

90643



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

*For Supervisor's use only*

## Level 3 Statistics and Modelling, 2008

### 90643 Solve straightforward problems involving probability

Credits: Four

9.30 am Monday 24 November 2008

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.

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 2–8 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.**

<i>For Assessor's use only</i>		<b>Achievement Criteria</b>	
<b>Achievement</b>		<b>Achievement with Merit</b>	<b>Achievement with Excellence</b>
Solve straightforward problems involving probability.	<input type="checkbox"/>	Solve probability problems.	<input type="checkbox"/>
		Apply probability theory.	<input type="checkbox"/>
<b>Overall Level of Performance</b>		<input type="checkbox"/>	

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

## THE "FARM PARK" TOURIST CENTRE

### QUESTION ONE

A farm park offers two activities to visitors: the farm show and the farm walk.

In one weekend the farm park had a total of 200 visitors:

- 85 went to the farm show
- 120 went on the farm walk
- 50 didn't participate in either activity; instead they just visited the farm park shop to make purchases.

- (a) Calculate the probability that a randomly selected visitor from the group went to the farm show only.

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- (b) Are the events "a visitor went to the farm show" and "a visitor went on the farm walk" mutually exclusive? Justify your answer.

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**QUESTION TWO**

The farm park shop sells six different styles of woollen jersey and four different styles of alpaca jersey. A visitor to the shop buys three jerseys.

If the visitor randomly chooses three **different** styles of jersey to buy, calculate the probability that exactly **two** of them are alpaca jerseys.

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**QUESTION THREE**

As well as buying jerseys at the farm park shop, people can also buy them on-line through the farm park's web site.

One weekend the farm park made a combined total of 85 jersey sales from visitors to the shop and from its on-line sales.

The table below summarises those sales:

	Jersey sales		TOTAL
	Farm park shop	On-line	
<b>Purchaser was a New Zealander</b>	25	32	57
<b>Purchaser was a non-New Zealander</b>	6	22	28
<b>TOTAL</b>	31	54	85

Suppose two of the sales are selected at random. Calculate the probability that exactly one of the two selected sales was made on-line to a non-New Zealander.

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**QUESTION FOUR**

The farm park shop sells other products as well as jerseys. Of the visitors to the shop one day, 20% bought other products and 84% bought jerseys. The probability that a visitor on that day bought other products given that they also bought jerseys was 0.15.

Calculate the probability that a randomly selected visitor on that day bought both jerseys and other products.

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**QUESTION FIVE**

Goods that are ordered on-line from the farm park shop are delivered in packages to customers. Two companies, Quality Couriers and Fast Movers, deliver the packages.

Quality Couriers makes 80% of the deliveries. It has been found that 3% of the packages delivered by Quality Couriers and 5% of the packages delivered by Fast Movers are damaged as a result of mishandling by the delivery companies. Assume that damage to packages occurs independently.

Three packages delivered in the last year are randomly selected.

- (a) Calculate the probability that all three packages are not damaged as a result of mishandling by the delivery companies.

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- (b) Given that none of the three packages are damaged as a result of mishandling by the delivery companies, calculate the probability that all three were delivered by Fast Movers.

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