



D&D Resources Ltd
Mathematics Exam Preparation Made Easy

External Achievement Standard - 91037

Practice External Assessments 1

CHANCE AND DATA

© Copyright D & D Resources Ltd 2020 – 2021.

This book is in copyright. Subject to statutory exception and to provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of D & D Resources Ltd.

D & D Resources Ltd
P O Box 8
WAIHI BEACH 3642

Phone (07) 862 8599
Email admin@ddresources.co.nz
Web www.ddresources.co.nz
(orders, queries and feedback)

Cover design: D & D Resources Ltd.
Image: depositphotos.com.
Author: livejournalist.guseff@gmail.com

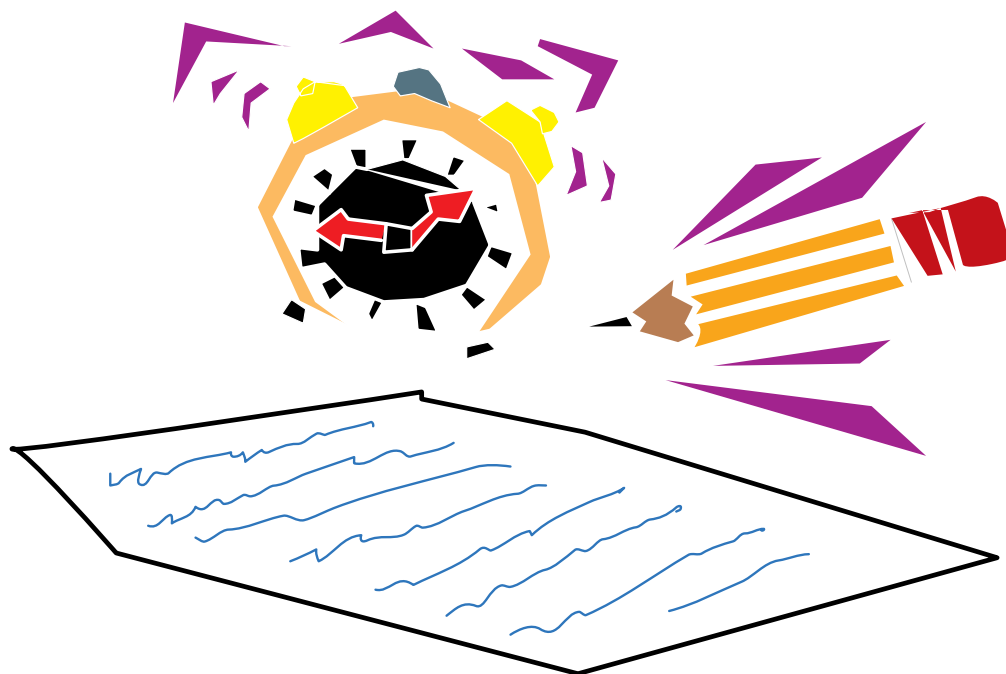
Printed in New Zealand by Bluestar,
Wellington

ISBN 978 0 9876578 3 1

NCEA 1 Maths

Contents

Chance and Data Achievement Standard – Page 3
Chance and Data Achievement Standard PEA 1 – Page 4
Chance and Data Achievement Standard PEA 2 – Page 13
Chance and Data Achievement Standard PEA 3 – Page 21
Chance and Data Achievement Standard PEA 4 – Page 32
Chance and Data Achievement Standard PEA 5 – Page 40
Chance and Data Achievement Standard PEA 6 – Page 49
Chance and Data Achievement Standard PEA 1 Answers – Page 57
Chance and Data Achievement Standard PEA 2 Answers – Page 61
Chance and Data Achievement Standard PEA 3 Answers – Page 67
Chance and Data Achievement Standard PEA 4 Answers – Page 72
Chance and Data Achievement Standard PEA 5 Answers – Page 75
Chance and Data Achievement Standard PEA 6 Answers – Page 78



The questions in the practice assessments are NOT in order of difficulty. Attempt all questions or you may not provide enough evidence to achieve the required standard.

Achievement Standard

91037

Demonstrate understanding of chance and data

This achievement standard involves demonstrating understanding of chance and data.

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Demonstrate understanding of chance and data. 	<ul style="list-style-type: none"> Demonstrate understanding of chance and data, justifying statements and findings. 	<ul style="list-style-type: none"> Demonstrate understanding of chance and data, showing statistical insight.

- ◆ This achievement standard is derived from Level 6 of The New Zealand Curriculum. The achievement standard is aligned to the following achievement objectives taken from the statistical literacy and probability threads of the mathematics and statistics learning area:
 - ❖ evaluate statistical investigations or probability activities undertaken by others, including data collection methods, choice of measures, and validity of findings
 - ❖ calculate probabilities, using fractions, percentages, and ratios
 - ❖ evaluate statistical reports in the media by relating the displays, statistics, processes, and probabilities used to the claims made
 - ❖ investigate situations that involve elements of chance: calculating probabilities in discrete situations.
- ◆ Demonstrate understanding of chance and data involves using appropriate concepts and terms to demonstrate statistical and probability literacy.

Justifying statements and findings involves providing supporting evidence such as summary statistics, probabilities, data values, trends or features of visual displays, and could involve reference to the context and the population.

Showing statistical insight means integrating statistical and contextual information and knowledge to show a deeper understanding. This may involve critical reflection on the validity of the processes and conclusions given in contexts involving probability or statistics.
- ◆ Students need to be familiar with:
 - ❖ the statistical enquiry cycle
 - ❖ reading and interpreting statistical tables, graphs and associated text
 - ❖ analysing statistical investigations
 - ❖ multivariate, bivariate and time series data
 - ❖ probability concepts.

QUESTION TWO

- (a) Aria undertook a study to investigate the relationship between a person's body fat percentage and their BMI (body mass index).

BMI (Body Mass Index) is a standard calculation of body weight in relation to height, and is used to diagnose if someone is overweight or obese.

Under 18.5 – you are considered to be underweight.

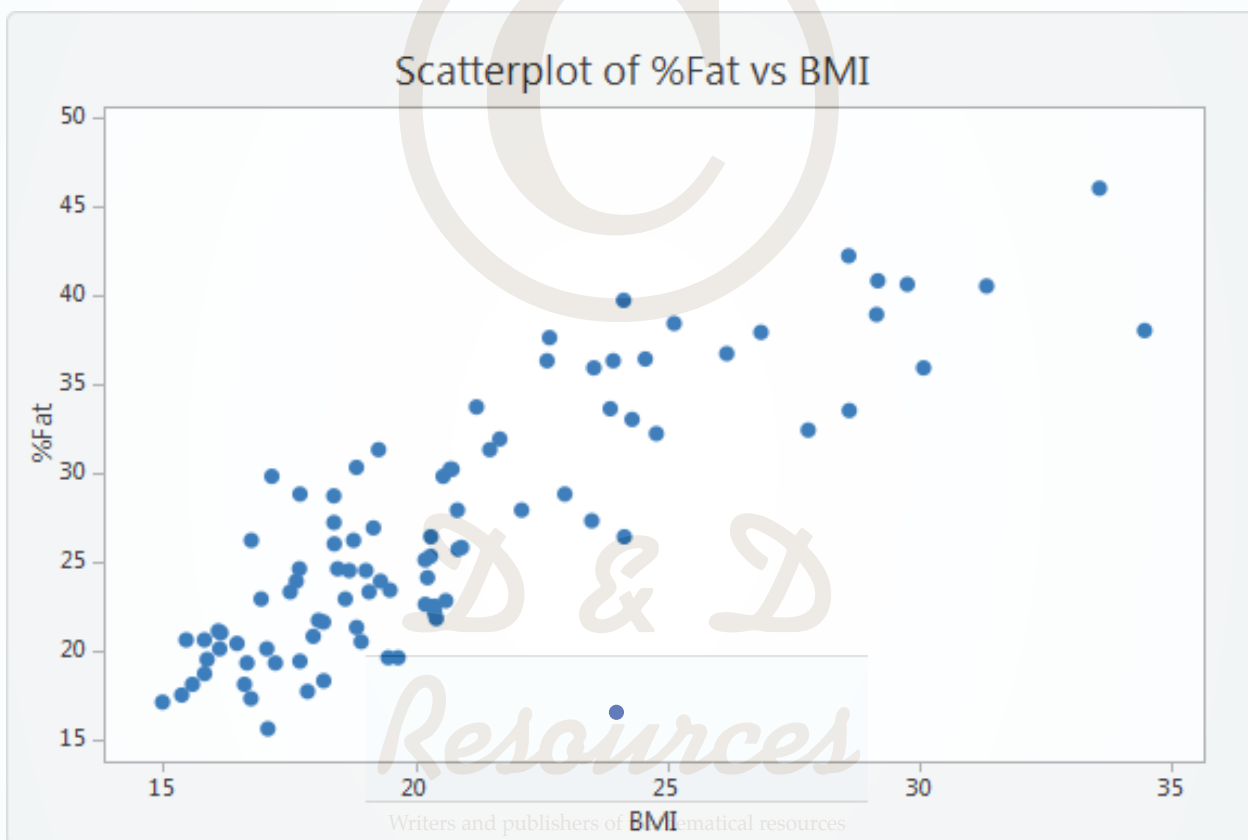
18.5 to 24.9 – you are considered to be within a healthy weight range.

25.0 to 29.9 – you are considered to be overweight.

The body fat percentage (BFP) of a person is their total mass of fat divided by their total body mass, multiplied by 100; body fat includes essential body fat and storage body fat.

Essential body fat is necessary to maintain life and reproductive functions.

Aria collected data on 92 individuals, entered the data into Excel and graphed the results below.



- (i) On the graph above, circle the most appropriate point which indicates a person with a healthy BMI but has a low percentage body fat.
- (ii) State the approximate median BMI for the individuals in the investigation.
Show clearly how you reached your answer.

D & D

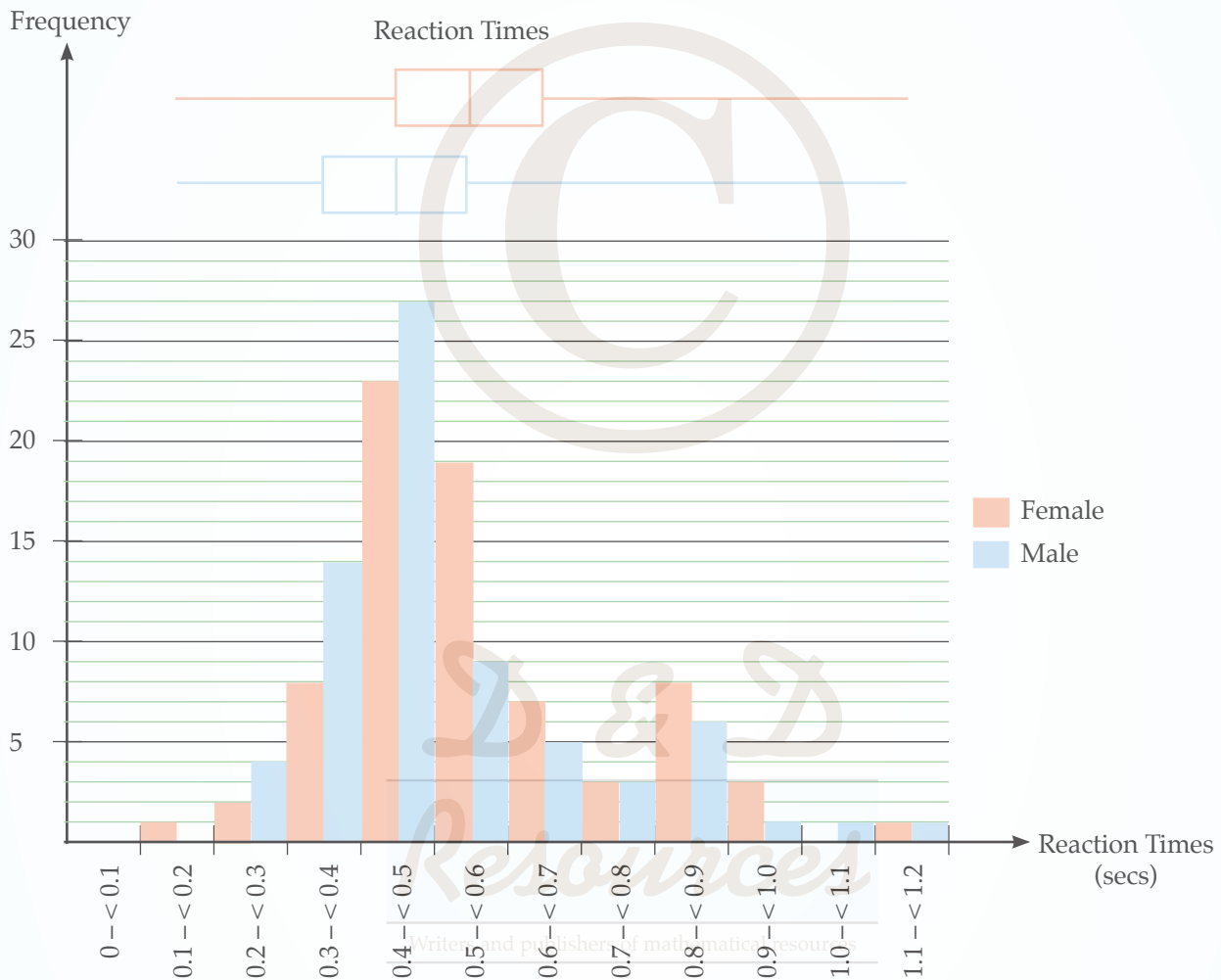
QUESTION TWO

Latham believes that males have a better reaction time than females.

To test this he uses the data from the 2015 CensusAtSchool survey which asks a student to click on a green button to start a reaction test and when the button turns red the student clicks on it as fast as they can.

The time for the student to react and click on the button after it has turned red is recorded as their reaction time.

Latham collects information on a sample of 150 students, but after cleaning the data is left with a sample size of 146 students (75 females and 71 males).



(a) Why would it have been necessary for Latham to clean the data first? Explain your answer.

Answers – 91037

PEA 1

ONE		TWO of:	TWO of:	ONE of:
(d) cont...	For ages > 35 the line $y = x$ deviates further from the trendline indicating the difference between ages is greater (husbands are older than their respective wives).	• makes the conclusion of yes and cites one reason clearly.	• makes the conclusion of yes and cites two reasons clearly.	• makes the conclusion of yes and cites two reasons clearly and in a way that relates to the context.
TWO		TWO of:	TWO of:	ONE of:
(a)	Korea and Romania. Korea 1970 – 9.2, 1995 – 8.8. Romania 1970 – 7.2, 1995 – 6.8.	• identifies Korea OR Romania.	• identifies Korea AND Romania with applicable justification, that is, appropriate figures that support answer.	
(b)	Marriage rates differ considerably across OECD countries. In some – such as Chile, Italy, Luxembourg, Portugal, Spain and Slovenia – marriage rates are very low at 3.5 or fewer marriages per 1000 people. In others – such as the United States and Turkey – rates are twice that at around 7 per 1000 or above. However, in most OECD countries, marriage rates are somewhere between 4 and 5.5 marriages per 1000, with the OECD average standing at approximately 4.6.	• appropriate comment but cites only one point in context.	• appropriate comment and cites two correct points in context.	• appropriate comment and cites three correct points in context showing insight.
(c)	Lithuania 6.0 to 7.6, Malta 6.3 to 6.8, Ireland 4.3 to 4.4, Latvia 4.4 to 6.3 and Sweden 3.8 to 5.4.	• identifies three correct countries.	• identifies three correct countries with applicable justification, that is, appropriate figures.	
(d)	Across the OECD, declining marriage rates have been accompanied by increases in the average age of those getting married. At the start of the 1990s the OECD-25 average mean age at first marriage for women was 25.0, while the OECD-25 average mean age for men was 27.5. By 2014, the OECD-25 average mean age at first marriage for both women and men had increased by about 5 years to 30.0 and 32.5, respectively. In no OECD country did the average age of either women or men at first marriage fall between 1990 and 2014.	• identifies average age of getting married has increased for both sexes and contrasts difference between two countries.	• identifies average age of getting married has increased for both sexes and uses OECD-25 average figures from table to highlight difference. Also contrasts difference between two countries using applicable figures.	• identifies average age of getting married has increased for both sexes and uses OECD-25 average figures from table to highlight difference. Also contrasts difference between two countries using applicable figures and shows statistical insight.