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Centre number						Candidate number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B293A**

**MATHEMATICS B (MEI)**

**Paper 3 Section A (Higher Tier)**

**TUESDAY 11 JANUARY 2011: Morning**

**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)**

**Do not use a calculator for this paper**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

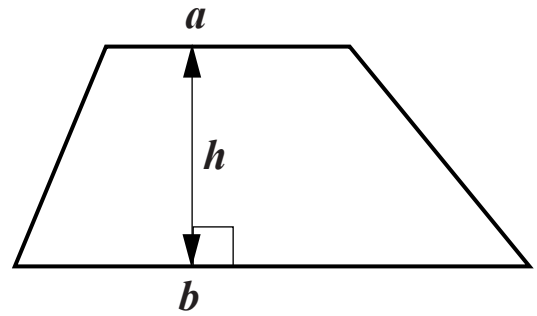
- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Show your working. Marks may be given for a correct method even if the answer is incorrect.**
- **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).**
- **Answer ALL the questions.**

## **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

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



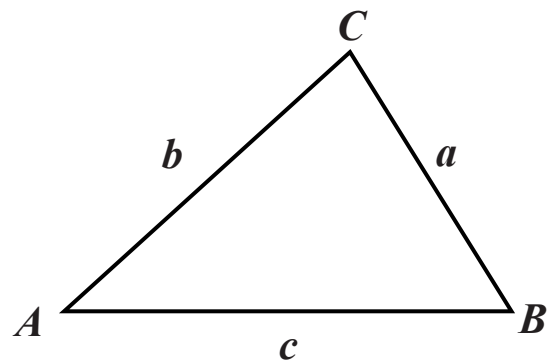
$$\text{Volume of prism} =$$
$$(\text{area of cross-section}) \times \text{length}$$

In any triangle  $ABC$

$$\text{Sine rule } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{Cosine rule } a^2 = b^2 + c^2 - 2bc \cos A$$

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



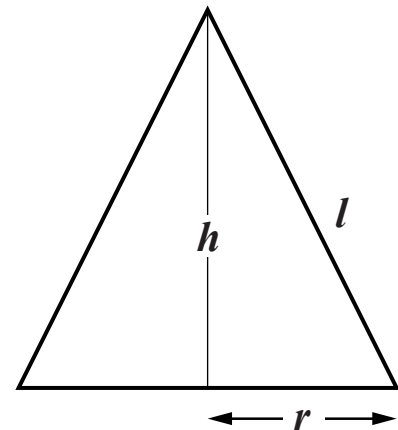
$$\text{Volume of sphere} = \frac{4}{3} \pi r^3$$

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

Where  $r$  is the radius.

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

$$\text{Curved surface area of cone} = \pi rl$$



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) Express 51 out of 300 as a percentage. [2 marks]**

\_\_\_\_\_ %

**(b) Find the smaller part when £300 is shared in the ratio 5:1  
[2 marks]**

£ \_\_\_\_\_

**2 For all whole number values of  $n$ , the following expressions can be described as**

**always odd**

**or**

**always even**

**or**

**either odd or even.**

**For each expression, determine which one of the descriptions is correct. Give your reasons.**

**(a)  $5n + 1$**

**The expression is \_\_\_\_\_**

**Reason: \_\_\_\_\_**

\_\_\_\_\_

**[2 marks]**

**(b)  $2(n + 1)$**

**The expression is \_\_\_\_\_**

**Reason: \_\_\_\_\_**

\_\_\_\_\_

**[2 marks]**

**3 Employees at a factory earn £700 per week.  
The manager offers them either an increase of £40 per week or a 5% rise in pay.**

**Which is the better choice for the employees? Explain your reasoning. [3 marks]**

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- 4 Peter has correctly worked out the sum below on his calculator, correct to 2 decimal places.

$$\frac{95.9}{0.81 \times 0.62} = 190.96$$

Jane does a rough check as follows.

$$\frac{95.9}{0.81 \times 0.62} \approx \frac{96}{1 \times 1} = 96$$

Jane tells Peter that his answer is too big.

However, Jane is wrong.

Carry out a more accurate approximation to demonstrate that the answer is close to 200.

[3 marks]

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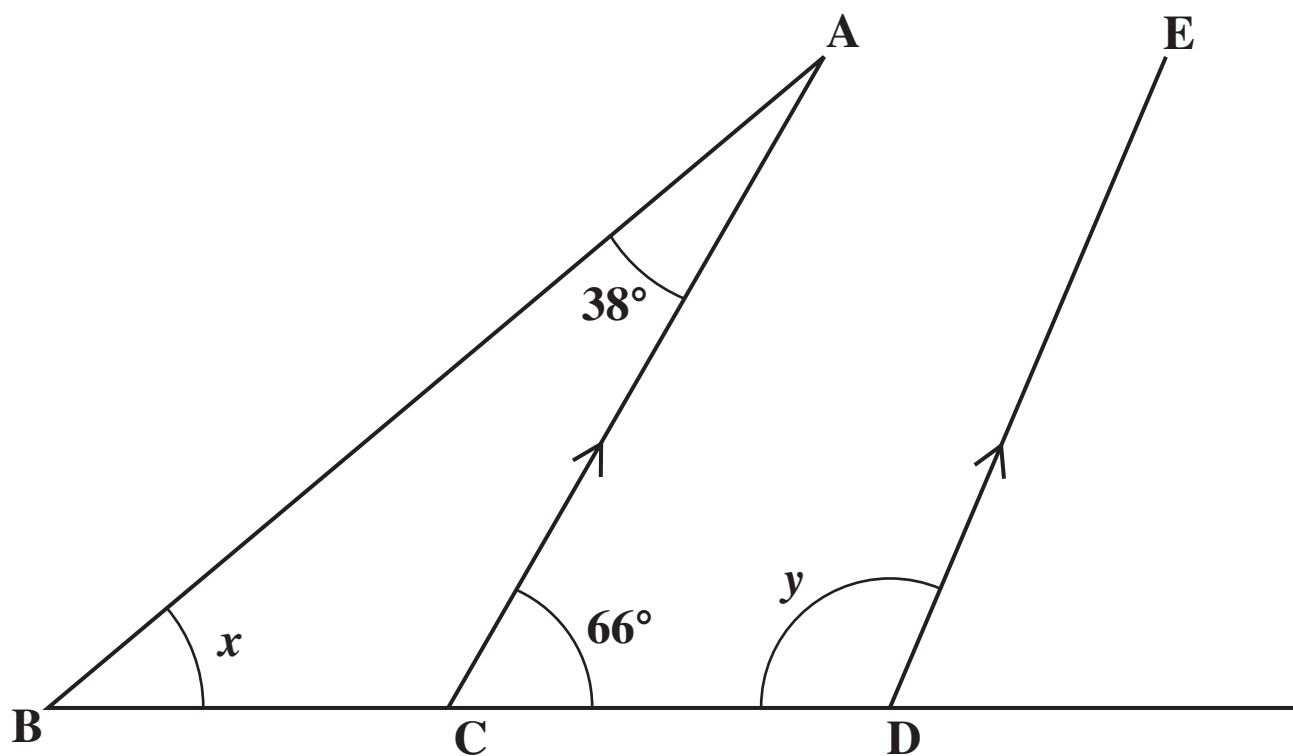
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- 5 Look at the diagram below.  
It is not to scale.





**In the diagram, CA is parallel to DE.  
Angle ACD =  $66^\circ$  and angle BAC =  $38^\circ$**

**Find the values of  $x$  and  $y$ , giving your reasons. [4 marks]**

**$x =$  \_\_\_\_\_  $^\circ$**

**Reason:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**$y =$  \_\_\_\_\_  $^\circ$**

**Reason:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**6 (a) Solve the equation below.**

$$3(2x + 5) = 27$$

**[3 marks]**

**(a)** \_\_\_\_\_

**(b) Solve algebraically the following simultaneous equations. [4 marks]**

$$4x + 3y = 6$$

$$5x - 2y = 19$$

$$x = \underline{\hspace{10cm}}$$

$$y = \underline{\hspace{10cm}}$$

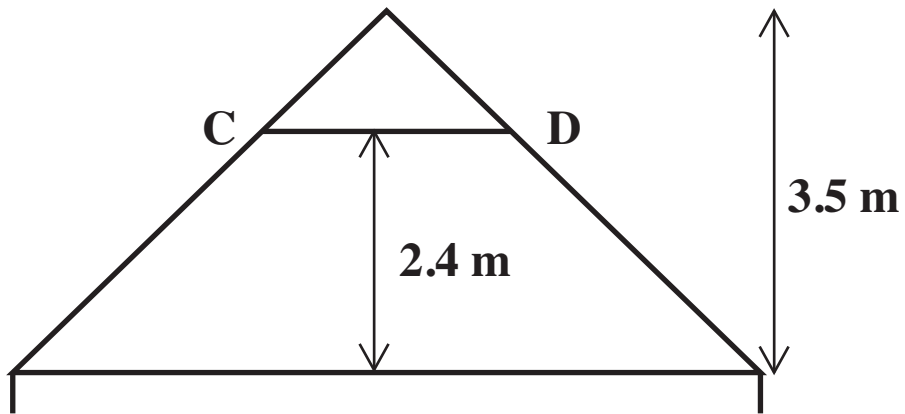
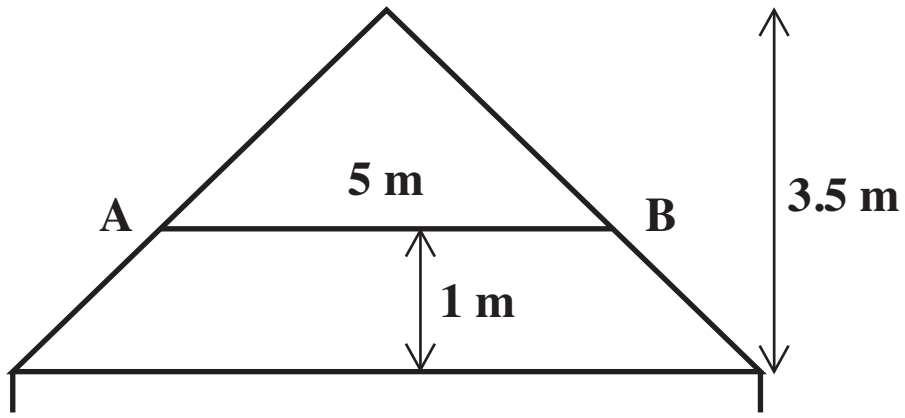
- 7 Look at the diagrams on the opposite page.  
They are not to scale.**

**Asif wants to convert his attic into a living area. However, there is a beam AB which is too low, as shown in the first diagram.**

$$\mathbf{AB = 5\text{ m.}}$$

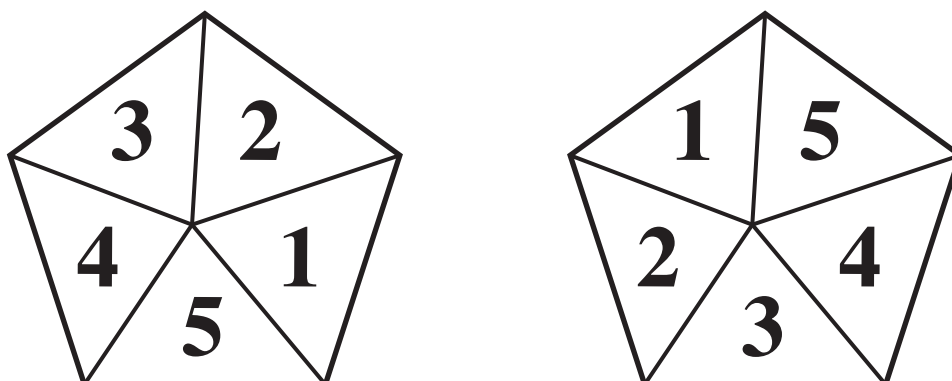
**He needs to replace AB with the beam CD as shown in the second diagram.**

**Use similarity to calculate the length of the beam CD.  
[4 marks]**



**8 Jake and Abdul are playing a game with spinners. Each has a spinner numbered from 1 to 5**

**The diagram below shows the face of each spinner.**



**They each record the results of 200 spins.**

**The table below shows these results**

	<b>Abdul</b>	<b>Jake</b>
<b>1</b>	<b>38</b>	<b>45</b>
<b>2</b>	<b>46</b>	<b>40</b>
<b>3</b>	<b>42</b>	<b>41</b>
<b>4</b>	<b>35</b>	<b>51</b>
<b>5</b>	<b>39</b>	<b>23</b>

**(a) Based on these results, what is the probability that Jake obtains a 5 on the next spin? [1 mark]**

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**(b) On this evidence, which spinner is more likely to be biased? Explain your reasoning. [2 marks]**

**The spinner used by \_\_\_\_\_ is more likely to be biased.**

**Reason: \_\_\_\_\_**

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- 9 (a) Factorise**  
 $x^2 - 2x$   
[1 mark]
- 

- (b) Hence simplify**

$$\frac{x^2 - 5x + 6}{x^2 - 2x}$$

[3 marks]

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**END OF QUESTIONS**



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