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90153

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 1 Mathematics, 2004

90153 Use geometric reasoning to solve problems

Credits: Two
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 pages provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–10 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 geometric reasoning to solve problems. ☐	Use, and state, geometric reasons in solving problems. ☐	Solve an extended geometrical problem. ☐
Overall Level of Performance ☐		

You are advised to spend 30 minutes answering the questions in this booklet.

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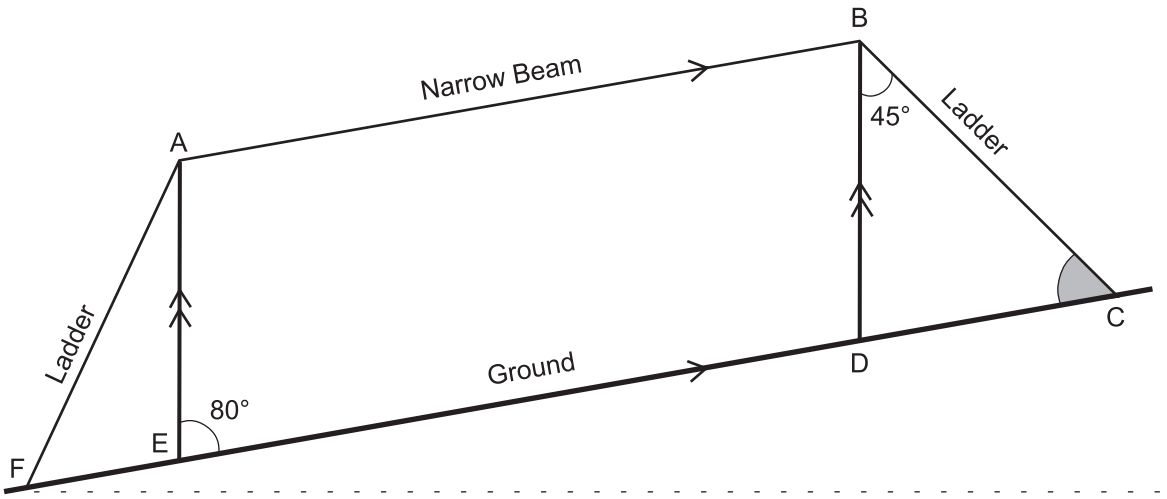
Playground Mathematics

You should show **ALL** working.

QUESTION ONE

The diagram below shows the *Narrow Beam Walk*.
It is built on sloping ground.
The beam, **AB**, is parallel to the ground.
The support posts, **AE** and **BD**, are vertical.
The support post, **AE**, makes an angle of 80º with the ground.

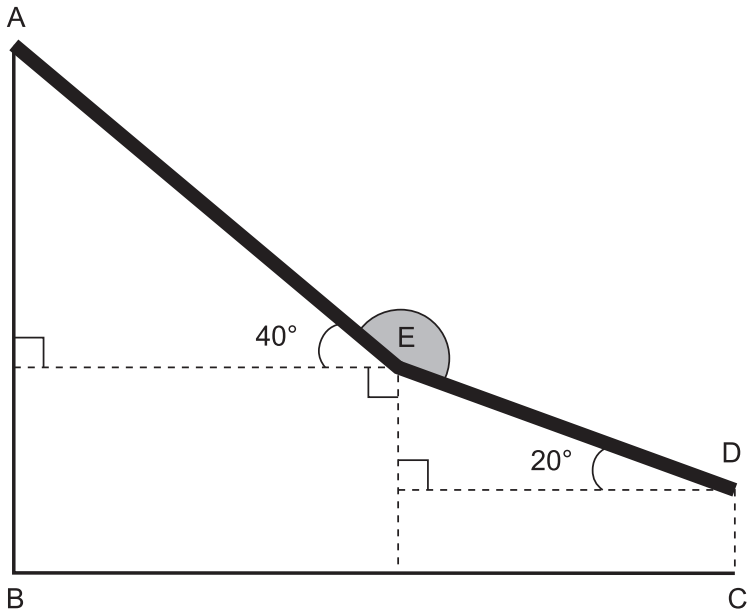


Find the angle **BCD**, the angle the ladder, **BC**, makes with the ground.

QUESTION TWO

AED is a playground slide.
The upper part, **AE**, makes an angle of 40º with the horizontal.
The lower part, **ED**, makes an angle of 20º with the horizontal.

Find the angle **AED** (shaded in the diagram) between the two parts of the slide.



QUESTION THREE

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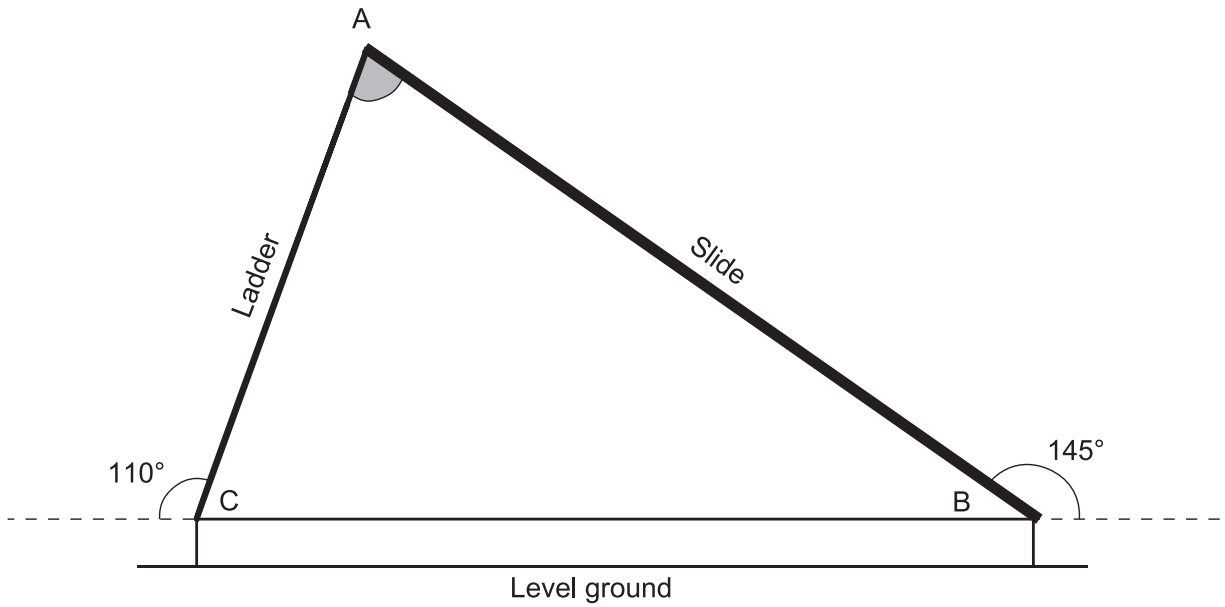
This is a diagram of another playground slide.



The ladder, **AC**, makes an angle of 110º with the horizontal.
The slide, **AB**, makes an angle of 145º with the horizontal.

Find the angle **BAC**, between the ladder and the slide.

QUESTION FOUR

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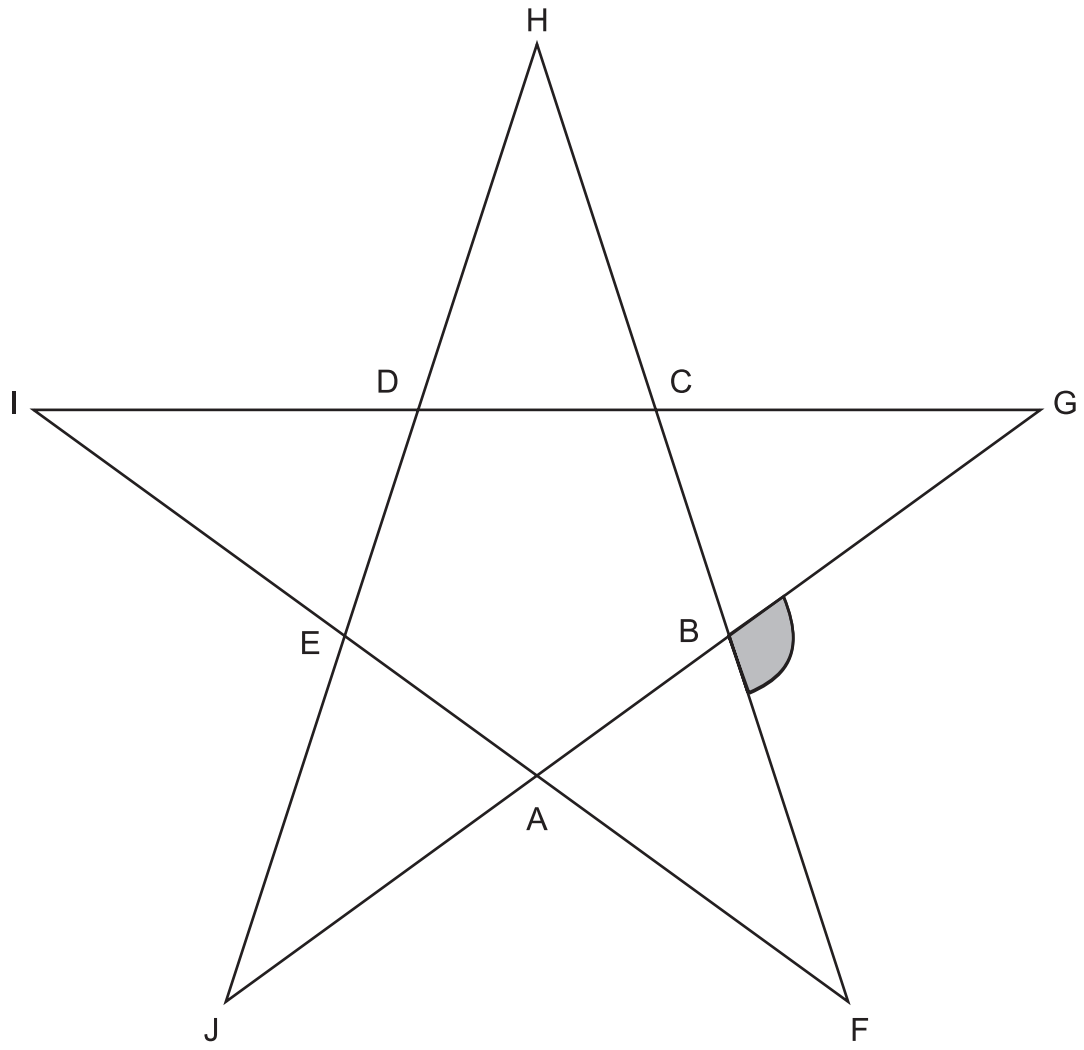

The diagram above shows a pentagram.
ABCDE is a regular pentagon.

Find the angle **GBF**. You MUST give geometric reasons for your answer.

QUESTION FIVE

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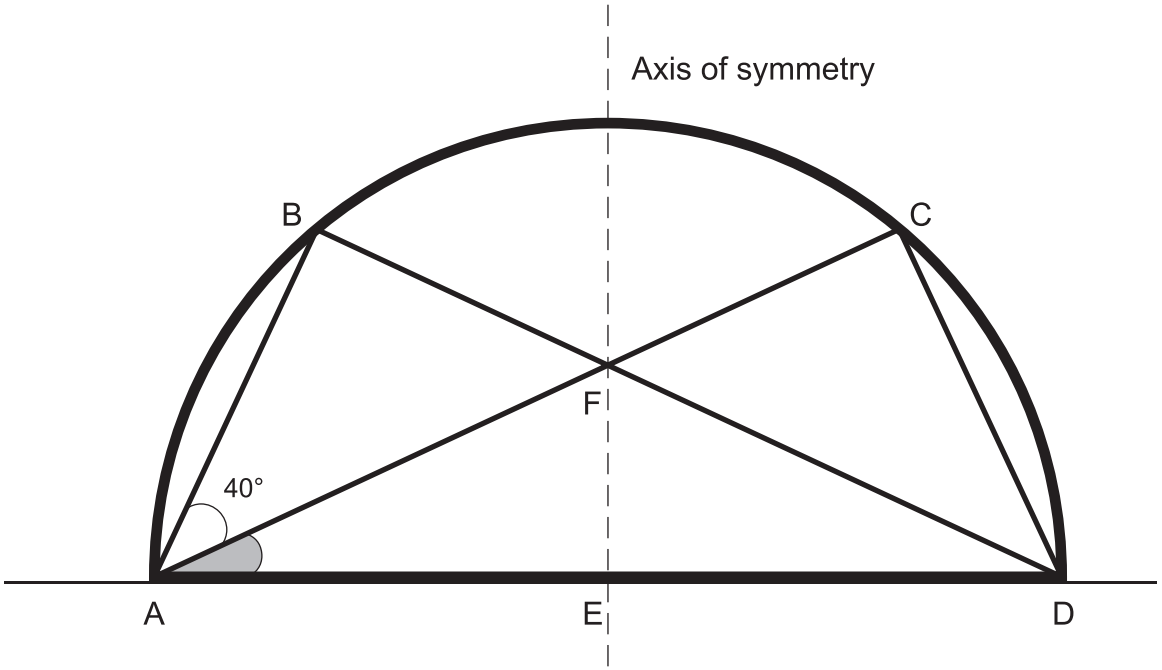

(a) The end of a playground tunnel is a semicircle with the centre at **E**.
EF is an axis of symmetry.
It is held up by bracing, as shown in the diagram.
The brace **AC** makes an angle of 40º with the brace **AB**.

Find the angle **DAC**, the angle the brace **AC** makes with the ground.
You MUST give geometric reasons for your answer.

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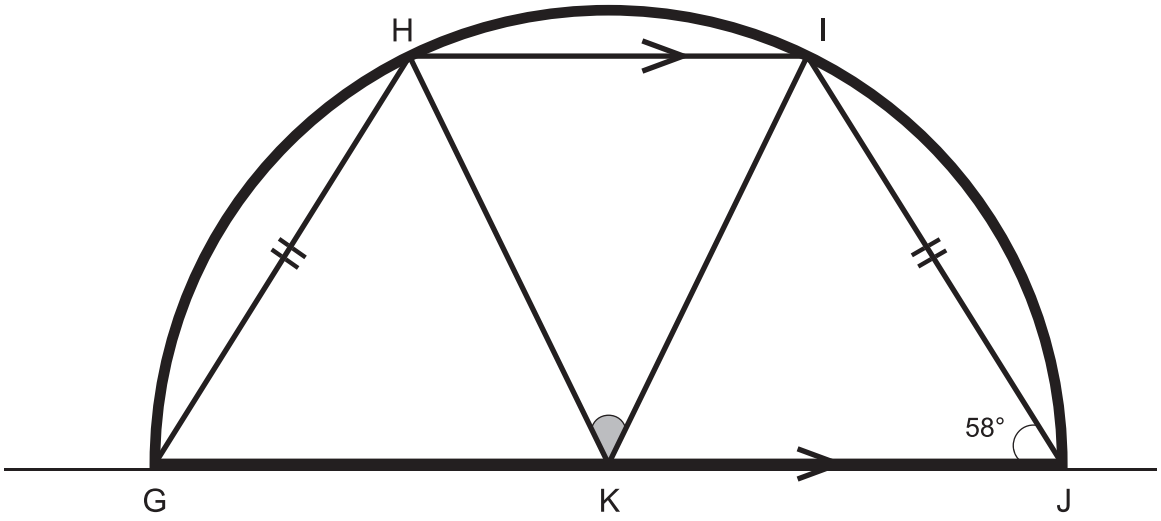

(b) The bracing is different at the other end of the playground tunnel.
K is the centre of the semicircle.
GHIJ is an isosceles trapezium, with **GJ** parallel to **HI**, as shown in the diagram.
The brace **IJ** makes an angle of 58º with the ground.

Find the angle **HKI**, the angle between the two braces at **K**.
You MUST give geometric reasons for your answer.

QUESTION SIX

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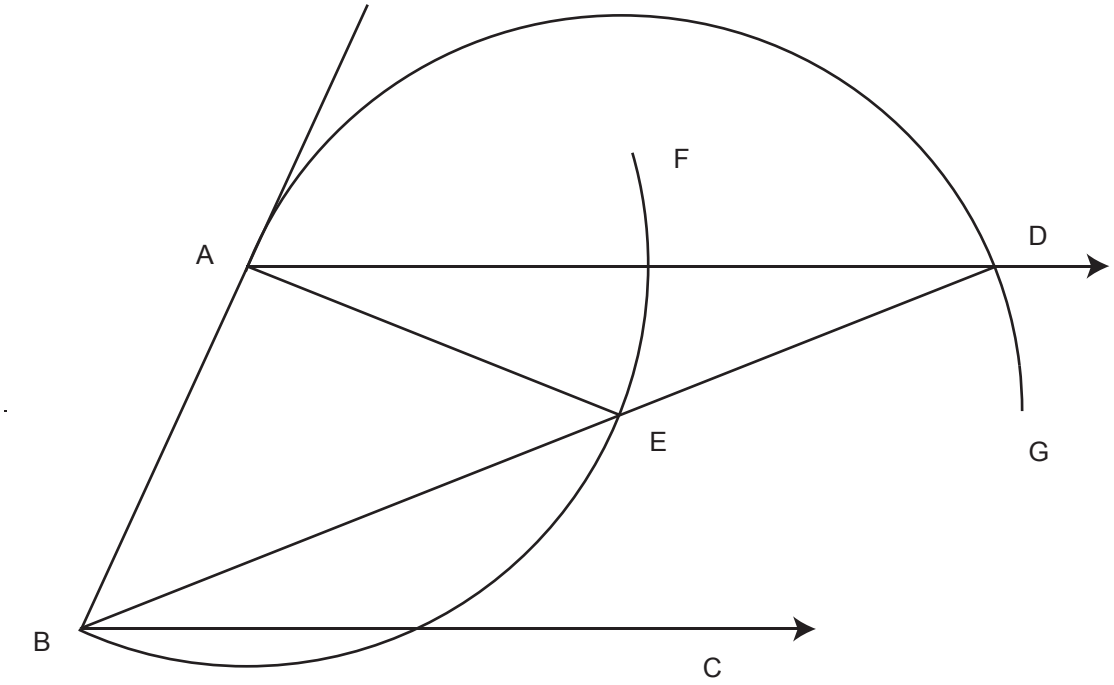
In the figure below **AD** is parallel to **BC.**
A is the centre of the arc **BEF.**
E is the centre of the arc **ADG.**

Prove that angle **ABE** is twice the size of angle **CBE**.



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

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