**OCR**
RECOGNISING ACHIEVEMENT

**ADVANCED GCE**

**MATHEMATICS (MEI)** 4754B

Applications of Advanced Mathematics (C4) Paper B: Comprehension

Candidates answer on the question paper

**OCR Supplied Materials:**
* Insert (inserted)
* MEI Examination Formulae and Tables (MF2)

**Other Materials Required:**
* Rough paper

**Tuesday 13 January 2009**
**Morning**

**Duration:** Up to 1 hour

| Candidate Forename | | Candidate Surname | |
|---|---|---|---|
| Centre Number | | Candidate Number | |

**INSTRUCTIONS TO CANDIDATES**

* Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
* Use black ink. Pencil may be used for graphs and diagrams only.
* Read each question carefully and make sure that you know what you have to do before starting your answer.
* Answer **all** the questions.
* Do **not** write in the bar codes.
* Write your answer to each question in the space provided, however additional paper may be used if necessary.
* You are permitted to use a graphical calculator in this paper.
* Final answers should be given to a degree of accuracy appropriate to the context.

**INFORMATION FOR CANDIDATES**

* The number of marks is given in brackets **[ ]** at the end of each question or part question.
* The insert contains the text for use with the questions.
* You may find it helpful to make notes and do some calculations as you read the passage.
* You are **not** required to hand in these notes with your question paper.
* You are advised that an answer may receive **no marks** unless you show sufficient detail of the working to indicate that a correct method is being used.
* The total number of marks for this paper is **18**.
* This document consists of **4** pages. Any blank pages are indicated.

| Examiner's Use Only: | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| **Total** | |

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**Turn over**

**1** Show how the value $d = 8$ on line 32 is obtained. **[2]**

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**2** Using the information given on lines 38 and 39, derive equation (1). **[3]**

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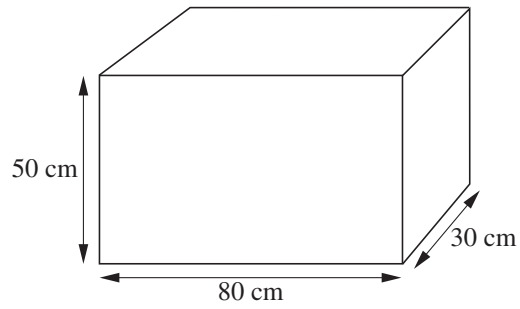
**3** On lines 43 and 44 it is suggested that the volume of fuel in the tank in Figs. 2.1 and 2.2 could be calculated using the values of $h$ and $\theta$.

Calculate the volume of fuel in the case where $h = 5$ and $\theta = 30°$. **[3]**

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**4**   A fuel tank in the shape of a cuboid is shown below.



It is partly filled with fuel and inclined at an angle to the horizontal.  The side view is shown below.
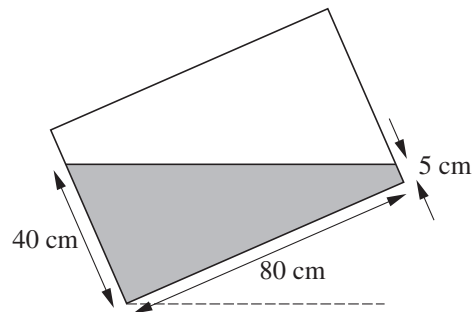


Calculate the volume, in litres, of fuel in the tank.   **[3]**

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**5** **(i)** Explain clearly how the equation on line 72 can be simplified to give the quadratic equation on line 74. **[1]**

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**(ii)** In line 76 only one root of the quadratic equation is given. Find the other root and explain why it is not relevant in the context of this problem. **[3]**

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**6** On line 90 it is stated that if $H = h = 10$ then equation (4) gives a volume of 37.5 litres. Use equations (3) and (4) to show how this volume is derived. **[3]**

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