**90147**

# Level 1 Mathematics, 2004

## 90147  Use straightforward algebraic methods and solve equations

Credits: Four
9.30 am Thursday 11 November 2004

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 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.**

| Achievement Criteria | | *For Assessor's use only* | | | |
|---|---|---|---|---|---|
| **Achievement** | | **Achievement with Merit** | | **Achievement with Excellence** | |
| Use straightforward algebraic methods. | | Use algebraic methods and solve equations in context. | | Use algebraic strategies to investigate and solve problems. | |
| Solve equations. | | | | | |
| **Overall Level of Performance (all criteria within a column are met)** | | | | | |

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

# At the Pool

You should show **ALL** working.

## QUESTION ONE

Solve these equations:

(a)  $(3x - 1)(x + 2) = 0$

(b)  $6x - 2 = 2x + 9$

(c)  $\dfrac{5x}{2} - 1 = 3$

## QUESTION TWO

Expand and simplify:

$(3x - 1)(2x + 5)$

## QUESTION THREE

Factorise completely:

$x^2 - 7x + 6$

## QUESTION FOUR

Simplify:

$$\dfrac{12x^6}{4x^2}$$

## QUESTION FIVE

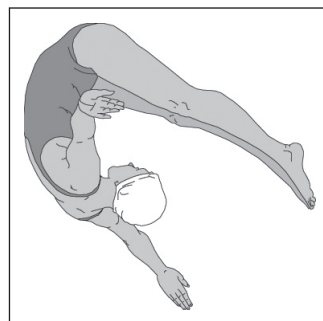In a diving competition, the score ($R$) for a dive is calculated using the formula

$R = 0.6\, DT$

where $D$ is the degree of difficulty for the dive
and $T$ is the total of the judges' marks.

Jill does a dive with degree of difficulty $D = 2.5$.
The judges' marks had a total $T = 34.5$.
Calculate the score, $R$, for Jill's dive.

$R =$ _____

## QUESTION SIX

Simplify:

$$\frac{3a^2 - 15ab}{6a^2}$$

## QUESTION SEVEN

John saved $4000 for a trip to the Olympic Games.
He wanted to buy as many tickets to the swimming as possible.
Each ticket to the swimming costs $85.
Travel, food and accommodation cost $3100.

Use this information to write an equation **or** inequation.

Solve your equation or inequation.

What is the greatest number of tickets to the swimming that John could buy?

## QUESTION EIGHT

Janet bought tickets to the diving and the swimming at the Olympic Games.
She paid $1095 for 15 tickets.
The tickets for the diving cost $65 and the tickets for the swimming cost $85.

Solve the pair of simultaneous equations to find the number of tickets Janet bought for the swimming.

$$65d + 85w = 1095$$
$$d + w = 15$$

## QUESTION NINE

At the Olympic Games 40 years ago, the **average number of competitors per sport** was 5 times the number of sports played.
In 2004 there were 10 more sports than there were 40 years ago.
In 2004 the average number of competitors per sport was 3.5 times greater than 40 years ago.
At the 2004 Olympic Games there were 10 500 competitors.

Write **at least** ONE equation to model this situation.
Use the model to find the **number of sports** played at the Olympic Games 40 years ago.

**Show all your working.**

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

Question
Number