OCR
RECOGNISING ACHIEVEMENT

H

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS B (MEI)
Paper 3 Section A (Higher Tier)

B293A

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:
* Geometrical instruments
* Tracing paper (optional)

Monday 7 June 2010
Afternoon

Duration: 45 minutes

B293A

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.
* Show your working. Marks may be given for a correct method even if the answer is incorrect.
* Answer **all** the questions.
* Do **not** write in the bar codes.
* Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

INFORMATION FOR CANDIDATES

* The number of marks is given in brackets **[ ]** at the end of each question or part question.
* The total number of marks for this Section is **36**.
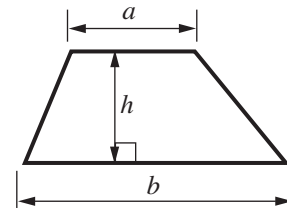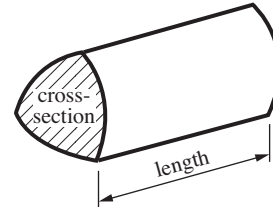* This document consists of **8** pages. Any blank pages are indicated.

WARNING

⊠ **No calculator can be used for Section A of this paper**

Turn over

Formulae Sheet: Higher Tier

Area of trapezium $= \frac{1}{2}(a+b)h$

Volume of prism = (area of cross-section) × length

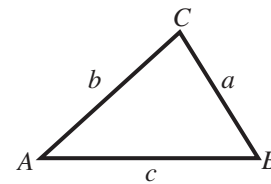**In any triangle *ABC***

Sine rule $\quad \dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$
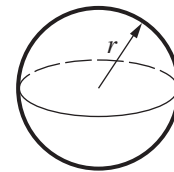
Cosine rule $\quad a^2 = b^2 + c^2 - 2bc \cos A$

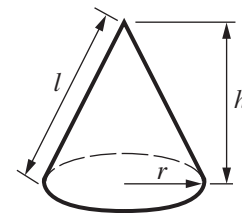**Area of triangle** $= \frac{1}{2}ab \sin C$

Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$

Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

PLEASE DO NOT WRITE ON THIS PAGE

1   A hire company uses this formula to work out the cost of hiring a car.

$$C = 5(4 + n)d + 50$$

   C is the hire charge in pounds.
   d is the number of days.
   n is the number of drivers.

John hires a car for 7 days. He registers himself and his wife as drivers.

How much will this cost?

£ .... **[3]**

2   A garden centre is carrying out a survey of its visitors to find out what they think of the new facilities. Visitors are asked to complete a questionnaire.

The first part asks about their age.

> **1**   Please tell us your age. Tick one of the boxes below.
>
> | 0 – 20 | | 20 – 40 | |
> |---|---|---|---|
> | 40 – 60 | | 60 or over | |

Criticise this part of the questionnaire and say how it can be improved.

....

....

.... **[2]**

3   The diagram shows a house with an extension.
All dimensions are marked in metres.
The base of the house and the base of the extension are horizontal rectangles.
All the walls are vertical. AB and CD are horizontal.
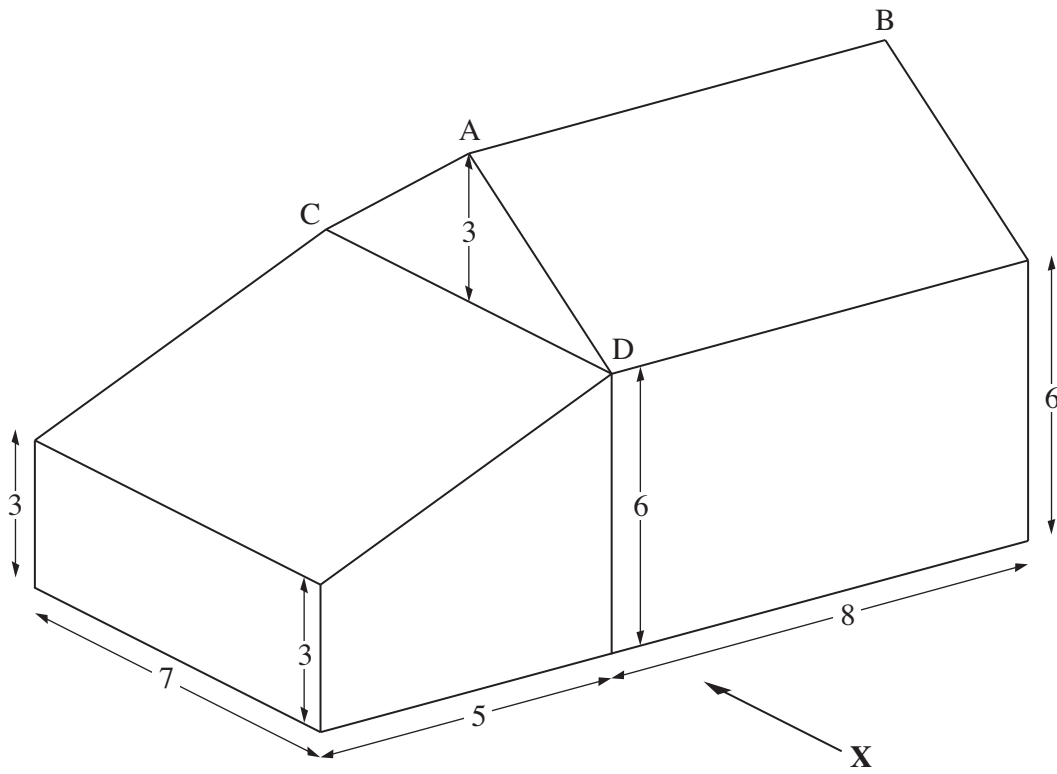
On the grid below draw the elevation from the direction marked **X**.
Use a scale of 1 cm represents 1 m.
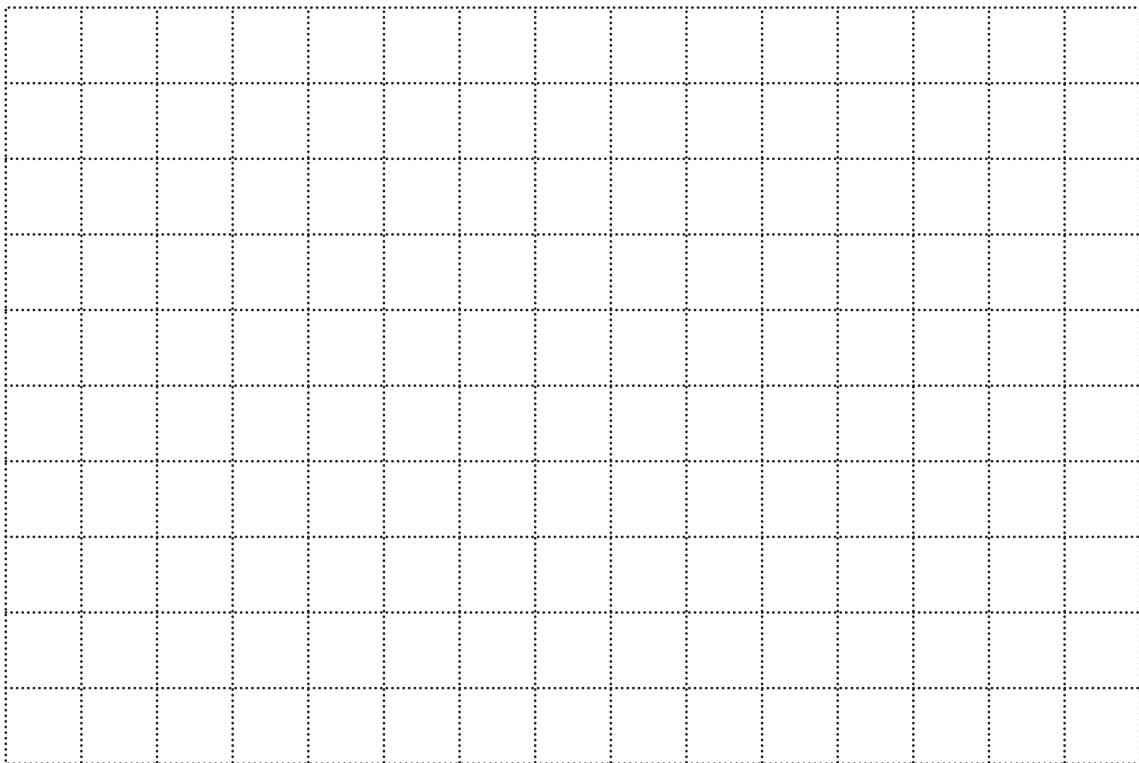
[3]

4 **(a)** **Estimate** the value of $\dfrac{211 \times 39}{82}$.

Show your working.

(a) .... **[2]**

(b) You are given that $71 \times 453 = 32163$.

Use this calculation to work these out.

.

(i) 710×4.53

(b)(i) .... **[1]**

(ii) $\dfrac{321.63}{71}$

(ii) .... **[1]**

5 The statements below are both false.

Find a counter-example for each one.

(a) "Every multiple of three is an odd number."

.... **[1]**

(b) "For all integers, n, the number $6n + 1$ is prime."

.... **[1]**

Turn over

6 300 g of pastry mix makes 50 cheese straws.
Mike wants to make 125 cheese straws for a party.

(a) How many grams of pastry mix will Mike need to make 125 cheese straws?

(a).................................. g **[2]**

(b) To make the pastry mix Mike uses flour, butter and cheese in the ratio 4 : 3 : 3.

Work out how much flour, butter and cheese Mike will need to make 125 cheese straws.

(b) Flour: .... g,   Butter: .... g,   Cheese: .... g **[3]**

7 A hemispherical container of radius r cm is filled with water to a depth of h cm.

Here are four expressions in terms of r and h.

A $2\pi \sqrt{2rh - h^2}$ **B** $\dfrac{\pi h^2(3r - h)}{3}$ **C** $\dfrac{2\pi(r + h^2)}{3}$ **D** $\pi h(2r - h)$

Which one of the expressions could give a formula for the volume of water.
Explain how you decided.

Expression: ....

Reason: ....

.... **[2]**

8 Solve the following equations.

   (a) $5x - 3 = 2x + 4$

   (a) .... **[3]**

   (b) $4x + 5 = 2(x + 7)$

   (b) .... **[3]**

   (c) $\dfrac{(3 - x)}{4} = 2 - x$

   (c) .... **[3]**

TURN OVER FOR QUESTION 9

9 **(a)** Solve the equation $x^2 - 4x - 1 = 0$.
Give your answers in the form $a \pm \sqrt{b}$ where a and b are integers.

(a) .... **[3]**

(b) Simplify the following expression.

$$\frac{x^2 - 5x}{x^2 - 25}$$

(b) .... **[3]**