90643

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 3 Statistics and Modelling, 2005

90643 Solve straightforward problems involving probability

Credits: Four

9.30 am Thursday 24 November 2005

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

Make sure you have a copy of the Formulae and Tables Booklet L3–STATF.

You should answer ALL the questions in this booklet.

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 2–8 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.

For Assessor's use only	Achievement Criteria				
Achievement		**Achievement with Merit**		**Achievement with Excellence**	
Solve straightforward problems involving probability.		Solve probability problems.		Apply probability theory.	
Overall Level of Performance					

You are advised to spend 40 minutes answering the questions in this booklet.

Show **ALL** working.

QUESTION ONE

Bentwood High School and Cauldwell College are playing a series of **three games** for the Interschool Basketball final. The probability that the Bentwood High School Basketball team will win the first game is 0.65. If Bentwood High School wins any game, the probability that it will win the next game is 0.7. If Bentwood High School loses any game, the probability that it will win the next game is 0.5. Assume no games are drawn.

What is the probability that the Bentwood High School Basketball team will win **exactly two of the three games** it will play for the Interschool Basketball final?

QUESTION TWO

The Bentwood High School Senior Netball team has made it through to the regional final. The Principal has decided she will go to the final only if the weather is fine and not windy. The probability of a fine day is 0.6, a windy day 0.3, and a windy day that is not fine 0.2.

What is the probability that the Principal attends the regional final for the Senior Netball team?

QUESTION THREE

(a) Cauldwell College has two Sports Coordinators, Rawiri and Janet. They are available to help students with sports-related inquiries at various times during the school day. Rawiri is available 65% of the time, Janet is available 80% of the time, and both of them are available 50% of the time.

A student chooses a time at random during the school day to make a sports-related inquiry. What is the probability that the student will find at least one Sports Coordinator available?

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(b) Are the events "Janet is available" and "Rawiri is available" mutually exclusive?

Use statistical reasoning to justify your answer.

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QUESTION FOUR

Rawiri and Janet collected information from 315 male students and 245 female students on their involvement in winter and summer sports. They found that 350 students took part in at least one winter sport, with 230 of them being male. They also found that 400 students took part in at least one summer sport, with 210 of them being male.

What is the probability that a randomly-chosen student participates in at least one summer sport, given that the student is female?

QUESTION FIVE

When the draw for the first round of the local soccer season is prepared, the teams playing each other are selected randomly.

- The probability that Bentwood High School will be drawn to play its first round game at home is $\frac{1}{2}$.

- The probability that rain will cancel all first round games is $\frac{2}{15}$.

- There are eight teams that Bentwood could play against, including Cauldwell College.

- If Bentwood High School plays Cauldwell College, then the probability that Bentwood High School will win is $\frac{3}{5}$; if Bentwood High School plays another team, the probability that Bentwood High School will win is $\frac{1}{2}$.

Calculate the probability that Bentwood High School will play the first round game at home and win it.

QUESTION SIX

A sports committee of four is to be chosen from a group of nine students, two of whom are twins.

If the members of the sports committee are selected at random from the group of nine, what is the probability that the twins are both on the sports committee?

QUESTION SEVEN

Suppose the group of nine students in Question Six is made up of three boys and six girls. Calculate the expected number of boys on the sports committee of four.

Clearly communicate how you calculated your answer.

Extra paper for continuation of answers if required.
Clearly number the question.

Question number