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.

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<td>Use, and state, geometric reasons in solving problems.</td>
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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 80° 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 40° with the horizontal. The lower part, ED, makes an angle of 20° with the horizontal.

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

This is a diagram of another playground slide.

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

Find the angle BAC, between the ladder and the slide.
The diagram above shows a pentagram. \(ABCDE\) is a regular pentagon.

Find the angle \(GBF\). You MUST give geometric reasons for your answer.
(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.
(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 $58^\circ$ 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

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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