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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

MATHEMATICS, 2002

Level 1

1.9 Use geometric reasoning to solve problems.

Credits: Two
9.30 am Wednesday 20 November 2002

Check that the Candidate Code Number 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.

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 2–7 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.

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ACHIEVEMENT CRITERIA

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.

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SPORTS GEAR

Show **ALL** working.

QUESTION ONE

Diagram 1 shows the side of a school hockey goal.

- **AB** is parallel to **FC**.
- **FCDE** is a rectangle.
- The angle **BAF** between the top and the frame for the net is 118°.

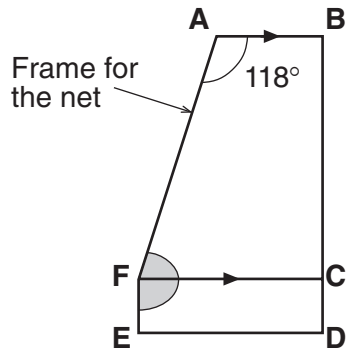

Diagram 1

Calculate the size of angle **AFE**.

Show each step of your working.

Angle **AFE** = _____

QUESTION TWO

In Diagram 2:

- **BG** is parallel to **FD**
- angle **ACG** = 124°.

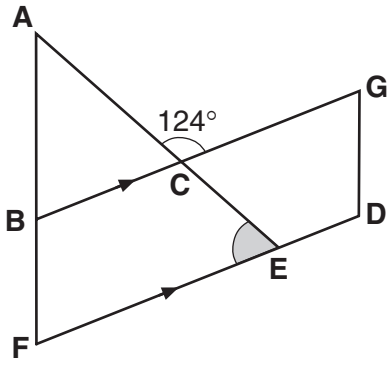

Diagram 2

Calculate the size of angle **CEF**.

Show each step of your working.

Angle **CEF** = _____

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QUESTION THREE

In Diagram 3:

- length **AB** = length **AC**
- angle **BAC** = 64°.

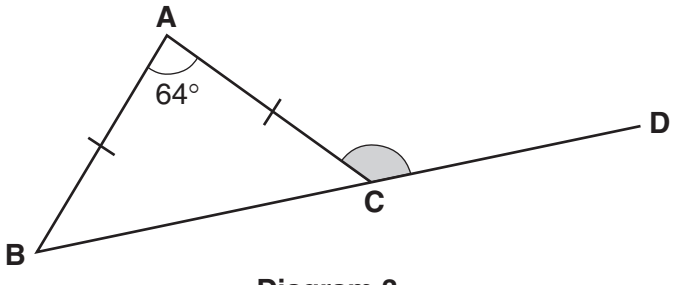

Diagram 3

Calculate the size of angle **ACD**.

Show each step of your working **and** give a geometrical reason for each step.

Angle	Reason

QUESTION FOUR

The prize for the top school soccer team is an engraved circular disc on a wooden stand, as shown in Diagram 4.

- **O** is the centre of the circle.
- angle **BDC** = 106°.

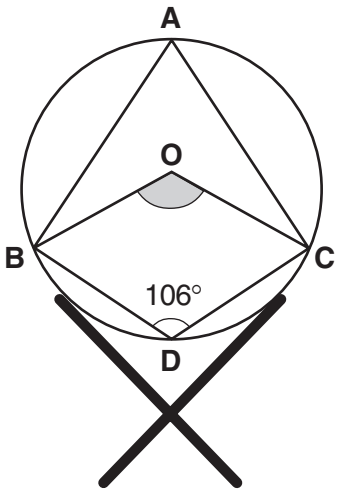

Diagram 4

Calculate the size of the shaded angle **BOC**.

Show each step of your working **and** give a geometrical reason for each step.

Angle	Reason

QUESTION FIVE

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A school has seating for its sports field.

The side view of this is shown in Diagram 5.

- **FD** is vertical.
- **DE** and the three seats are horizontal.

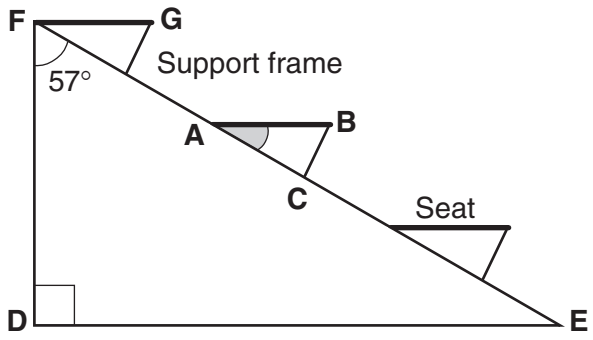

Diagram 5

Calculate the size of angle **BAC**, which one of the seats makes with the support frame, **FE**.

Show each step of your working **and** give a geometrical reason for each step.

Angle	Reason

QUESTION SIX

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A soccer club has as its logo the design shown in Diagram 6.

- The logo is based on two regular pentagons and a regular hexagon.
- **AB** and **AC** are straight lines.

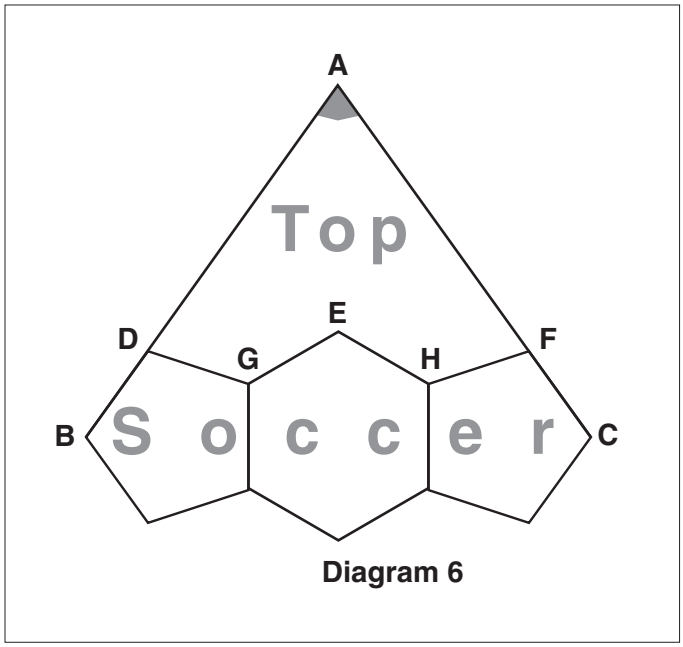

Diagram 6

Prove angle **DAF** is 72°.

Show your working **and** give geometrical reasons to support your proof.

You may add any labels to the diagram that you wish.