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**90194**

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

# Level 1 Mathematics, 2006

## 90194 Determine probabilities

Credits: Two
9.30 am Friday 24 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.

You should answer ALL the questions in this booklet.

You should 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.**

| *For Assessor's use only* | **Achievement Criteria** | |
|---|---|---|
| **Achievement** | **Achievement with Merit** | **Achievement with Excellence** |
| Determine probabilities. ☐ | Solve probability problems using theoretical methods. ☐ | Explore probability situations to solve problems. ☐ |
| **Overall Level of Performance** ☐ | | |

You are advised to spend 25 minutes answering the questions in this booklet.

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# GAMES WE PLAY

You should show **ALL** working.

## QUESTION ONE

Jake has been keeping records of his wins and losses for the different kinds of games he plays, in order to find out in which games he has most success. His tabulated records are shown below:

| | **Wins** | **Losses** | **Totals** |
|---|---|---|---|
| Ball Games | 130 | 70 | 200 |
| Card Games | 141 | 58 | 199 |
| Board Games | 100 | 75 | 175 |
| **Totals** | 371 | 203 | 574 |

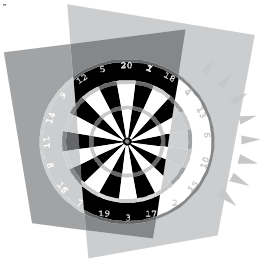
(a) What is the probability that Jake wins a board game?

Probability = _____

(b) What is the probability that the last game Jake won was a board game?

Probability = _____

## QUESTION TWO



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Jan and Alison play a game where prizes are shown on a wheel.
The winner of the game spins the wheel to get a prize.
30% of the prizes shown on the wheel are worth over $20.

(a) Jan wins two games and spins the wheel twice to get her two prizes.

What is the probability that both prizes are worth over $20?

Probability = _____

(b) Alison also wins two games and spins the wheel twice to get her two prizes.

What is the probability that only one of her two prizes is worth over $20?

Probability = _____

## QUESTION THREE

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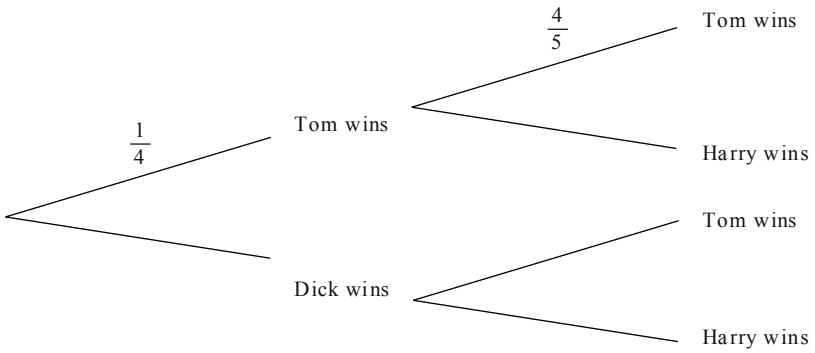
Tom, Dick and Harry often play tennis.

When Tom and Dick play, Tom wins $\frac{1}{4}$ of the games.

When Tom and Harry play, Tom wins $\frac{4}{5}$ of the games.

Tom plays one game of tennis with Dick and one game of tennis with Harry.

Some of the information is already shown on the diagram below.




(a) What is the probability Tom wins both games?

Probability is _____

(b) What is the probability that Tom wins exactly one of the two games?

Probability is _____

(c) When it is a windy day, Tom does not play as well against Harry.
His probability of winning when he plays Harry is only $\frac{2}{5}$ on a windy day.
The probability of their next game being on a windy day is 0.3.

What is the probability Tom wins the game?

Probability is _____

## QUESTION FOUR

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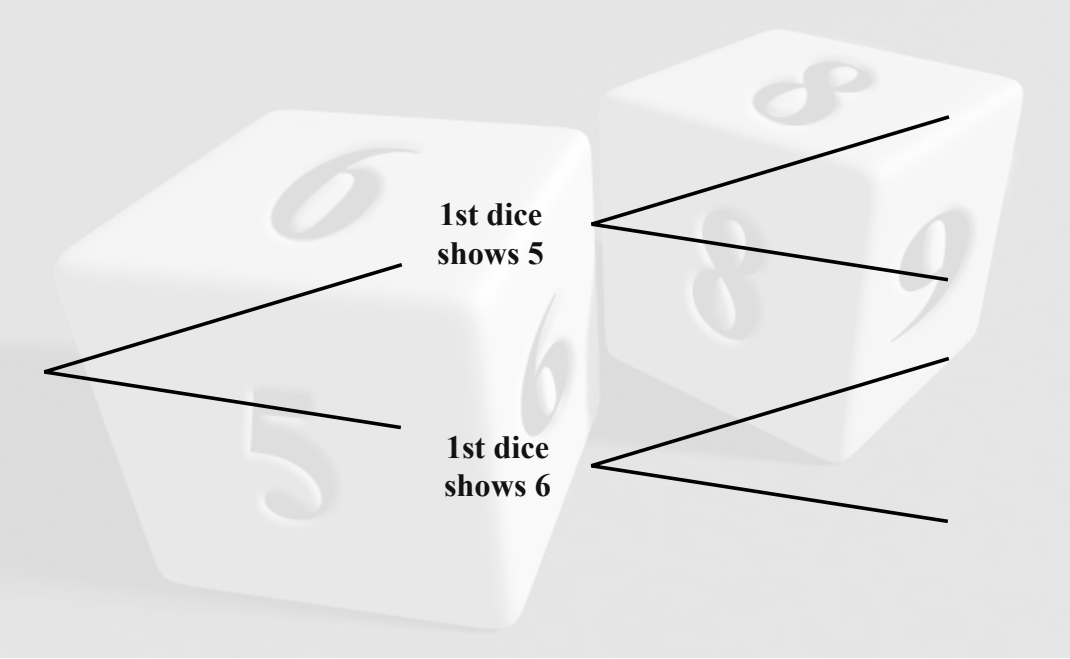
Jess has one six-sided dice that has three sides labelled **"6"** and three sides labelled **"5"**.
She has a second six-sided dice that has either an **"8"** or a **"9"** on each of its sides.
Jess rolls the two dice 120 times, and records the total showing each time.
Her results are shown in the table:

| Total showing on the two dice | **13** | **14** | **15** |
|---|---|---|---|
| Frequency | 20 | 66 | 34 |

Determine the most likely number of sides on the second dice that were labelled "**9**".
**Use probabilities and / or diagrams to explain and support your answer**.




Number of sides labelled "**9**" is _____

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

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

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