

# 2

91267M



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

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KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

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## Te Pāngarau me te Tauanga, Kaupae 2, 2015

### 91267M Te whakahāngai tikanga tūponotanga hei whakaoti rapanga

2.00 i te ahiahi Rātū 10 Whiringa-ā-rangi 2015  
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakahāngai tikanga tūponotanga hei whakaoti rapanga.	Te whakahāngai tikanga tūponotanga mā te whakaaro whaipānga hei whakaoti rapanga.	Te whakahāngai tikanga 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 KATO A kei roto i tēnei pukapuka.**

Tirohia mēnā kei a koe te Rau Rauemi L2-MATHF.

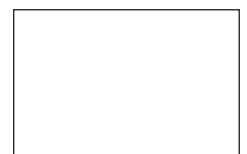
Whakaaturia ngā mahinga KATO A.

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 2–29 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**

(a) Ko te wā tatari mō te tūroro i tētahi whare hauora i mua i te kitenga i tētahi tākuta he mea tuari māori āwhiwhi, me te tau toharite o te 34 meneti me te ine mahora o te 8 meneti.

(i) Whiriwhiria te tūponotanga ka tatari tētahi tūroro i waenga i te 34 meneti me te 40 meneti.

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(ii) E hia ngā meneti ka pau e tirohia ana te 90% o ngā tūroro e tētahi tākuta?

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**QUESTION ONE**

(a) The waiting time for a patient attending a medical centre before seeing a doctor is approximately normally distributed, with a mean of 34 minutes and a standard deviation of 8 minutes.

(i) Find the probability that a patient will wait between 34 and 40 minutes.

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(ii) After how many minutes will 90% of patients have begun being seen by a doctor?

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- (b) I te taupaepae, ka aromatawaihia ngā tūroro e ai ki te taumaha o tō rātau raruraru. Ka oti tēnei i roto i te rua meneti mai o te taenga atu.

Ko te whakaaro mō te wā i mua i tētahi aromatawai ka oti he mea tuari māori āwhiwhi me te tau toharite o te 60 hēkona me te ine mahora o te 20 hēkona.

- (i) He aha te hautanga o ngā tūroro ka aromatawaihia i te taupaepae i roto i te 90 hēkona o te taenga atu?

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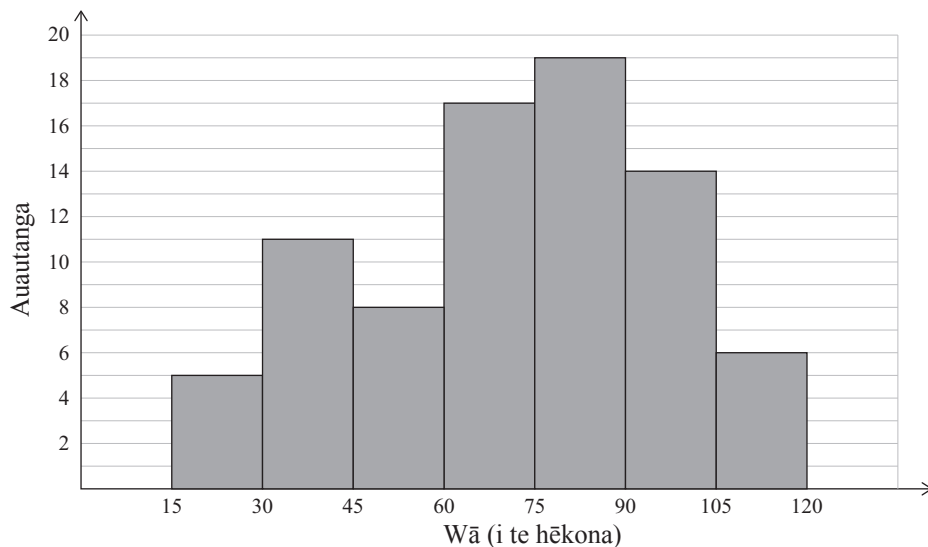
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- (ii) Ka whakahaerehia he rangahau mō ngā tūroro 80 ka tae atu ki te taupaepae. Ka tīpakohia matapōkeretia ngā tūroro i tētahi rangi. E whakaaturia ana ngā otinga ki te kauwhata pouhere auautanga i raro.

**Te wā aromatawai i te taupaepae**



He aha te hautanga o ngā tūroro i roto i te rangahau i aromatawaihia i te taupaepae i roto i te 90 hēkona o te taenga atu?

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- (b) At reception, patients are assessed on the urgency of their condition. This is done within two minutes of arrival.

It is thought that the waiting time before an assessment is done is approximately normally distributed with a mean of 60 seconds and standard deviation of 20 seconds.

- (i) What proportion of patients would be assessed at reception within 90 seconds of arrival?

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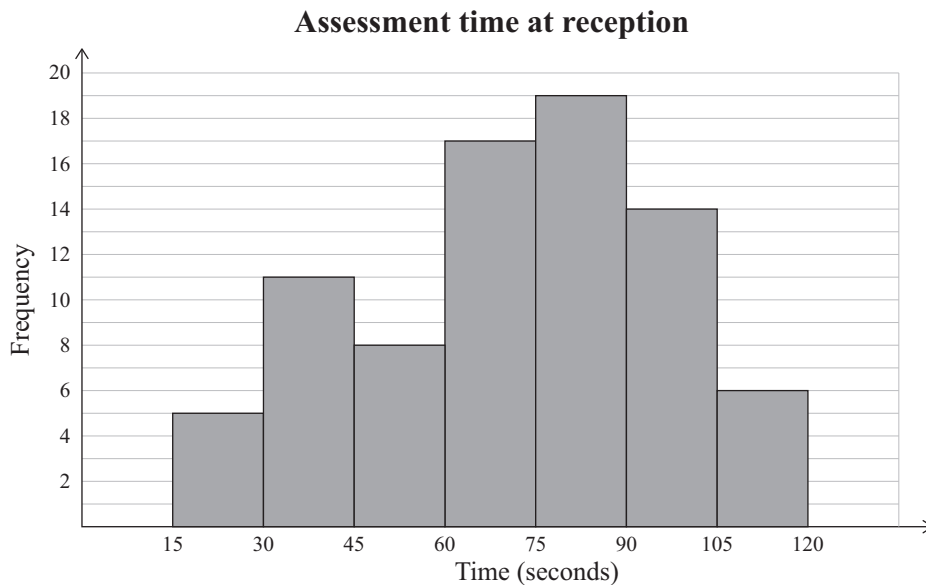


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- (ii) A survey is carried out on 80 patients who arrive at reception. Patients are selected at random on a particular day. The results are shown in the frequency histogram below.



What proportion of patients in the survey were assessed at reception within 90 seconds of arrival?

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## TŪMAHI TUARUA

Ka whakahaerehia he rangahau o ngā kaitono 1500 mō tētahi whakamātautau ā-ao i tīpakohia matapōkeretia hei tūhura mēnā i momoho ake ngā kaitono Tau 12 ki ērā o te Tau 13.

Kua tuhia ngā otinga ki te tūtohi i raro nei:

	<b>Tau 12</b>	<b>Tau 13</b>	<b>Tapeke</b>
<b>Hipa</b>	347	853	1200
<b>Hinga</b>	33	267	300
<b>Tapeke</b>	380	1120	1500

(a) (i) He aha te hautanga o ngā kaitono i roto i tēnei rangahau i hipa i te whakamātautau?

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(ii) He aha te hautanga o ngā kaitono i hinga i roto i te whakamātautau nō te Tau 12?

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(iii) Tata ki te 52 500 ngā kaitono nō te Tau 12 me te Tau 13 i whakauru ki te whakamātautau.

Mā te whakamahi i ngā otinga o tēnei rangahau, e hia ngā kaitono e tūmanakohia ana nō te Tau 13, ā, i hipa i te whakamātautau?

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**QUESTION TWO**

A study is conducted of 1500 randomly selected candidates for an international examination to investigate whether Year 12 candidates were as successful as those from Year 13.

The results are summarised in the table below:

	<b>Year 12</b>	<b>Year 13</b>	<b>Total</b>
<b>Passed</b>	347	853	1200
<b>Failed</b>	33	267	300
<b>Total</b>	380	1120	1500

- (a) (i) What proportion of candidates in the study passed the examination?

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- (ii) What proportion of candidates who failed the examination were from Year 12?

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- (iii) There were about 52 500 candidates from Year 12 and Year 13 who attempted the examination.

Using the results of this study, how many candidates would be expected to be from Year 13, and pass the examination?

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- (b) I whakaarohia anō e taua rangahau te maha o ngā marau i te whai ngā kaitono i roto i ā rātau akoranga. I kitea, o ngā kaitono 1500 o te tīpako ōrite, e 682 i te whai i ngā marau e ono, ā, ko te nuinga atu e rima ā rātau marau. O ngā kaitono e whai ana i ngā marau e rima, 192 i hinga i roto i te whakamātautau.

*E tuaruahia ana te tūtohi o te whārangi 12 i konei hei āwhina i a koe ki te whakatutuki i ngā tūmahi e whai ake nei.*

	<b>Tau 12</b>	<b>Tau 13</b>	<b>Tapeke</b>
<b>Hipa</b>	347	853	1200
<b>Hinga</b>	33	267	300
<b>Tapeke</b>	380	1120	1500

- (i) He aha te hautanga o ngā ākongā i roto i te rangahau i whai i ngā marau e ono me te hipa anō?

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- (b) The same study also considered the number of subjects the candidates were taking in their normal academic courses. It found that of the same sample of 1500 candidates, 682 were taking six subjects, while the rest were taking five subjects. Of the candidates who were taking five subjects, 192 failed the examination.

*The table from page 14 is repeated here to help you answer the questions that follow.*

	<b>Year 12</b>	<b>Year 13</b>	<b>Total</b>
<b>Passed</b>	347	853	1200
<b>Failed</b>	33	267	300
<b>Total</b>	380	1120	1500

- (i) What proportion of candidates in the study took six subjects and passed?

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**TŪMAHI TUATORU**

- (a) Ina whānau mai ngā kāwhe ki tētahi kāhui kau horomata, ka puta ngā whakatauranga ina eke ki te kotahi marama, ā, me te toru marama, mēnā ka puritia ki te kāhui, ka hokona atu rānei.

55% o ngā kāwhe he toa. I te kotahi marama te pakeke, 70% o ngā kāwhe toa me te 20% o ngā uwaha ka hokona atu. O te toenga, i te toru marama te pakeke, 80% o ngā kāwhe toa me te 35% o ngā uwaha ka hokona atu.

- (i) Kimihia te tūponotanga o tētahi kāwhe ka tīpakohia matapōkeretia i whānau mai ki te kāhui he kāwhe toa, ā, ka hokona atu i te kotahi marama te pakeke.

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- (ii) Kimihia te tūponotanga o tētahi kāwhe ka tīpakohia matapōkeretia i whānau mai ki te kāhui he uwaha, ā, ka hokona atu i te toru marama te pakeke.

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- (iii) He aha te ōrautanga o ngā kāwhe ka puritia ki te kāhui horomata?

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**QUESTION THREE**

- (a) When calves are born into a pedigree beef herd, decisions are made after they are one month old, and again when they are three months old, as to whether they will be kept in the herd or sold.

55% of calves born are male. At age one month, 70% of male and 20% of female calves are sold. Of the remainder, at age three months, 80% of males and 35% of females are also sold.

- (i) Find the probability that a randomly chosen calf born into the herd will be male and sold at age one month.

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- (ii) Find the probability that a randomly chosen calf born into the herd will be female and sold at age three months.

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- (iii) What percentage of calves will eventually be kept in the pedigree herd?

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- (iv) In a particular year 550 calves were born.

How many male calves can be expected to be kept in the pedigree herd?

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- (v) The ratio of male to female calves being kept in the herd after three months is about one male to every seven females. This is to be changed to one male to every ten females.

If the number of male calves remains the same, what proportion of females would have been sold?

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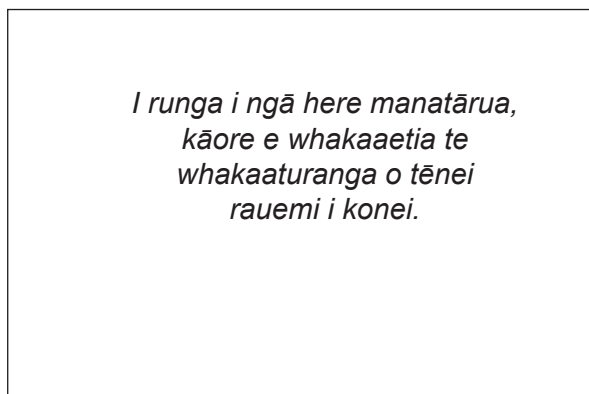
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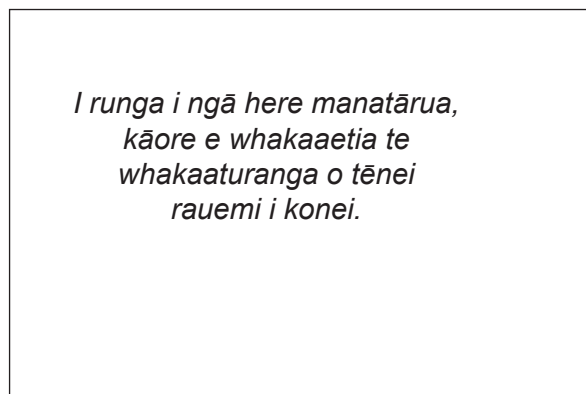
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- (b) Ko ngā tīrairaka o Aotearoa he manu ōpurepure, pango rānei.



Pīwaiwaka

Cheryl Mariner, www.nzbirdsonline.org.nz/species/new-zealand-fantail



Tīrairaka pango

Ka whakaputa uri ngātahi rāua, ā, ko ngā takirua he whai kōhanga momoho ka kitea i ngā ōwehenga e whai ake:

Takirua	E rua ngā pīwaiwaka	Kotahi te pīwaiwaka, ā, kotahi te tīrairaka pango	E rua ngā tīrairaka pango
Ōwehenga	0.75	0.2	0.05

Ko ngā kōhanga momoho mai i te kotahi me te whā ana hua. Kei te tūtohi i raro nei ngā ōwehenga o ngā hua.

Takirua	E rua ngā pīwaiwaka	Kotahi te pīwaiwaka, ā, kotahi te tīrairaka pango	E rua ngā tīrairaka pango
1 hua	0.15	0.2	0.3
E rua ngā hua	0.3	0.35	0.5
E toru ngā hua	0.4	0.35	0.15
E whā ngā hua	0.15	0.1	0.05

- (i) He aha te ōwehenga o ngā takirua pīwaiwaka ka whai kōhanga momoho e nui atu ngā hua i te kotahi?

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- (ii) Ko te whakapae a tētahi kairangahau kotahi anake te kōhanga i roto i te 50 ka kitea e toru ngā hua i roto nō tētahi takirua tīrairaka pango.

Whakamahia ngā tātaitai hei whakaatu kei te parahau te whakapae a te kairangahau.

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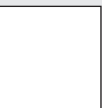
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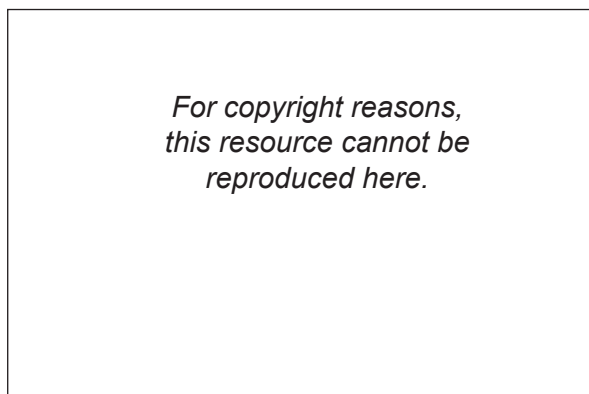
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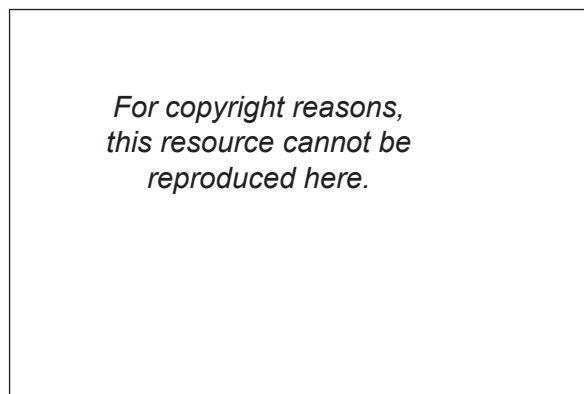
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- (b) New Zealand fantails are birds which are either pied or black.



Pied fantail



Black fantail

Cheryl Mariner, [www.nzbirdsonline.org.nz/species/new-zealand-fantail](http://www.nzbirdsonline.org.nz/species/new-zealand-fantail)

They interbreed, and pairs with successful nests are found in the following proportions:

Pair	Two pied fantails	One pied and one black fantail	Two black fantails
Proportion	0.75	0.2	0.05

Successful nests have between one and four eggs. The proportions of eggs are given in the table below.

Pair	Two pied fantails	One pied and one black fantail	Two black fantails
One egg	0.15	0.2	0.3
Two eggs	0.3	0.35	0.5
Three eggs	0.4	0.35	0.15
Four eggs	0.15	0.1	0.05

- (i) What proportion of pairs with two pied fantails will have a successful nest with more than one egg?

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- (ii) A researcher claims that only one out of every 50 nests found with three eggs is likely to be from a pair of two black fantails.

Use calculations to show that the researcher's claim is justified.

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ASSESSOR'S  
USE ONLY









*English translation of the wording on the front cover*

## Level 2 Mathematics and Statistics, 2015

### 91267 Apply probability methods in solving problems

2.00 p.m. Tuesday 10 November 2015

Credits: Four

91267M

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

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.**

Make sure that you have Resource Sheet L2–MATHF.

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 2–29 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.**