90153

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 1 Mathematics, 2003

90153 Use geometric reasoning to solve problems

Credits: Two
2:00 pm Wednesday 19 November 2003

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.

Show ALL working.

If you need more space for any answer, use the pages provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–6 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**
Find unknowns using two-step processes.	Find unknowns using a process with two-step reasoning.	Investigate a conjecture or present a proof involving at least three steps of reasoning in analysing shapes or designs.
Overall Level of Performance		

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

Angles All Around Us

QUESTION ONE

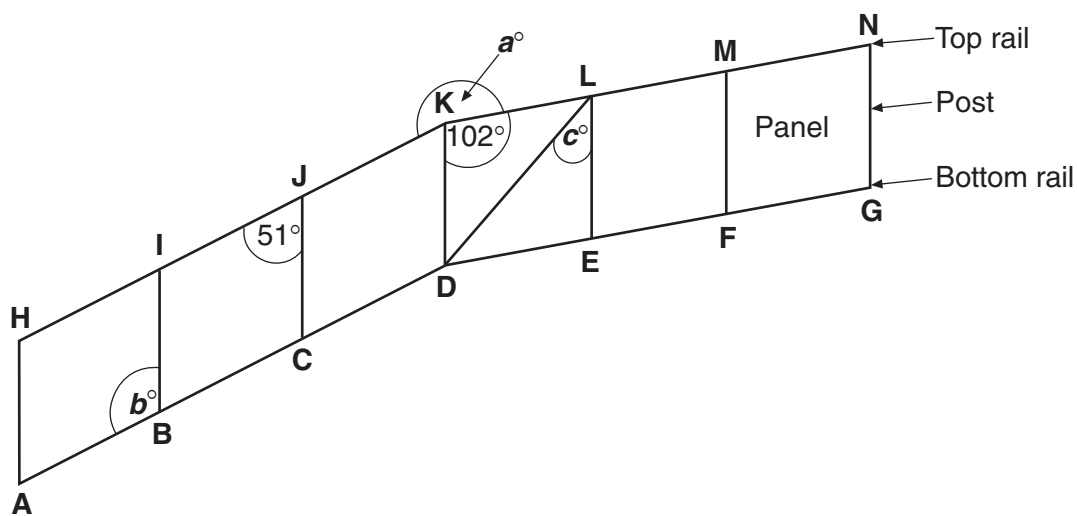The diagram below shows the handrails that skateboarders sometimes use.

Each panel in the diagram is a rhombus.
The top and bottom rails are parallel.
The posts are vertical.
The top rail **NK** makes an angle of 102° with the post **KD**.
The top rail **HJ** makes an angle of 51° with the post **JC**.

(a)   Find the angle marked *a*.

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(b)   Find the angle marked *b*.

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(c)   Find the angle marked *c*. Give geometrical reasons.

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QUESTION TWO

To the right is a diagram of a power pylon.

AM is an axis of symmetry.

Angle **JGD** is 100°.

JD and **LN** are horizontal.

Angle **EIB** = angle **KCH** = 90°.

Triangle **GKE** is isosceles.

(a) Find the size of the angle **IFC**. Give geometric reasons for your answer.

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(b) Find the size of the angle **LKJ**. Give geometric reasons for your answer.

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(c) **GJ** = 4.0 m, **JK** = 5.0 m, and **JD** = 6.1 m

Find the length of **KE**. Give reasons for your answer.

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QUESTION THREE

The lines **DE** and **FG** are parallel.

AC bisects the angle **DAB**.

BC bisects the angle **FBA**.
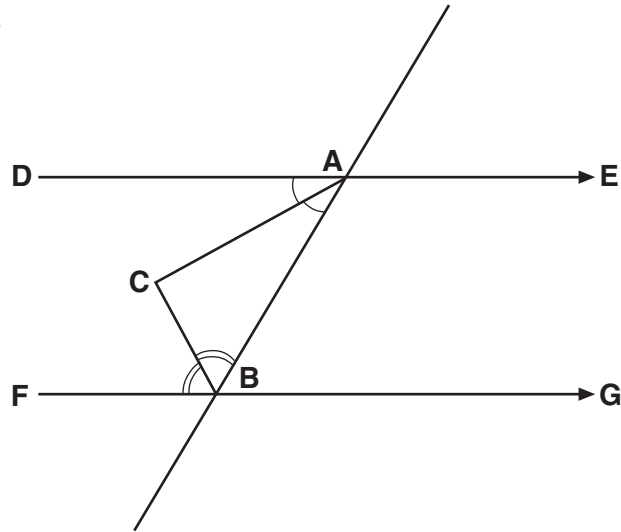
Prove that **AB** is the diameter of the circle through points **A**, **B** and **C**.

You must give geometric reasons to support your proof.

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

Question Number

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