1

91037

910370

SUPERVISOR'S USE ONLY

NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 1 Mathematics and Statistics, 2015

91037 Demonstrate understanding of chance and data

9.30 a.m. Monday 9 November 2015
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 2–12 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

© New Zealand Qualifications Authority, 2015. All rights reserved.
No part of this publication may be reproduced by any means without the prior permission of the New Zealand Qualifications Authority.

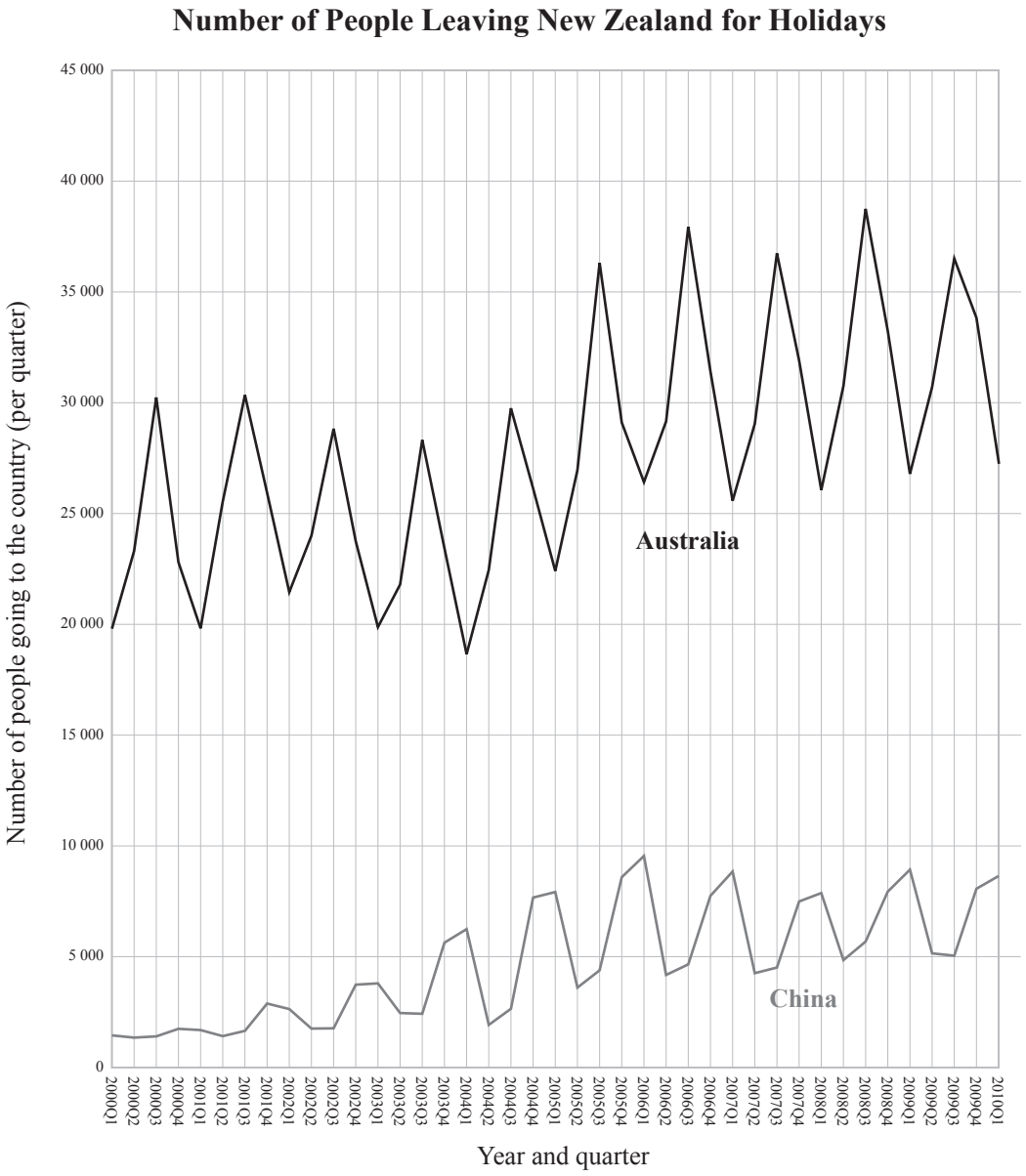
QUESTION ONE

ASSESSOR'S USE ONLY

The following graph shows how many people leave New Zealand for holidays to Australia or to China.

The graph shows the number of people travelling per **quarter**, from 2000 to 2009.

Each quarter is a group of 3 months (Q1 = January to March, Q2 = April to June, Q3 = July to September, Q4 = October to December).



ASSESSOR'S USE ONLY

(a) Comment on the graph of the number of people going to **Australia** for holidays.

You should discuss any trends, seasonal effects, or unusual features that you notice.

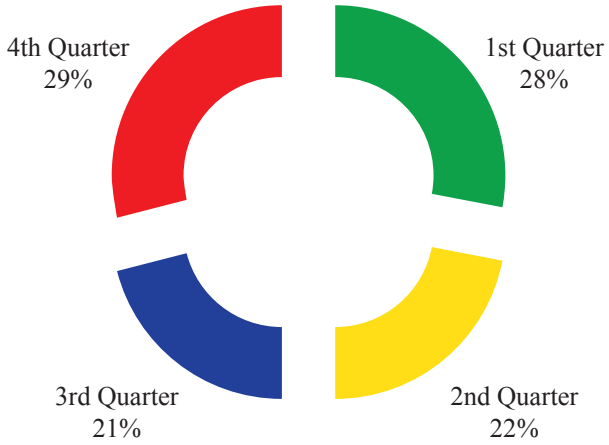
(b) How does the graph of people going to China **compare** with the graph of people going to Australia over these years?

You should discuss any differences or similarities in the graphs.

ASSESSOR'S USE ONLY

(c) This graph shows the percentage of travellers who travelled to China in each quarter of 2014.

Travellers to China in 2014



(i) A traveller to China in 2014 is chosen at random.

What is the probability that they did **not** travel in the 4th quarter (Q4)?

(ii) A traveller to China in **2015** is chosen at random.

Estimate the probability that they did **not** travel in the 4th quarter (Q4) of 2015.
Explain your reasoning.

QUESTION TWO

ASSESSOR'S USE ONLY

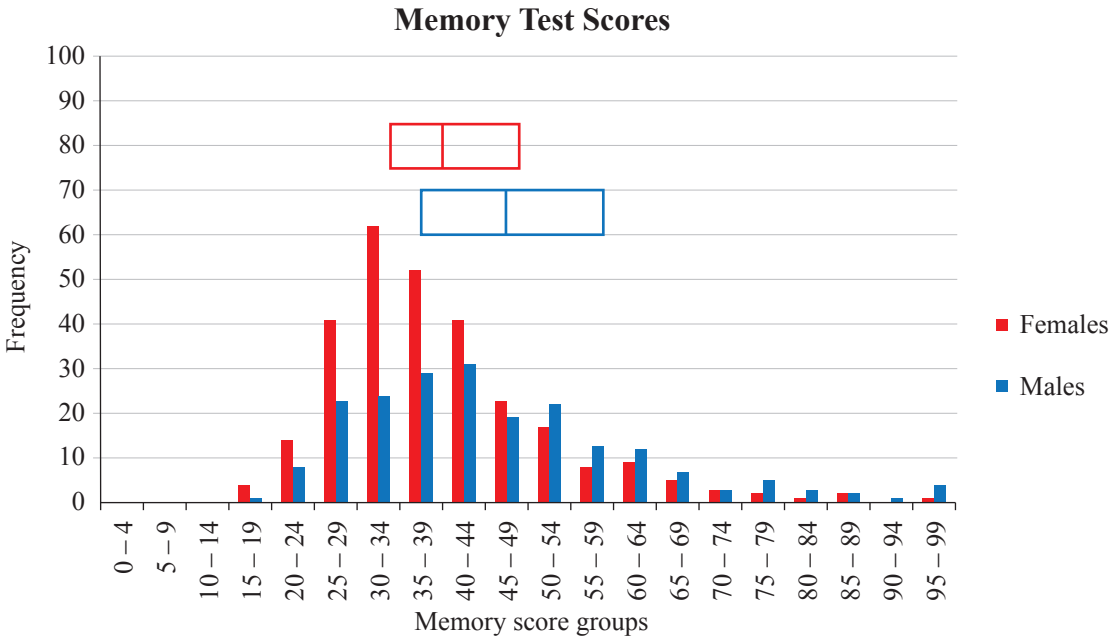
Rei's mother says that "females have better memories than males".

Rei wonders if this is true.

He uses some data from *Census at Schools* to try to answer his question. The data was collected from students who took part in an online memory test described by these words:

Test your memory. How quickly can you match all the pairs of pictures?

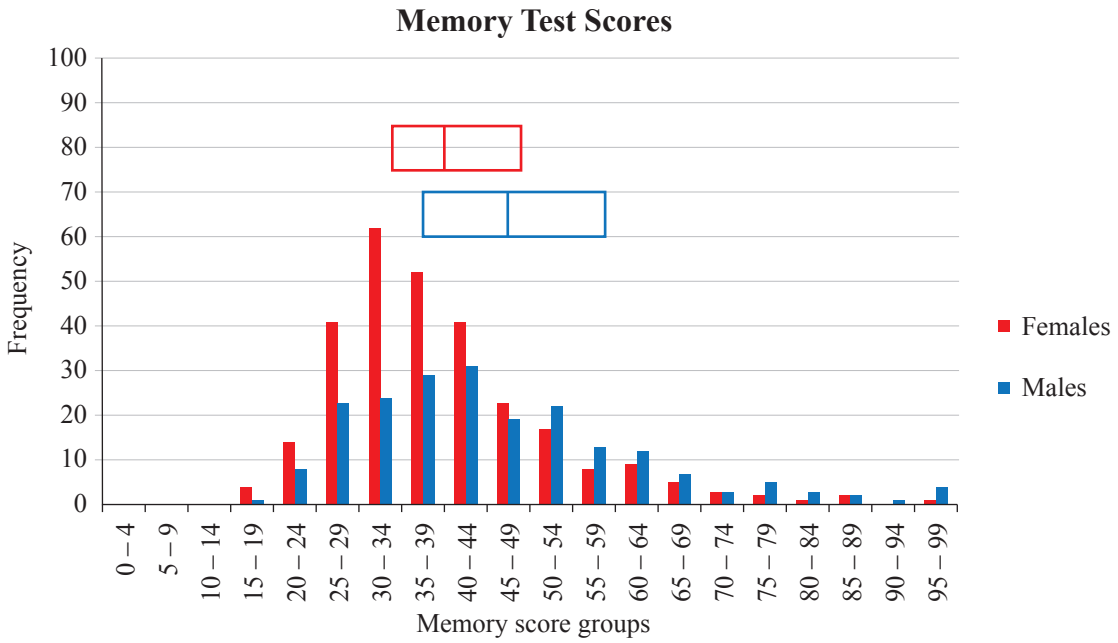
- *Click on "Start" and then click on two squares to uncover their pictures.*
- *Matching squares will remain uncovered.*
- *Keep clicking to see how many pairs you can uncover in 3 minutes. This is your memory score.*



(a) Compare the distribution of memory test scores for males and for females.

Rei's bar graph on the previous page is repeated below.

ASSESSOR'S USE ONLY



(b) Looking at the graph above, are females better at this memory test than males?
Explain your answer.

(c) Is the data from this experiment a good way for Rei to test his mother's statement that "females have better memories than males"?

Justify your answer.

ASSESSOR'S USE ONLY

(d) Rei looks closely at his bar graph and realises that there was more data from females than from males.

What could he now do with his data or his graph to make his bar graph display the data better?

QUESTION THREE

ASSESSOR'S USE ONLY

The statistics for Rei's data are given in the table below:

	Min.	Lower Quartile	Median	Mean	Upper Quartile	Max.	Sample Size
female	21	36	42	44.88	50	94	284
male	23	39	48	50.7	59	98	203

(a) Using the data in this table, what is the interquartile range for the females?

(b) There are more females than males in this sample. Rei's friend Waiari said that the results and the graphs are not fair because of this.

Do you agree or disagree?

Use statistical reasons to justify your answer.

ASSESSOR'S USE ONLY

(c) (i) If a student from this sample was chosen at random, what is the probability that the student is male?

(ii) If a **male** from this sample was chosen at random, what is the probability that his memory test score is 59 or less?

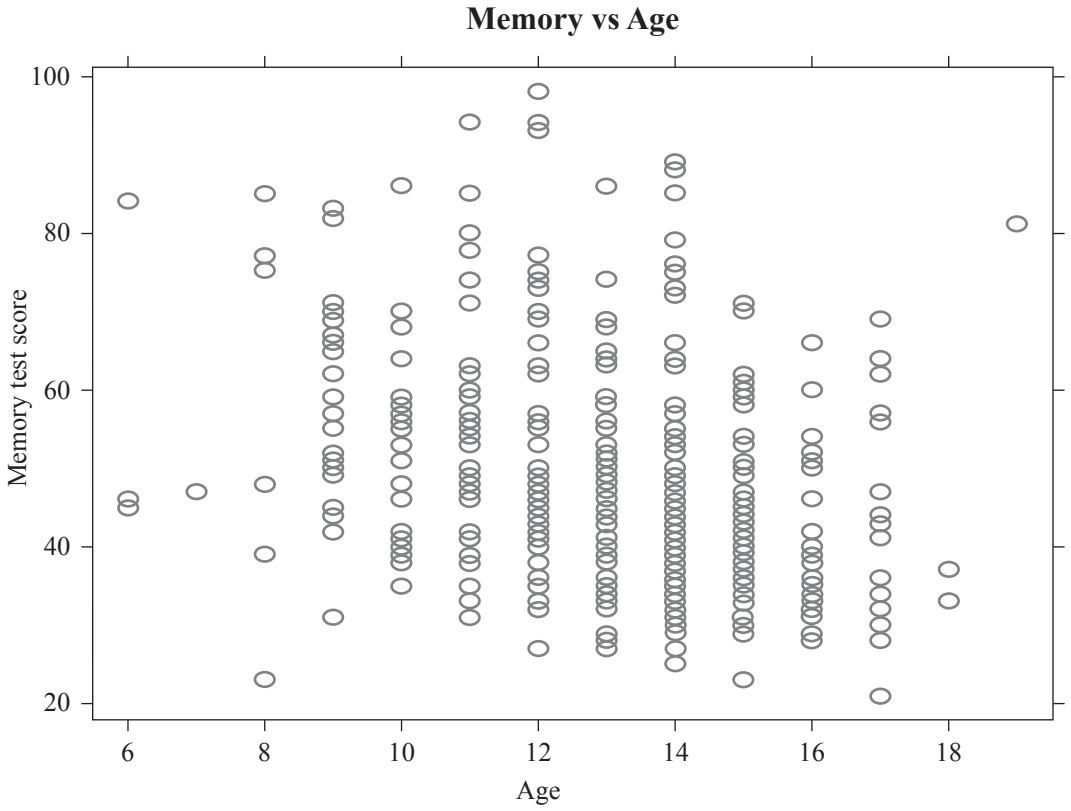
(d) Brianna's score was added to the sample of females used here. The mean score for the females then went up, while the median score stayed the same.

What can you deduce about Brianna's test score?

Explain your reasoning.

(e) Rei wondered if the ages of the students doing the memory test affected how well they scored. He drew the scattergraph below.

ASSESSOR'S USE ONLY



What should Rei conclude about the relationship between the age of the students and their memory test score revealed from this graph?

Explain your answer.

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

ASSESSOR'S USE ONLY

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

ASSESSOR'S USE ONLY

91037