



For Supervisor's use only

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90646



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA



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

Level 3 Statistics and Modelling, 2006

90646 Use probability distribution models to solve straightforward problems

Credits: Four

2.00 pm Tuesday 21 November 2006

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 2–7 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>		Achievement Criteria	
Achievement		Achievement with Merit	Achievement with Excellence
Use probability distribution models to solve straightforward problems.	<input type="checkbox"/>	Use probability distribution models to solve problems.	<input type="checkbox"/>
		Use and justify probability distribution models to solve complex problems.	<input type="checkbox"/>
Overall Level of Performance		<input type="checkbox"/>	

You are advised to spend 35 minutes answering the questions in this booklet.

QUESTION ONE

Research has shown that the times taken for walkers to complete a track through a particular national park are normally distributed with a mean of 3.6 hours and a standard deviation of 0.5 hours.

Calculate the probability that a randomly selected walker will take less than 3 hours to complete the track.

QUESTION TWO

A large section of the national park track goes through a beech forest. The beech forest is home to a lot of wasp nests. A local walker estimates that in this forest, there is an average of two nests per 300 metres of track.

Assuming these nests occur randomly and independently, a Poisson distribution may be used to model the number of nests found per 300 metre section of track.

Based on this model, calculate the probability that a randomly selected 300 metre section of the beech forest track has more than one wasp nest.

QUESTION THREE

It is estimated that 15% of the population is allergic to wasp venom. (Assume occurrences of the allergy to wasp venom in people are random and independent.)

- (a) On a particular day, a group of 10 people walk through the beech forest part of the track.

Calculate the probability that no more than two of these people are allergic to wasp venom.

- (b) On another day, a group of 6 people walk through the beech forest part of the track in the morning and a group of 8 people walk through in the afternoon.

Calculate the probability that exactly one person in each group will be allergic to wasp venom.
