tau
I pā mai te matehuka hapūtanga	0.05	0.04
Kāore i pā mai te matehuka hapūtanga	0.415	0.495

- (i) Whakaritea te maha o ngā wāhine i roto i tēnei rangahau i pāngia e te matehuka hapūtanga, he pakeke atu rānei i te 30 tau.

- (ii) Whakamahia ngā mōhiohio i tukuna mai hei tātai i ngā tūponotanga e hiahiatia ana ki te whakaoti i te rākau tūponotanga e whakaaturia ana i raro, me te whakaawhiwhi i ngā tūponotanga ki te 3 mati whaiira.



QUESTION TWO

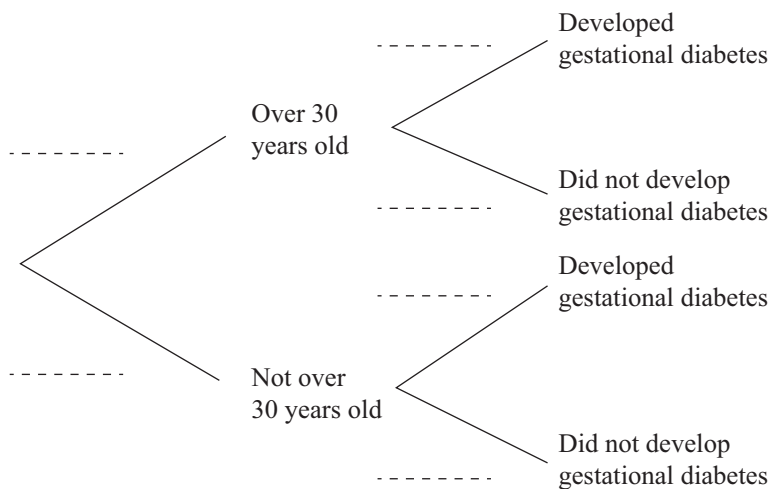
- (a) Gestational diabetes is a condition in which women with no previous history of diabetes show high blood glucose levels during pregnancy.

The table below shows the proportions in each category from an observational study of a group of 400 women.

	Over 30 years old	Not over 30 years old
Developed gestational diabetes	0.05	0.04
Did not develop gestational diabetes	0.415	0.495

- (i) Determine the number of women in this study who developed gestational diabetes or were over 30 years old.

- (ii) Use the information provided to calculate the necessary probabilities to complete the probability tree shown below, rounding probabilities to 3 decimal places.



- (iii) Whakatauritea te mōreareatanga o te pā mai o te matehuka hapūtanga mō tētahi wahine hapū he pakeke atu i te 30 tau ki te mōreareatanga mō tētahi wahine hapū kāore i te pakeke atu i te 30 tau.

- (b) E whakaatu ana ngā kōrero hōhipera he 72.9% o ngā māhanga mātāmua he iti iho te taumaha. I ngā āhuatanga e iti iho ana te taumaha o te māhanga mātāmua, he 90.1% o ngā māhanga mātāmuri he iti iho anō te taumaha. Mō ngā māhanga 12.4%, kāore te māhanga mātāmua me te māhanga mātāmuri i te iti iho te taumaha.

Ka tīpakohia matapōkerehia tētahi tokorua māhanga mai i ngā kōrero hōhipera. Mēnā ka kitea kāore i te iti iho te taumaha o te māhanga mātāmuri, whakatauhia te tūponotanga he iti iho te taumaha o te māhanga mātāmua.

- (iii) Compare the risk of developing gestational diabetes for a pregnant woman who is over 30 years old with the risk for a pregnant woman who is not over 30 years old.

- (b) Hospital records show that 72.9% of the first-born of all twins are underweight. In instances where the first-born twin is underweight, 90.1% of second-born twins are also underweight. For 12.4% of twins, both the first-born and the second-born are not underweight.

A set of twins is selected at random from the hospital records. If the second-born twin is found to be not underweight, determine the probability that the first-born twin is underweight.

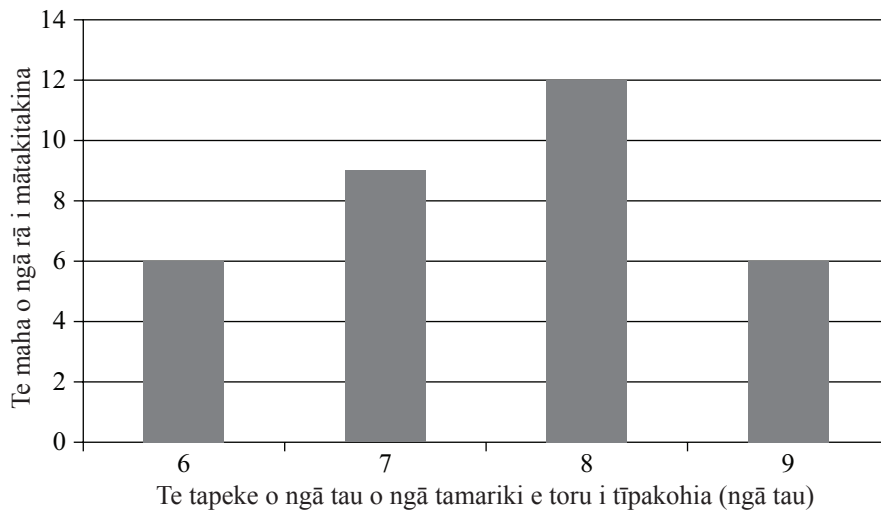
PĀTAI TUATORU

I tētahi kura kōhungahunga, e ono ngā tamariki e rua ngā tau, ā, e whā ngā tamariki e toru ngā tau.

I ia rā mō ngā rā toru tekau, e toru o ēnei tamariki tekau i tīpakohia mō tētahi whakaahua.

E whakapae ana tētahi matua kāore i tīpakohia matapōkerehia ngā tamariki e toru mō te whakaahua o te rā.

E whakaatu ana te kauwhata i raro i te tapeke o ngā tau o ngā tamariki e toru i tīpakohia i roto i ngā rā toru tekau.



Ka tātaihia tikahia e te matua mēnā i tīpakohia matapōkerehia ngā tamariki e toru, ko te ariā ko

$$P(\text{ko te tapeke o ngā tau o ngā tamariki e toru he } 8) = \frac{3}{10}.$$

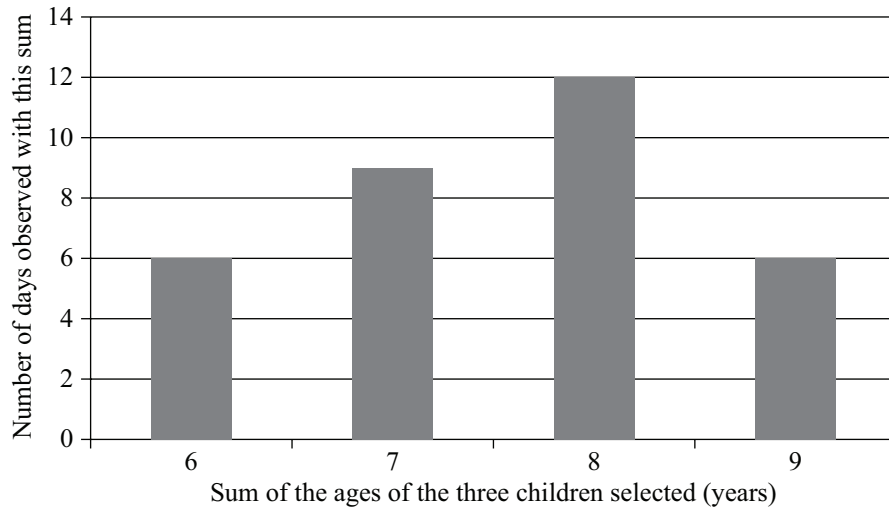
Ko te whakaaro whaitake o te matua, i te mea kāore tēnei tūponotanga e ōrite ana ki te ōwehenga o ngā rā i mātakina ai ina ko te tapeke o ngā pakeke o ngā tamariki e toru he 8, nō reira kāore i te matapōkere te tukanga tīpakotanga.

(a) Kei te tika te whakaaro o te matua mō te tukanga tīpakotanga?

Whakamāramahia mai he aha ai, he aha i kore ai rānei.

QUESTION THREE

At a childcare centre, there are six children aged two years and four children aged three years. Each day for thirty days, three of these ten children were selected for a photograph. A parent suspects that the three children for the daily photograph were not randomly selected. The graph below shows the sum of the ages of the three children selected over the thirty days.



The parent correctly calculates that if the three children were randomly selected, then theoretically

$$P(\text{sum of the ages of the three children is } 8) = \frac{3}{10}.$$

The parent reasons that, as this probability is not the same as the proportion of days observed where the sum of the ages of the three children was 8, the selection process was not random.

- (a) Is the parent correct in her reasoning about the selection process?

Explain why or why not.

English translation of the wording on the front cover

Level 3 Mathematics and Statistics (Statistics), 2014

91585 Apply probability concepts in solving problems

9.30 am Thursday 20 November 2014

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.

91585M

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 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 2–15 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.