| Candidate Forename | | Candidate Surname | |
|---|---|---|---|

| Centre Number | | | | | | Candidate Number | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

# OXFORD CAMBRIDGE AND RSA EXAMINATIONS
## GENERAL CERTIFICATE OF SECONDARY EDUCATION

# B293A

# MATHEMATICS B (MEI)

### Paper 3 Section A (Higher Tier)

### MONDAY 7 JUNE 2010: Afternoon
### DURATION: 45 minutes

### SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

**Candidates answer on the Question Paper**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Geometrical instruments**
**Tracing paper (optional)**

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

**READ INSTRUCTIONS OVERLEAF**

DC (LEO/SW) MEP60289 29424/1

## INSTRUCTIONS TO CANDIDATES

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**

- **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 all your working. Marks may be given for a correct method even if the answer is incorrect.**

- **Answer ALL the questions.**

- **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).**

- **Do not use a calculator for Section A of this paper.**

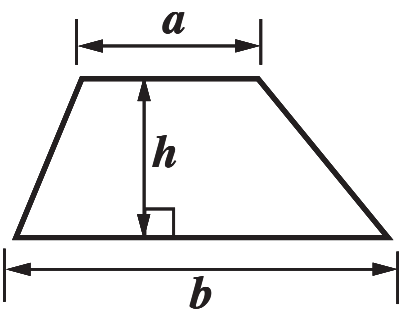
## INFORMATION FOR CANDIDATES

- **The number of marks is given in brackets [ ] at the end of each question or part question.**

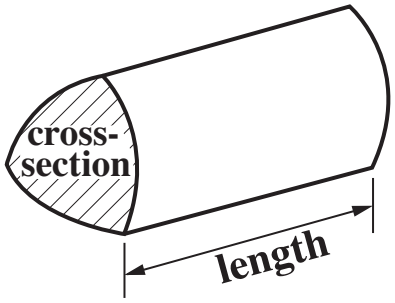
- **The total number of marks for this Section is 36.**

# FORMULAE SHEET: HIGHER TIER

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




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

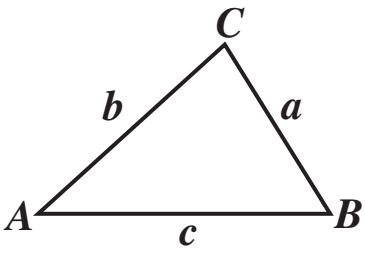



**In any triangle** $ABC$

**Sine rule** $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

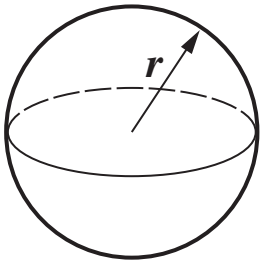
**Cosine rule** $a^2 = b^2 + c^2 - 2bc\cos A$

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



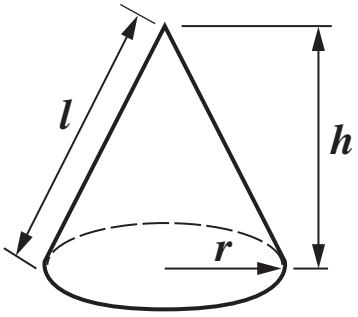

**Volume of sphere** $= \frac{4}{3}\pi r^3$

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




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

**Curved surface area of cone** $= \pi rl$




**The Quadratic Equation**

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

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

**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 marks]**

**£** _____

**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** | |

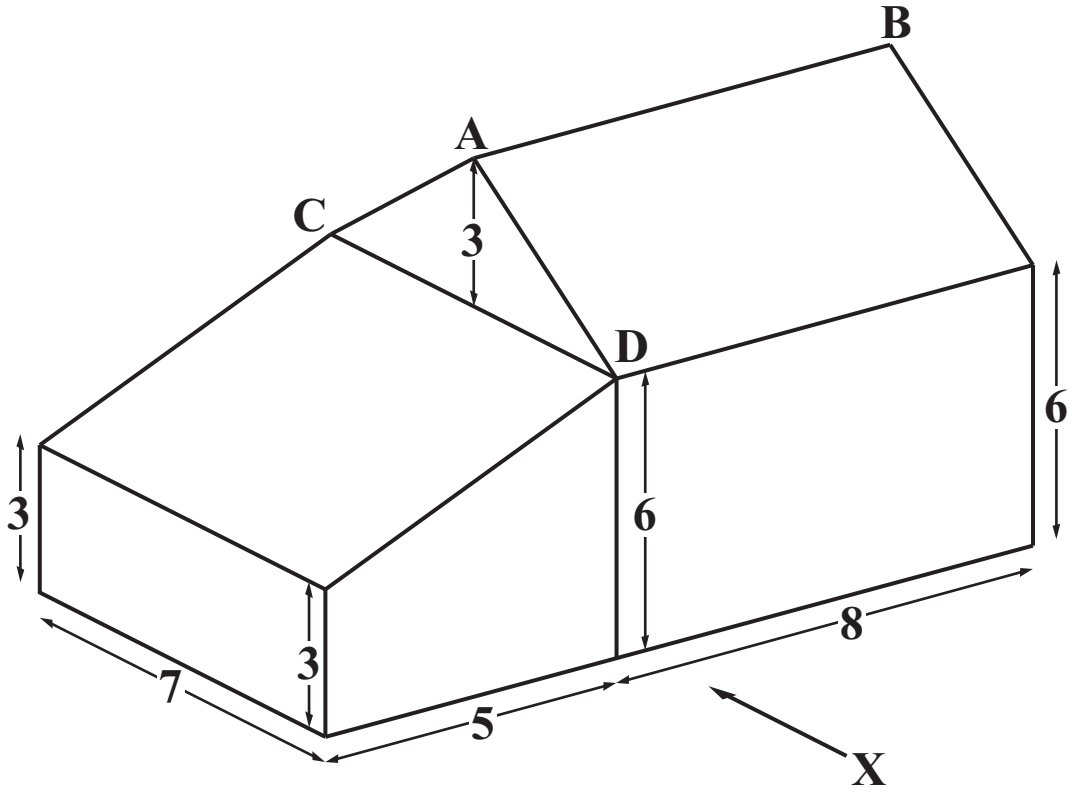
**Criticise this part of the questionnaire and say how it can be improved.**
**[2 marks]**

_____

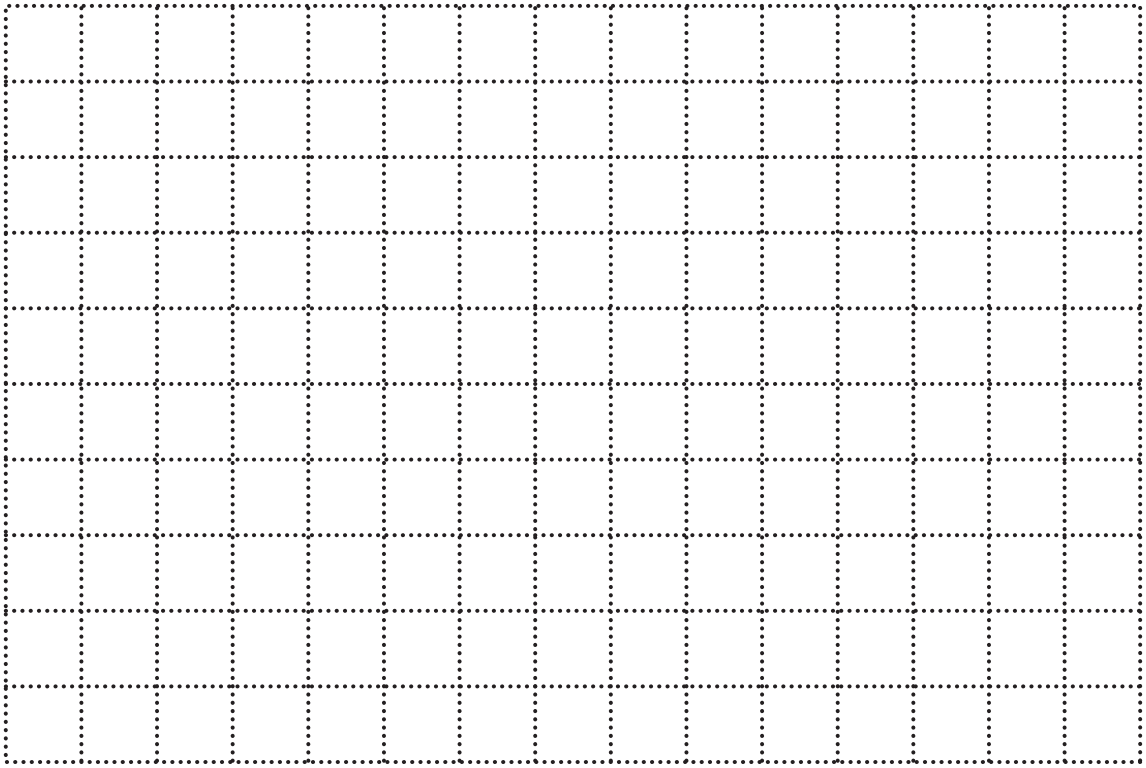
_____

_____

**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 marks]**



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

**Show your working.**
**[2 marks]**

**(a) _____**

**(b) You are given that 71 × 453 = 32163.**

**Use this calculation to work these out.**

**(i) 710 × 4.53**
**[1 mark]**

**(b)(i) _____**

**(ii) $\frac{321.63}{71}$**

**[1 mark]**

**(ii) _____**

**5 The statements below are both false.**

**Find a counter-example for each one.**

**(a) "Every multiple of three is an odd number."**
**[1 mark]**

_____

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

_____

**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?**
**[2 marks]**

**(a) _____g**

**(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.**
**[3 marks]**

**(b) Flour: _____ g, Butter: _____ g, Cheese: _____ g**

**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** $\frac{\pi 2h^2(3r - h)}{3}$ **C** $\frac{2\pi(r + h^2)}{3}$ **D** $\pi h(2r - h)$

**Which one of the expressions could give a formula for the volume of water.**
**Explain how you decided.**
**[2 marks]**

**Expression: _____**

**Reason: _____**

_____

**8 Solve the following equations.**

**(a) $5x - 3 = 2x + 4$**
**[3 marks]**

**(a)** _____

**(b) $4x + 5 = 2(x + 7)$**
**[3 marks]**

**(b)** _____

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

**[3 marks]**

**(c)** _____

**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.**
**[3 marks]**

**(a)** _____

**(b) Simplify the following expression.**

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

**[3 marks]**

**(b)** _____