

<b>Candidate Forename</b>		<b>Candidate Surname</b>	
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<b>Centre Number</b>						<b>Candidate Number</b>				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B280B**

**MATHEMATICS C  
(GRADUATED ASSESSMENT)**

**MODULE M10 – SECTION B**

**MONDAY 21 JUNE 2010: Afternoon**

**DURATION: 30 minutes**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**Candidates answer on the Question Paper**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Geometrical instruments**

**Tracing paper (optional)**

**Scientific or graphical calculator**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

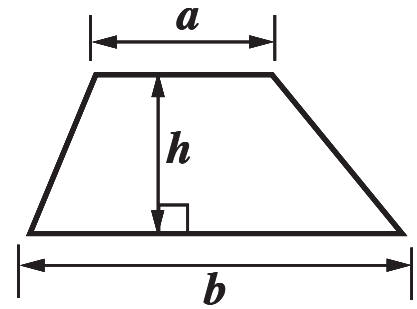
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show your 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).

## **INFORMATION FOR CANDIDATES**

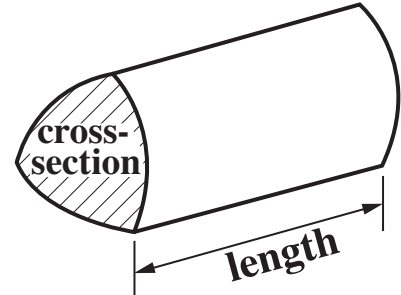
- The number of marks is given in brackets [ ] at the end of each question or part question.
- Section B starts with question 7.
- You are expected to use a calculator for this section of the paper.
- Use the  $\pi$  button on your calculator or take  $\pi$  to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is 25.

# FORMULAE SHEET

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



**Volume of prism** = (area of cross-section)  $\times$  length

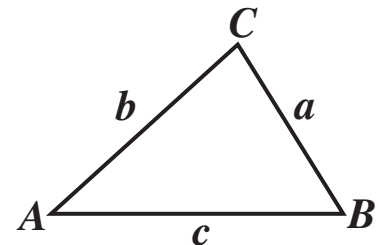


**In any triangle ABC**

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

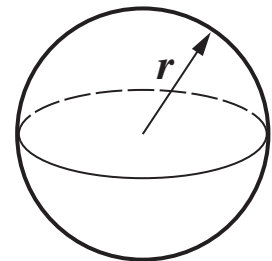
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

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



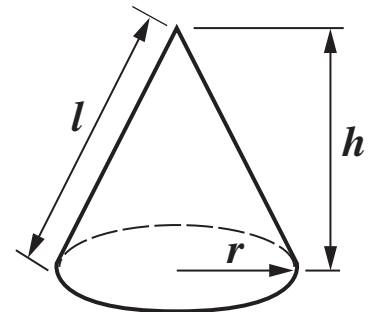
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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



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

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



**The Quadratic Equation**

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

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

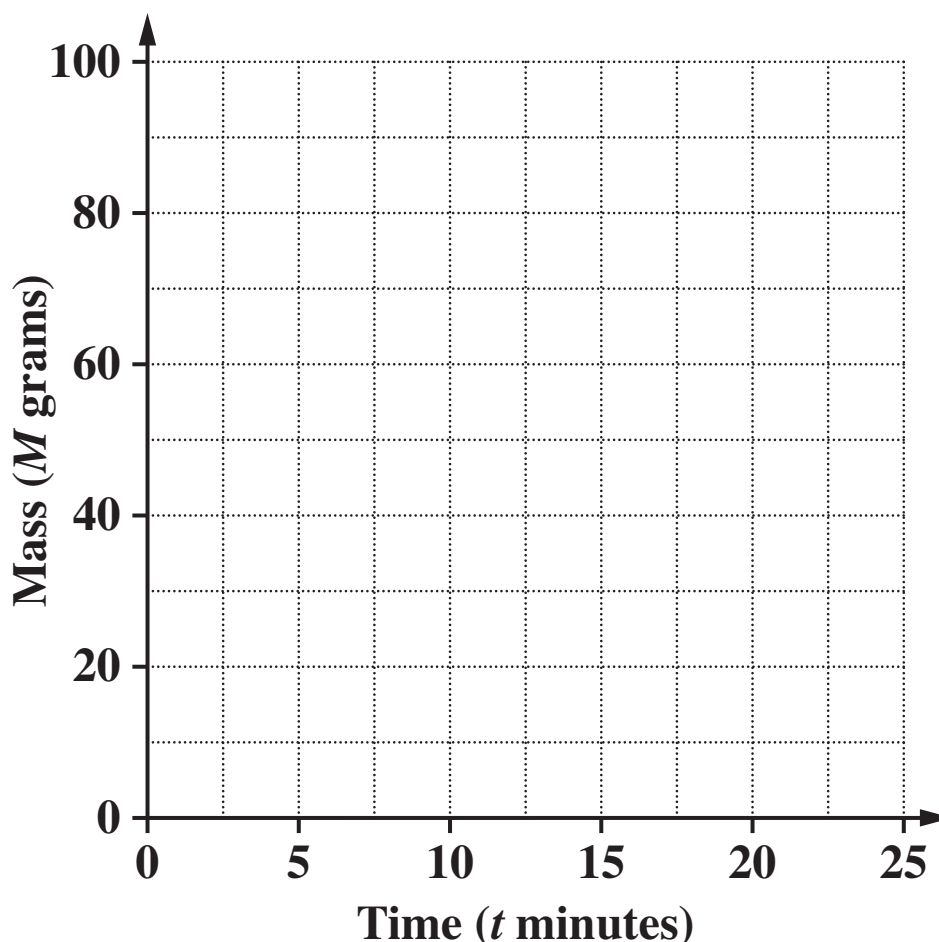
- 7 A scientist is experimenting with a radioactive substance. The mass,  $M$  grams, of the substance  $t$  minutes after the start of the experiment is given by this formula.

$$M = 100 \times 0.92^t$$

- (a) (i) Complete this table of values for  $M = 100 \times 0.92^t$ .  
[1 mark]

Time ( $t$ minutes)	0	5	10	15	20	25
Mass ( $M$ grams)	100	65.9	43.4	28.6		12.4

- (ii) Draw a graph to show this information.  
[2 marks]



**(b) The half-life of a radioactive substance is the time taken for the mass to reduce to half of its original value.**

**Use your graph to find the half-life of this radioactive substance.**

**[1 mark]**

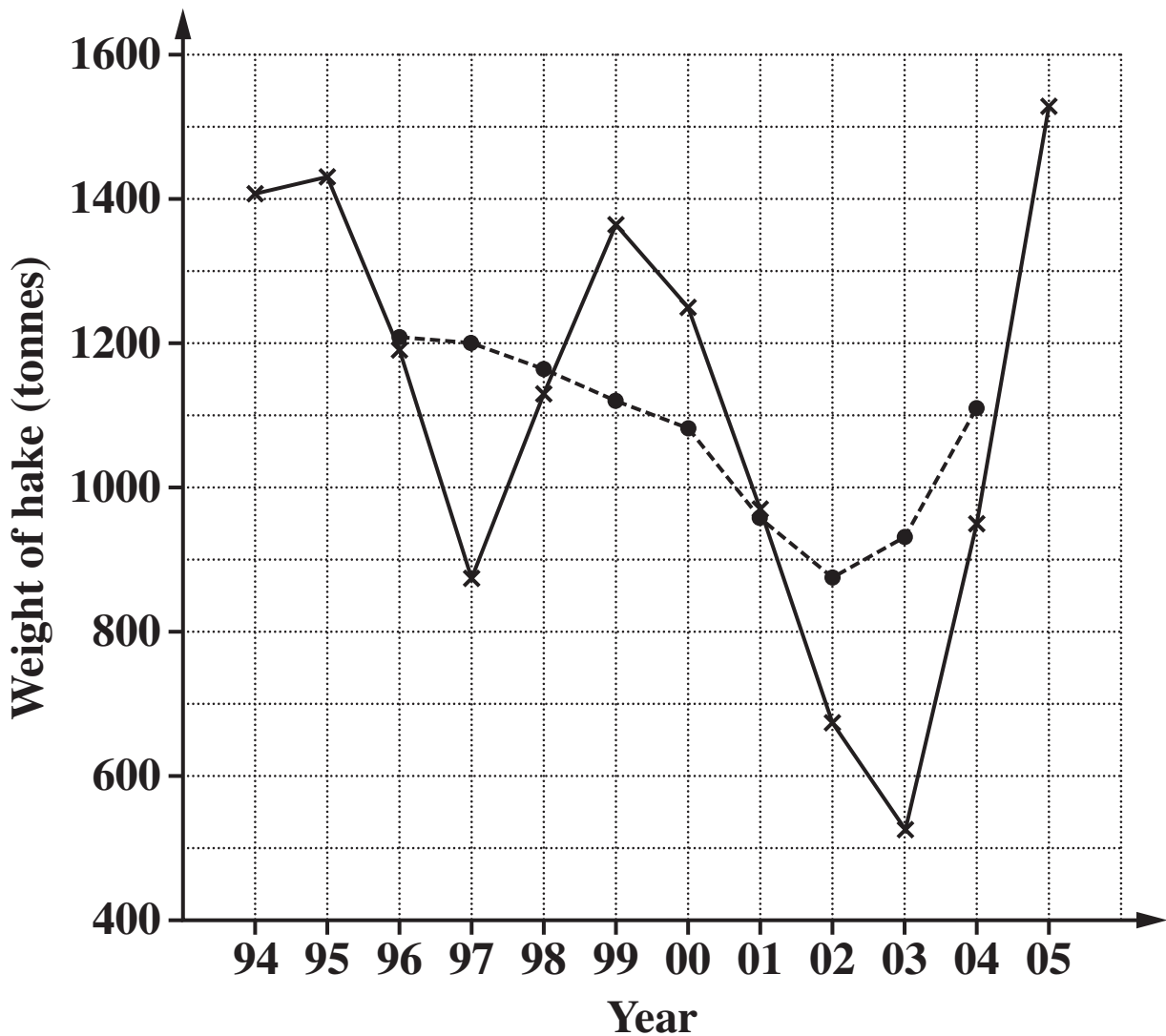
**(b) \_\_\_\_\_ minutes**

8 The table shows the weight, to the nearest tonne, of hake landed at Scottish fishing ports from 1994 to 2005.

<b>Year</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
<b>Weight (tonnes)</b>	<b>1409</b>	<b>1437</b>	<b>1194</b>	<b>874</b>	<b>1137</b>	<b>1362</b>

<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
<b>Weight (tonnes)</b>	<b>1252</b>	<b>976</b>	<b>677</b>	<b>525</b>	<b>947</b>	<b>1530</b>

These data have been plotted on the grid along with the 5-year moving averages.



**Key:**  
 —x— weights landed yearly  
 ---●--- 5-yearly moving averages

- (a) Describe what the moving averages show about the weight of hake landed at Scottish fishing ports.  
[1 mark]**

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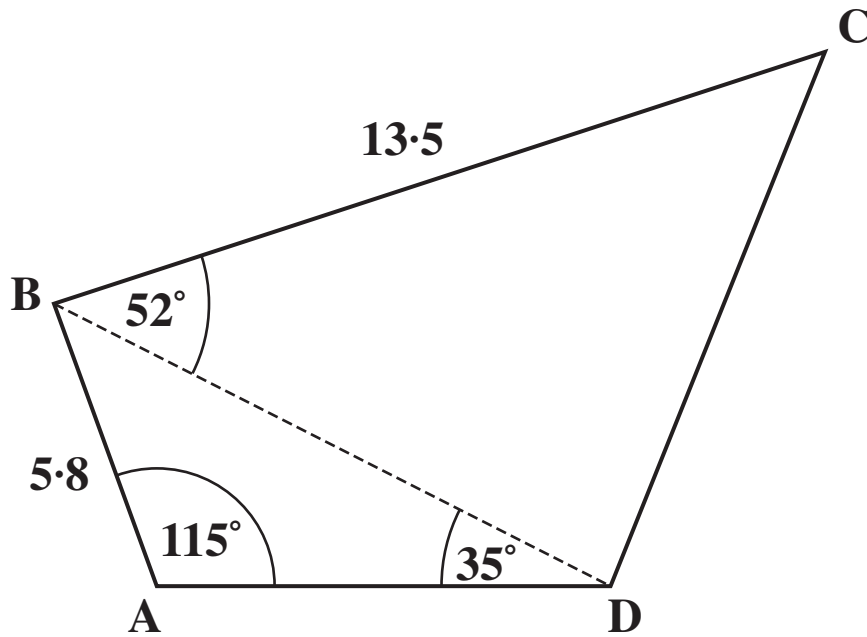
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- (b) Use the last moving average on the graph, and the table, to help you calculate the weight of hake landed in 2006. Show your method clearly.  
[2 marks]**

**(b) \_\_\_\_\_ tonnes**

- 9 ABCD is a quadrilateral.  
AB = 5.8 cm and BC = 13.5 cm.  
Angle BAD =  $115^\circ$ , angle DBC =  $52^\circ$  and angle BDA =  $35^\circ$ .



- (a) Calculate the length BD.  
[3 marks]

(a) \_\_\_\_\_ cm



**(b) Calculate the area of triangle BCD.  
[2 marks]**

**(b) \_\_\_\_\_ cm<sup>2</sup>**

**10 Solve algebraically.**

$$\frac{3}{x+2} + \frac{4}{2x-1} = 2$$

**Write your answers correct to 2 decimal places.**

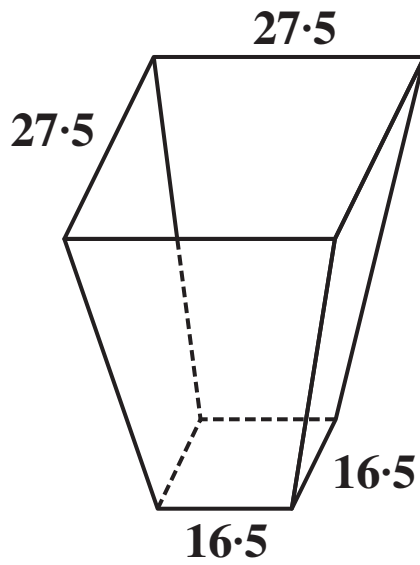
**[7 marks]**

\_\_\_\_\_ and \_\_\_\_\_

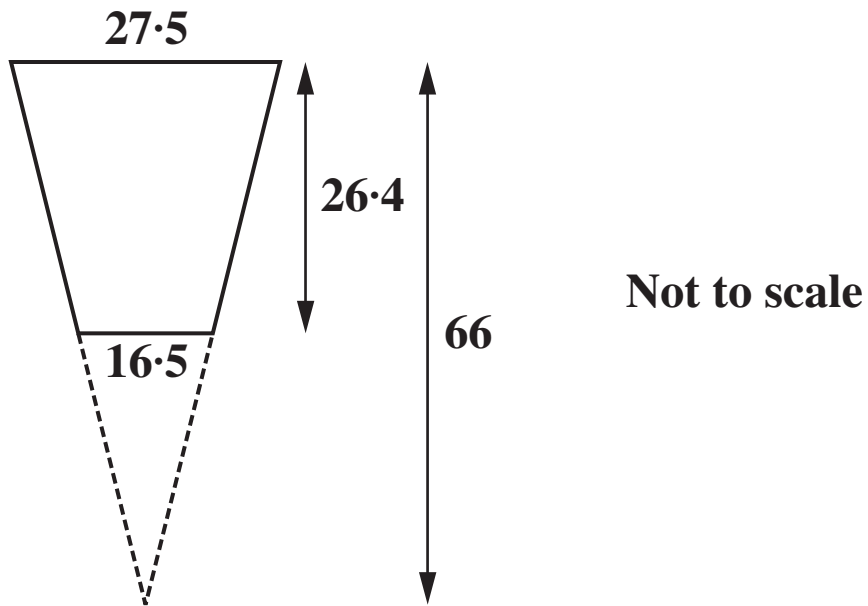
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**TURN OVER FOR QUESTION 11**

- 11 This diagram shows a planter with a square base and a square top.  
The sloping edges are all the same length.  
All measurements are in centimetres.**



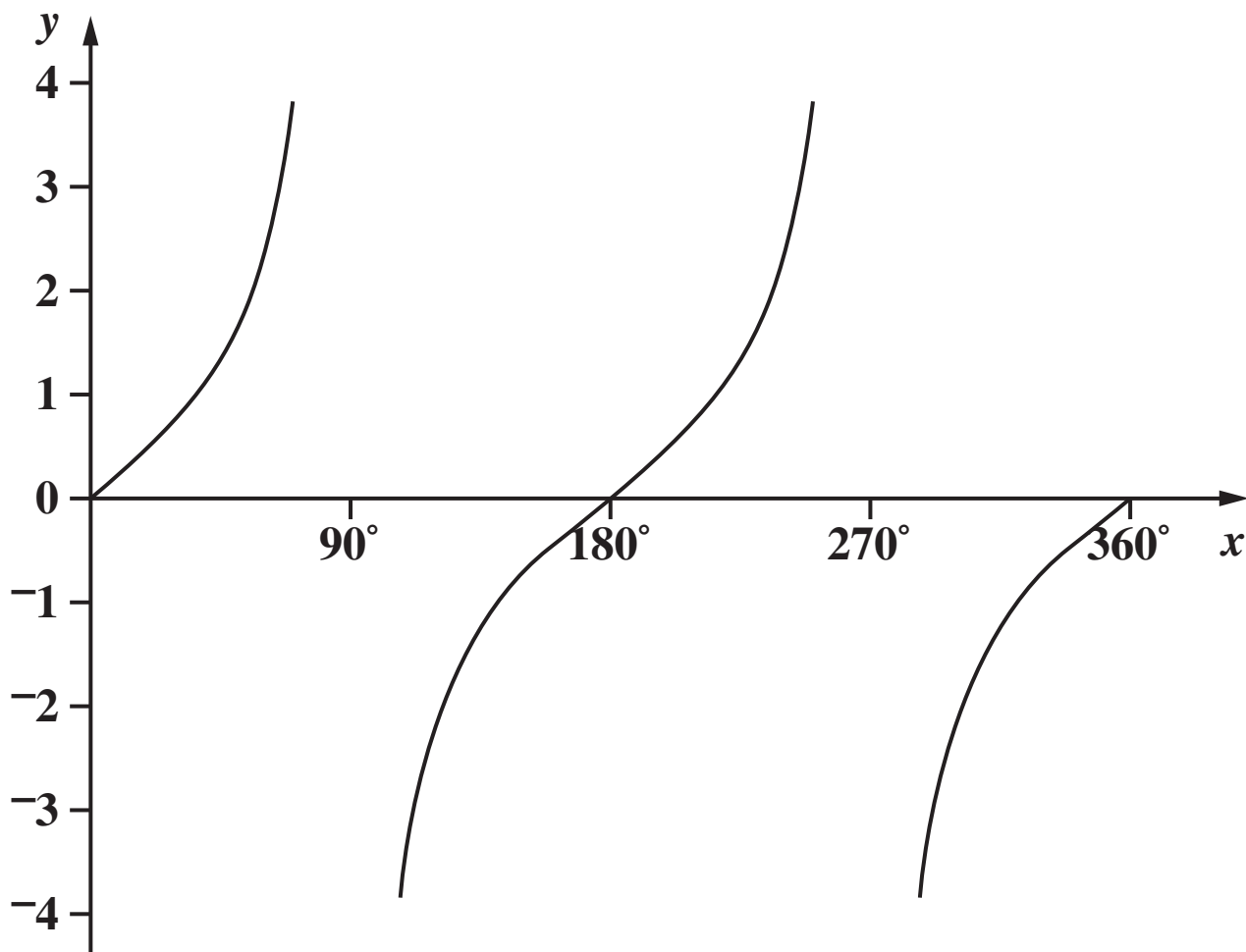
The diagram below shows a cross-section of the planter.



Calculate the volume of the planter.  
[4 marks]

\_\_\_\_\_  $\text{cm}^3$

**12 This is the graph of  $y = \tan x$  for  $0^\circ \leq x \leq 360^\circ$ .**



**Solve the equation  $\tan x = -1.5$  for  $0^\circ \leq x \leq 360^\circ$ .**

**Give your answers correct to one decimal place.**

**[2 marks]**

\_\_\_\_\_  $^\circ$  and \_\_\_\_\_  $^\circ$

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